# NORTHWEST RAPID TRANSIT

# PROJECT INTEGRATED MANAGEMENT SYSTEM

# CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

# FOR

# SYDNEY METRO NORTHWEST OPERATIONS, TRAINS and SYSTEMS PPP

| | |
|---|---|
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# Construction Air Quality Management Plan Approval Records

## Approval Record

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## Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar ( | ).

| DATE | REV | AMENDMENT DESCRIPTION | BY | INITIALS |
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| 03/03/2016 | 03.01 | Updated to include Norwest Pedestrian Link works and 33kV Underground Feeder Powerline works | Alex Bamford<br>Cameron Newling | AB<br>CN |
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# Certification Record

| DATE | REV | AMENDMENT DESCRIPTION | BY | INITIALS |
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# 1 Introduction

This *Construction Air Quality Management Plan* (CAQMP) outlines the construction environmental management arrangements by which Northwest Rapid Transit (NRT), in partnership with Transport for NSW (TfNSW), is delivering the Operations, Trains and Systems (OTS) Public Private Partnership (PPP) component of the Northwest Rail Link (NWRL) Project, now renamed as 'Sydney Metro Northwest'.

Note: In June 2015, TfNSW changed the project's name to Sydney Metro Northwest (from the North West Rail Link) to reflect its role in Sydney's new railway network. Any references to the North West Rail Link in this plan can be assumed to be referring to the Sydney Metro Northwest. Similarly, the Rapid Transit Rail Facility (RTRF) is now known as the Sydney Metro Trains Facility (SMTF).

## 1.1 OTS PPP

Sydney Metro is Australia's largest public transport project. Sydney Metro Northwest, formerly known as the North West Rail Link, is the first stage of Sydney's new fully-automated metro system and will open to customers in the first half of 2019.

Stage 2, Sydney Metro City & Southwest, will extend metro rail under Sydney Harbour, through the CBD and southwest to Bankstown.

The $8.3 billion Sydney Metro Northwest will deliver eight new railway stations and 4,000 commuter car parking spaces to Sydney's growing North West. Services will start with a train every four minutes in the peak. The project also includes the upgrade and conversion of five existing railway stations to metro standards.

The OTS contract is a 15-year PPP project – the largest in the history of New South Wales as well as the largest of the three delivery contracts for Sydney Metro Northwest.

Northwest Rapid Transit is delivering Sydney's new generation metro trains; building the new stations and car parks; installing tracks, signalling, mechanical and electrical systems; building and operating the RTRF at Tallawong Road; upgrading and converting the railway between Epping to Chatswood to rapid transit standards; and operating Sydney Metro Northwest – including all maintenance work.

## 1.2 Purpose and Application

This *Construction Air Quality Management Plan (CAQMP)* describes how NRT will manage Air Quality issues during Phase 1, ECRL Conversion, Phase 2, Norwest Pedestrian Link, 33kV Underground Feeder Powerline Works and Rouse Hill Temporary Bypass Powerline works of the delivery of the NWRL OTS contract.

Figure 1 below illustrates the delineation of the Phase 1, ECRL Conversion and Phase 2 of the OTS Works.

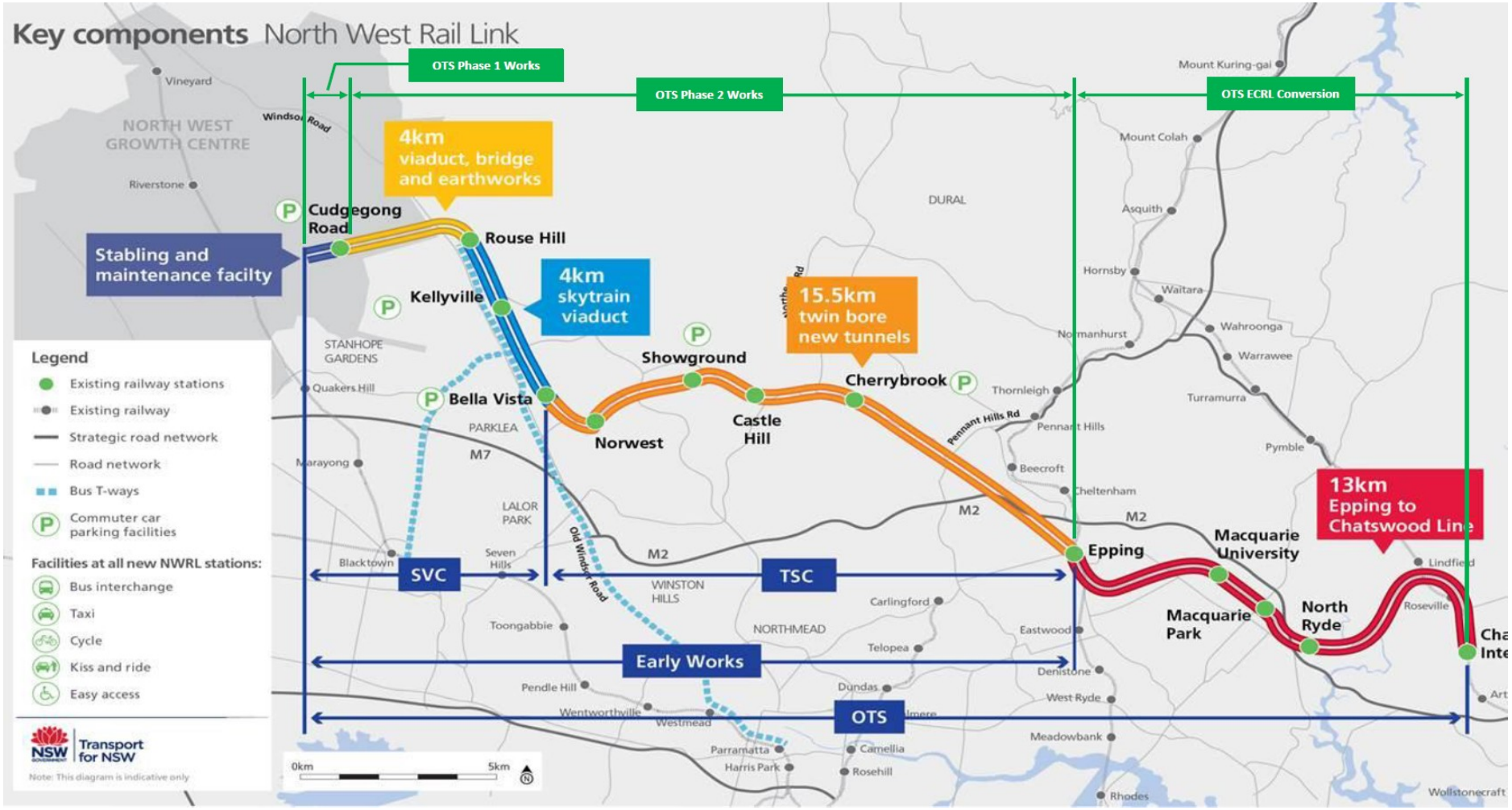


Figure 1 Schematic of NWRL OTS Phase 1, ECRL and Phase 2 Works

The NWRL OTS Phase 1 covers the works associated with the delivery of the RTRF and the Cudgegong Road Precinct Enabling Works – see Figure 2 below.


*Figure 2 Indicative NWRL OTS Phase 1 Site: RTRF and Cudgegong Road Station*

ECRL Conversion works refer to the conversion of the existing Epping to Chatswood Rail Line to rapid transit. See Figure 3 below.

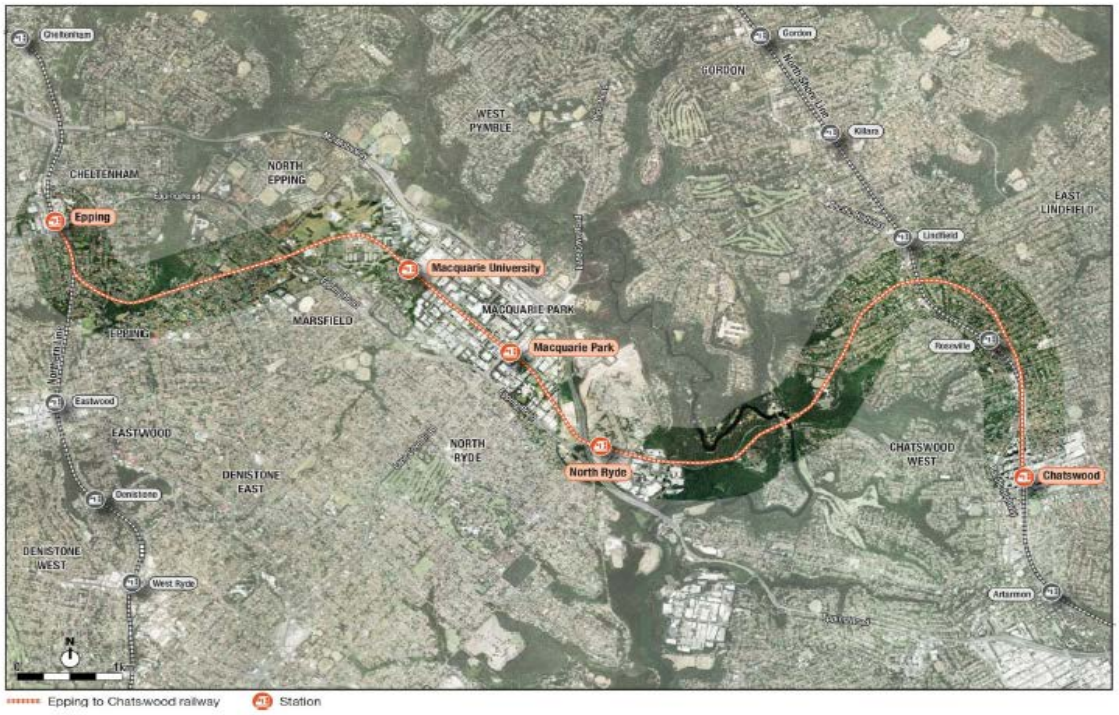


*Figure 3 Indicative ECRL Conversion Works Area*

Phase 2 Works refer to the construction of:

- New railway stations and precincts at Rouse Hill, Kellyville, Bella Vista, Norwest, Showground, Castle Hill and Cherrybrook (connecting to the Phase 1 works to the west and ECRL conversion works to the south-east. These works include the major civil construction work areas, including but not limited to the seven stations sites and six sites associated with the above rail corridor from Bella Vista to the Phase 1 work areas.
- Services facilities at Cheltenham and Epping
- Rail infrastructure and systems
- Infrastructure such as road works, pedestrian/cycle facilities, landscaping associated with construction of precincts and stations.

The scope of Phase 2 Works is illustrated in Figure 4 below.

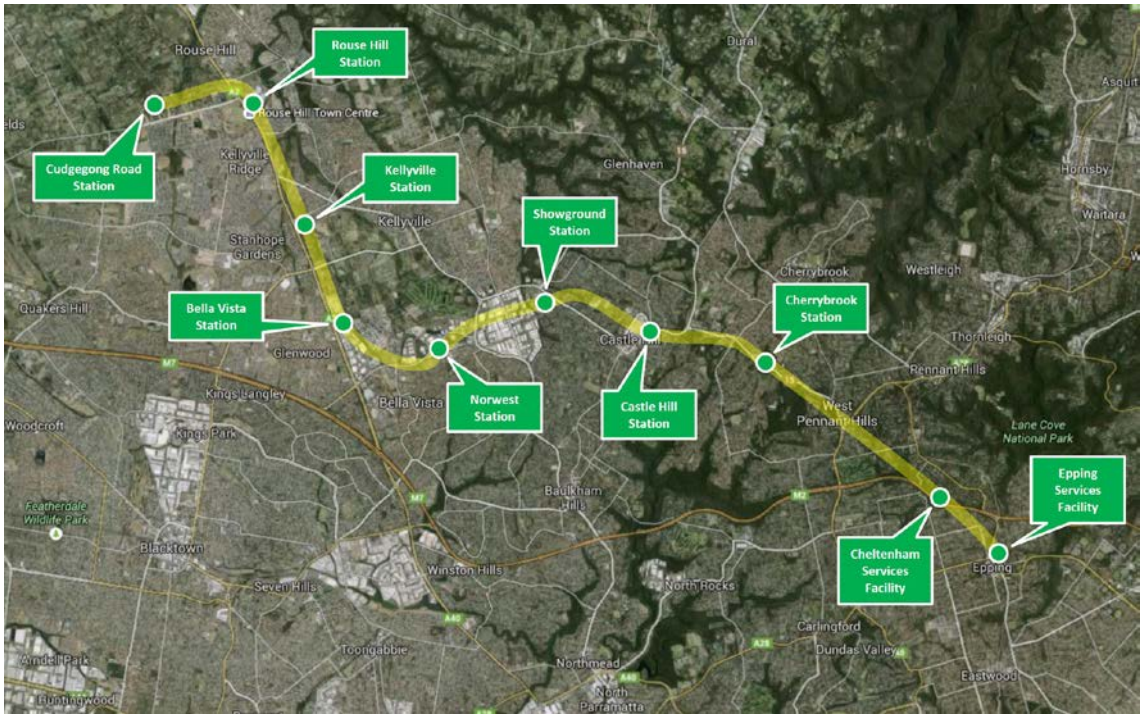


*Figure 4 Indicative NWRL OTS Phase 2 Works Areas*

Norwest Pedestrian Link works refer to the installation of an underground pedestrian link and second station entry on the northern side of Norwest Boulevard at Norwest Station. See Figure 5 below.

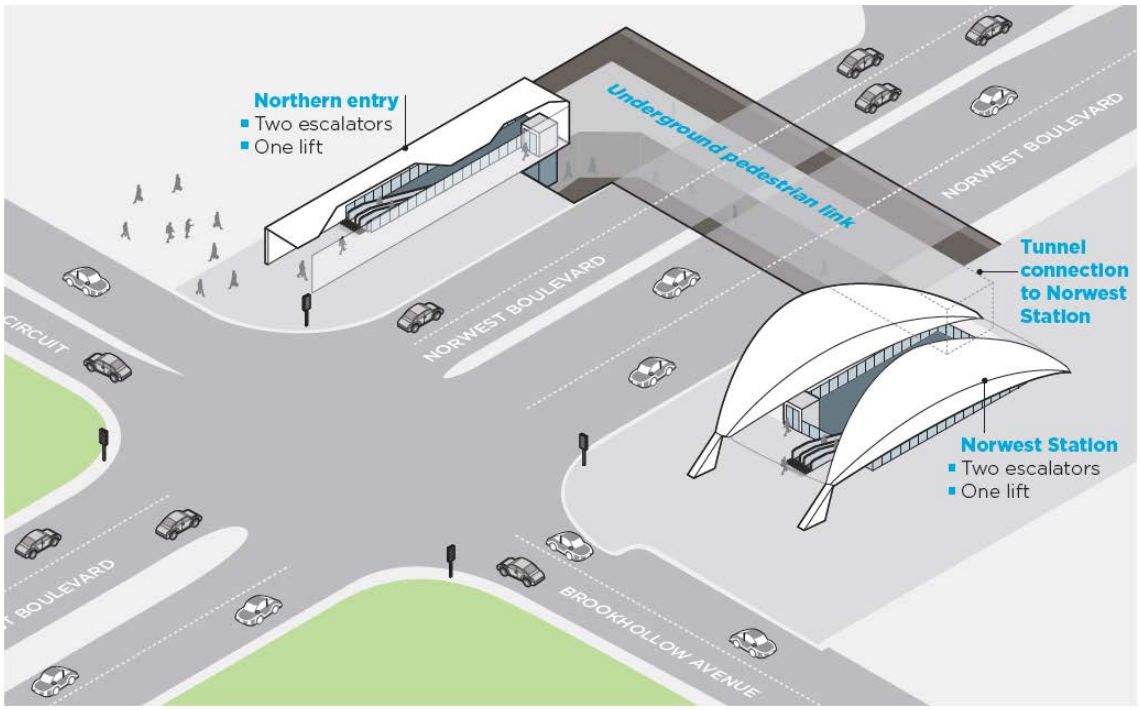


*Figure 5: Artist Impression of the Underground Pedestrian Link*

The 33kV Underground Feeder Powerline works refer to the building and maintaining a new five kilometre 33kV feeder power line between Ausgrid's Willoughby Subtransmission Substation and the TfNSW Chatswood North Traction Substation.

The proposal is required to provide dedicated, independent 33kV connection in order to meet the reliable supply of electricity requirements for this project. See Figure 6.

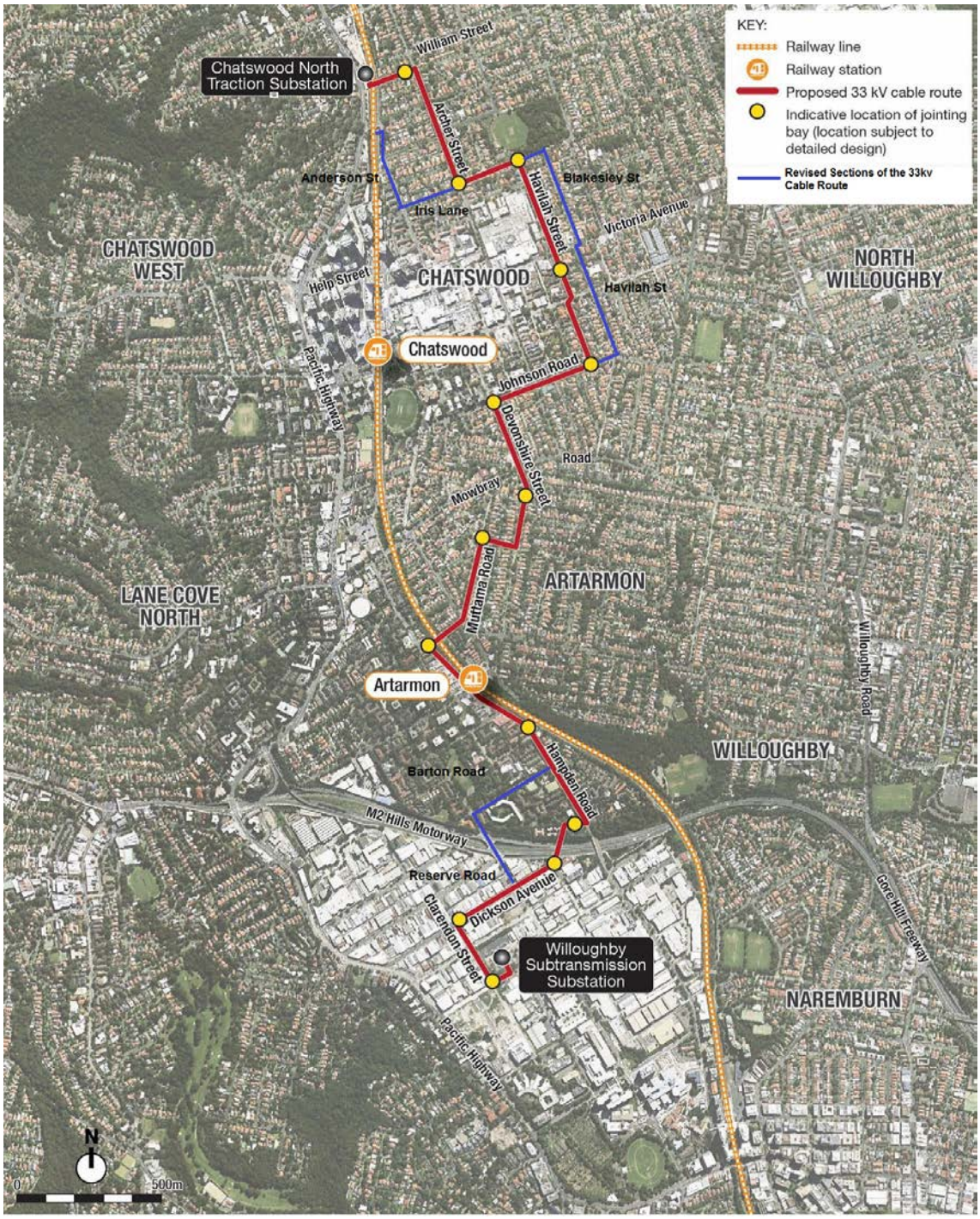


*Figure 6: Overview of the 33kV Underground Feeder Powerline Route*

The Rouse Temporary Bypass Powerline involves the construction of a temporary powerline from the southern side of the Sydney Metro Windsor Road Bridge crossing Schofields Road, running underground through Castlebrook Memorial Park transitioning back to overhead and crossing Windsor Road to the Rouse Hill traction substation located south of Sanctuary Drive. The purpose of the temporary powerline is to enable energisation and commissioning of the rail systems associated with the construction of Sydney Metro Northwest. See Figure 7 below.


*Figure 7 - Rouse Hill Temporary Bypass Power Work Area*

Specifically, this Sub Plan:

- Identifies potential sources of air pollutants of concern, in particular dust
- Set air quality management objectives
- Outlines mitigation measures to be implemented, including measures during adverse weather conditions (such as strong winds in dry weather)
- Develop a monitoring program to assess compliance with the identified objectives
- Document mechanisms for the monitoring, review and amendment of this plan.

This Plan is a Sub Plan of the Phase 1, ECRL Conversion, Phase 2, Norwest Pedestrian Link, 33kV Underground Feeder Powerline Works and Rouse Hill Temporary Bypass Powerline Construction Environmental Management Plan (CEMP). The relationship of this Plan to other NRT Plans is described in detail below in Section 1.4.

## 1.3 Scope and Objectives

This CAQMP addresses the following requirements:

- OTS Project Deed, Operations, Trains and Systems, Exhibit 1, Scope and Performance Requirements, Appendix 54 – Project Plan Requirements, Section 3.17
- Project Planning Approval – Rapid Transit Rail Facility (ref SSI-5931)
- Project Planning Approval (and Modification 20 May 14) – NWRL Stage 2 – Stations, Rail Infrastructure & Systems (SSI-5414) – applicable to NWRL OTS works, as defined in Staging Report
- ECRL Conversion Determination Report Conditions of Approval

- Applicable Revised Environmental Mitigation Measures from Project EISs:
  - Environmental Impact Statement 2 (EIS2) and Submissions Report (including – NWRL Stage 2 Stations, Rail Infrastructure and Systems (2012/3)
  - Environmental Impact Statement and Submissions Report – Tallawong Road, Rouse Hill Rapid Transit Rail Facility (RTRF, 2013)
- ECRL Conversion Review of Environmental Factors (Parsons Brinkerhoff, 10 October 2014) and Submissions Report (Parsons Brinkerhoff, 5 February 2015)
- Norwest Pedestrian Link Review of Environmental Factors (Parsons Brinkerhoff 4 June 2015) and Submissions Report (Parsons Brinkerhoff, 1 October 2015)
- Norwest Pedestrian Link Determination Report Conditions of Approval
- Willoughby to North Chatswood 33kV Underground Feeder Powerline Review of Environmental Factors (Parsons Brinkerhoff 20 October 2015) and Submissions Report (Parsons Brinkerhoff 9 March 2016)
- 33kV Underground Feeder Powerline Determination Report Conditions of Approval
- Rouse Hill Temporary Bypass Powerline Environmental Impact Assessment (EIA)
- NWRL Construction Environmental Management Framework (Rev 1.4)
- Applicable Legislative Obligations.

The Compliance Matrix in Annexure A details how the CAQMP complies with the requirements of the applicable CoAs requiring the Plan to be prepared and approved. Annexure A provides a comprehensive list of compliance requirements, environmental documents and the contract documents. Additional detail on compliance management is also contained in Section 2.2

NRT's air quality management objectives and targets for the delivery of the Phase 1, ECRL Conversion, Phase 2, Norwest Pedestrian Link and 33kV Underground Feeder Powerline Works of the OTS Contract are:

- Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable.
- Identify and control potential dust and air pollutant sources.

These objectives conform to TfNSW's objectives as described in the NWRL Construction Environmental Management Framework.

## 1.4 NRT Environmental Management System

In accordance with the OTS Project Deed, Exhibit 1, Scope and Performance Requirements, Section 5.2, NRT must implement and maintain an effective Management System, which addresses all its obligations under the Deed.

The Management Systems must seamlessly integrate all NRT's systems and processes, including those related to rail safety and rail accreditation quality, environmental, sustainability, health and safety and they must accommodate, coordinate and give effect to the Project Plans.

Details of NRT's Integrated Management System including the integrated relationship of the CAQMP with the other Project Plans and with the delivery Core Processes are

contained in the Project Management Plan. As improvements are made to the processes and systems, these will be reflected in updates to the relevant Project Plans. All elements of the Integrated Management System will reside on Aconex as controlled copies. An intranet will contain a front page to the Integrated Management System with links between documents, processes and forms utilising the Aconex search engine.

## 1.5 Approval Before Submission

The *CAQMP* and future updates are to be approved by NRT's CEO before being submitted to TfNSW.

## 1.6 Certification by Independent Certifier

This updated CAQMP and any future update is to be submitted, in accordance with the provisions of clause 8 of the Deed, to TfNSW for comment and to the OTS Independent Certifier for certification prior to its implementation by NRT.

## 1.7 Update and Ongoing Development

The *CAQMP* is incorporated as Appendix 76 of the Deed.

The *CAQMP* will be updated regularly in accordance with the requirements of the *Deed,* clause 8 and annually as required in *Exhibit 1, Scope and Performance Requirements, Appendix 54 – Project Plan Requirements, Table 1.*

NRT will undertake the ongoing development, amendment and updating of the *CAQMP* to ensure it remains consistent with Project priorities, risk management, client requirements and Project objectives, taking into account:

- The status and progress of NRT's activities
- Changes in the design, delivery and operations processes and conditions
- Lessons learnt during delivery and operations
- Changes in other related Project Plans
- Requirements and matters not covered by the existing Project Plans
- Changes to Plans resulting from any comments from the OTS Independent Certifier
- Changes to Project Plans as directed by TfNSW's Representative under the Deed.

## 1.8 Agency and Stakeholder Consultation

The CAQMP does not require any agency or stakeholder consultation.

# 2 Legal and Other Requirements

## 2.1 Relevant Legislation

The key legislation relevant to air quality management includes:

- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment Operations (Clean Air) Regulations 2010*

Refer to the Construction Environmental Management Plan for further details of legislative requirements.

The Environment Protection Licence (EPL) issued under the POEO Act for the OTS Works includes a number of conditions relevant to the management of air quality, which may be varied during construction. The POEO Act defines air pollution to mean the emission into the air of any air impurity, which includes smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists, odours and radioactive substances.

## 2.2 Compliance Requirements

All compliance requirements associated with this sub plan including the Conditions of Approval and Environmental Management and Mitigation Measures from the NWRL Project Environmental Impact Assessments and the ECRL REF that are pertinent to this sub plan are tracked and reported via the OTS compliance tracking program developed in accordance with CoA D5((a)-(h)).

## 2.3 Relevant Guidelines

Additional guidelines and standards relating to the management of air quality include:

- AS 3570 – Automotive Diesel Fuels
- Safe Work Australia 2011 – Workplace Exposure Standards for Airborne Contaminants
- National Environment Protection Council 1998 – Ambient Air: National Environment Protection Measure for Ambient Air Quality
- NSW EPA 2005 – Approved Method for Modelling and Assessment of Air Pollutants in NSW Roles and Responsibilities
- AS 2922 Ambient Air – Guide for the Siting of Sampling Units
- AS 3580.10.1-1991 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter - Gravimetric method
- AS 2724.3-1984 Ambient Air – Particulate Matter – Determination of Total Suspended Particulates (TSP) – High Volume Sampler Gravimetric Method
- National Environment Protection Measure (NEPM) (Diesel Vehicle Emissions)

- OEH's Smokey Vehicles Program under the NSW Protection of the Environment and Operations Act 1997and NSW Protection of the Environment and Operations Regulations 2010.

## 2.4 Key NRT Personnel

The roles and responsibilities of key NRT Personnel with respect to air quality are as follows:

*Table 1 Roles and Responsibilities*

| | |
|---|---|
| Project Director | Managing the delivery of the NRT Works including overseeing implementation of air quality management<br>Act as Contractor's Representative |
| Environment Manager (EM) | Oversee the implementation of all air quality management initiatives<br>Responsible for managing ongoing compliance with the CoA and environmental document requirements |
| Commercial Manager | Ensure that relevant air quality management requirements are considered in procuring materials and services |
| Construction Managers<br>Site Superintendent | Manage the delivery of the construction process, in relation to air quality management across all sites in conjunction with the Environment Manager<br>Manage the impacts of vehicle, plant and equipment emissions |
| Sustainability Manager | Track and report air quality elements against sustainability targets |
| Environment Coordinator | Manage the on-ground application of air quality management measures during construction (e.g. dust control)<br>Monitor and report on air quality management during construction |
| Project Engineer | Implement air quality management activities during construction works |
| Specialist Consultant | Specialist consultants will be engaged to undertake investigations, modelling, and specialised monitoring |

# 3 Existing Environment

## 3.1 Phase 1 Works

Table 2 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site. Information has been drawn from EIS 2 and the RTRF EIS.

*Table 2 Air Quality Environment – Phase 1*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **RTRF (RTRF EIS)**<br>**And**<br>**Cudgegong Road Precinct (EIS 2)** | Both the RTRF site and Cudgegong Road Precinct are highly modified from their original condition, and consists predominantly of areas of cleared semi-rural and/or agricultural land.<br>They consisted of small rural lots which have been utilised for activities such as low intensity grazing, small amounts of cropping and other associated semi-rural activities.<br>Most of the land is cleared of native vegetation; however, there are small moderate areas of native tree canopy, in some instances with a native or partly native groundcover and in others with predominantly introduced weeds and other species.<br>First ponds creek exists immediately to the west of the RTRF site. Second | The main sources of air pollution in the wider area surrounding the RTRF may include agricultural activities, emissions from local human activities such as motor vehicle exhaust and domestic wood heaters, urban activity and various other commercial and industrial activities.<br>Concentrations of $PM_{10}$ are nominally highest in the spring and summer months. This is attributed to the warmer weather leading to drier ground and elevating the amount of windblown dust, the occurrence of bushfires and also increased pollen levels.<br>Annual average $PM_{10}$ levels recorded at surrounding BOM monitoring sites during 2012 are below the criterion of 30µg/ $m^3$. The maximum recorded 24-hour average $PM_{10}$ concentrations are below the 50µg/$m^3$ criterion, with the exception of one monitor, where the criterion was exceeded on three occasions in August 2012. An | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed<br>• Exhaust emissions from the operation of construction vehicles and plant | Development in the immediate vicinity of the subject site includes a range of low-medium density housing, rural residential, agricultural and market garden uses.<br>Land to the south of Schofields Road is comprised of a mix of rural-residential properties and market gardens with single and double-storey dwellings.<br>Land to the east, is a mix of rural residential properties, market gardens and other agricultural uses.<br>Land to the west is comprised of predominately rural residential properties, market gardens and agricultural uses (such as poultry farming). The Lankarama Sri Lankan |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | Ponds creek exists to the South East of the Cudgegong Road Precinct. | investigation into the cause of these exceedances suggests a potential bushfire or back burning event in the area may have been the cause.<br><br>Annual average $PM_{2.5}$ levels recorded at this monitoring site are below the advisory reporting standard of 8µg/$m^3$ and the maximum 24-hour average levels were below 25µg/$m^3$ for all months except August. The elevated levels recorded in August coincide with the elevated $PM_{10}$ levels during the same period. | | Buddhist temple is located approximately 200 metres to the north of the site on the western side of Oak Street.<br><br>Land to the west of First Ponds Creek is currently sparsely developed with a small number of rural residential properties and market gardens accessible from Boundary Road, Gordon Road and Oak Street |

## 3.2 ECRL Conversion Works

Table 3 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site. Information has been drawn from the ECRL Conversion REF.

*Table 3 Air Quality Environment – ECRL*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **Epping to Chatswood Corridor** | Along the Epping to Chatswood railway corridor, the area has been developed predominantly for retail/ commercial purposes and residential areas with educational precincts. This may result in close interaction between local residents and other members of the general public and the proposed works. | These include, but are not limited to:<br>• Traffic emissions from the existing road networks (the greatest source of air pollution).<br>• Light commercial general residential sources (including domestic wood heaters).<br>• A search of the National Pollution Inventory database (NPI) at Epping and Chatswood was conducted to investigate for cumulative pollutants within the proposal's airshed.<br>For the 2012/2013 reporting period there were no individual facilities reporting along the proposed corridor of the Epping to Chatswood railway conversion works alignment. The primary contributors to air pollutant levels in the proposal are expected to be emissions from motor vehicles along arterial and local roads. Air quality can also be influenced by naturally occurring events such as bushfires and dust storms.<br>Ambient concentrations of pollutants along the Epping to Chatswood railway proposal corridor are expected to be primarily | Dust generation would be primarily be limited to construction activities as they progress along the work corridor and would be expected to increase where higher dust generating activities are undertaken. The activity specific nature of construction and the high level of control available enable particulate matter emissions to be effectively managed.<br>Emissions from vehicles are associated with the combustion of diesel fuel from vehicle movements and the operation of on-site plant and machinery. These sources would generate emissions of CO, $NO_x$, $SO_2$ and trace amounts of non-combustible hydrocarbons. The rates of emissions and potential impacts on surrounding area, depends on the number and power output of the combustion engines, the quality of the fuel | The existing land surrounding the proposal location comprises of urban area including:<br>• Residential properties.<br>• Commercial entities including: health facilities, recreation clubs, reserves, educational facilities including schools and museums.<br>Along the Epping to Chatswood railway corridor, where conversion works are proposed to occur, the area has been developed predominately for retail/commercial purposes and residential areas with educational precincts. This may result in close interaction between local residents, other members of the general public and conversion works. |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | | dependent on local and regional weather conditions and overall regional air quality. | used, the condition of the engines and the intensity of use.<br><br>Fugitive emissions are expected from fuel and chemicals where construction activities are occurring (e.g. liquid petroleum gas, diesel, lubricant oils, cleaning chemicals). These emissions are expected to be minor and readily dispersed within the construction compounds. Appropriate handling and storage of chemicals would ensure air quality impacts from these fugitive sources are minimal. | |

## 3.3 Phase 2 Works

Table 2 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site. Information has been drawn from EIS 2.

*Table 4 Air Quality Environment – Phase 2*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **Epping Services Facility** | The Epping Worksite is located along Beecroft Road within the established town centre of Epping, which is centred on Epping railway station. The area surrounding the Epping Worksite consists mainly of lower density dwellings, with some medium to high density residential development surrounding the town centre. A number of community facilities are located within close proximity to the Epping Worksite, including Essex Street Scout Hall, places of worship, and educational establishments.<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL. | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Epping Baptist Church<br>• Our Lady of Help Christians Primary School<br>• Essex Street Scout Hall<br>• Epping Uniting Church<br>• Arden Anglican School<br>• Surrounding commercial premises<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | | The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Cheltenham Services Facility** | The Cheltenham Worksite is located between Castle Howard Road (to the north) and the M2 Motorway (to the south). The footprint of the works will be located in an area of open space, including the netball courts at Cheltenham Oval and some vegetation associated with Beecroft Reserve. The area surrounding the Cheltenham Worksite consists of low density residential dwellings and areas of established vegetation, open space, and recreational facilities. There are a number of community facilities within the vicinity of the construction site, including Beecroft Nursing Home, Chesalon Care Beecroft, an aged care facility, Beecroft Reserve and Cheltenham Oval.<br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Users of Cheltenham Oval and Beecroft Reserve<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | | quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Cherrybrook Station** | The Cherrybrook Worksite is located on the corner of Castle Hill, Robert, and Franklin Roads within the Cherrybrook residential neighbourhood. The area surrounding the Cherrybrook Worksite consists mainly of low density dwellings (with some pockets of medium density housing), and an undulating topography (the worksite is on a ridge). A number of community facilities are located in close proximity to the construction site, including educational establishments, childcare centres, and an adult day care service.<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed<br>• Mud Tracking onto local roads.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Tangara School for Girls<br>• Inala Rudolf Steiner School<br>• Inala Dilkara Adult Day Service<br>• Kindalin Early Childhood Learning<br>• Playdays Pre-school<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | | the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Castle Hill Station** | The Castle Hill Worksite is located within the centre of the highly urbanised Castle Hill retail precinct, adjacent to the Castle Towers and Castle Mall shopping centres. The area surrounding the Castle Hill worksite is dominated by commercial and residential uses, consisting mainly of single detached dwellings on larger blocks, with some higher density residential buildings integrated throughout. The area is also a major thoroughfare for traffic and public transport services. Community facilities located within the surrounding area include Castle Hill Community Information Centre, Castle Hill Police Station, Castle Hill Senior Citizens Centre, Castle Hill Adventists Church, a number of educational facilities, and a childcare centre. | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed<br>• Mud Tracking onto local roads.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Castle Hills Senior Citizens Centre<br>• St Bernadette's School<br>• Commercial premises<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Showground Station** | The Showground Worksite is located on open space associated with the Castle Hill Showground complex and The Hills Shire Council Depot. The area surrounding the Showground Worksite consists of industrial, civic, residential, and community uses. To the west of the site is the Castle Hill light industrial land, an area which also contains indoor recreation facilities, hotels and motels, and a motor registry. The surrounding residential development consists of established low density low rise dwellings. Community facilities within the surrounding area include Castle Hill Showground, Fred Caterson Recreation Reserve, The Hills Shire Council Chambers and Depot, The Hills Centre for Performing Arts, a church, a pre-school, and a disability services facility. Castle Hill | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100). | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Castle Hill Showground<br>• Fred Caterson Recreational Reserve<br>• Life Church Castle Hill<br>• Gemhill Cottage disability services facility<br>• Carrington Road Pre-school<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | Showground is actively used by the community, most notably for the Annual Castle Hill Agricultural Show.<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Norwest Station** | Norwest is a major employment area, characterised by large commercial buildings, including extensive car parking and road networks. The footprint of construction works will be located on Norwest Boulevard. Community facilities located within the surrounding area include Hillsong Church, Convent of St Joseph, retail facilities (Bunnings and Norwest Marketown), restaurants, gyms, and some residential buildings (mostly single detached dwellings, with some medium density dwellings currently being developed).<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Hill Song Church<br>• Convent of St Joseph<br>• Commercial properties<br>• Surrounding residents |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | | affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Bella Vista** | The area to the east of the site is mostly low density residential with small pockets of medium density townhouse development. Areas to the north and north east are mostly rural. Some businesses and recently developed low density residential areas are located west of Old Windsor Road in the suburb of Glenwood. A T-Way bus station and associated car park are located on the corner of Old Windsor Road and Memorial Avenue. Community facilities in the surrounding area include churches, education establishments, and childcare facilities. | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity. | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed<br>• Mud Tracking onto local roads.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Surrounding residents (residential and rural properties)<br>• Emmanuel Baptist Church<br>• Anglican Technical College Western Sydney |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Kellyville Station** | Kellyville Station is located east of Old Windsor Road, south of Samantha Riley Drive, and just north of a large area of proposed greenfield development. The station is 34 km north west of the Sydney CBD.<br><br>Kellyville station is located close to Old Windsor Road and within The Hills Shire.<br><br>The landscape consists gently undulating topography, wide valleys and open views.<br><br>Kellyville station is adjacent to the Riley T-way Station on the south- | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms).<br><br>There are no notable heavy industrial or extractive operations or other operations | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant. | • Sensitive receivers in surrounding residential, commercial and rural areas.<br>• Key sensitive receivers include Castlebrook Lawn Cemetery and Crematorium and the community facilities within Rouse Hill Town Centre. |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | eastern corner of Old Windsor Road and Samantha Riley Drive.<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | | |
| **Rouse Hill Station** | The Rouse Hill Town Centre is 37 km north west of the Sydney CBD and located within The Hills Shire.<br><br>Rouse Hill Station is above the existing T-way, in between Windsor Road and Tempus Street, directly to the west of Rouse Hill Town Centre.<br><br>Area 20, within the north west growth sector, is located to the north and future development is also expected to the north east. Recent residential | Ambient air is regarded as typical of a primarily developed and developing residential and commercial area. The ambient air quality is largely affected by motor vehicle emissions, commercial businesses (for example service stations and smash repairs), domestic activities (including backyard burning, wood fired home heaters, lawn mowing) construction and event based emissions (such as bushfires, pollen or dust storms). | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation | • Sensitive receivers in surrounding residential, commercial and rural areas.<br>• Key sensitive receivers include Castlebrook Lawn Cemetery and Crematorium and the community facilities within Rouse Hill Town Centre. |

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| | development lies to the south of the station.<br><br>The worksite and surrounds are affected by the works associated with the Major Civil Construction (SSI-5100). | There are no notable heavy industrial or extractive operations or other operations that may generate significant amounts of air pollution in the immediate vicinity.<br><br>The current air quality conditions at the worksite and its surrounds would also be affected by the works associated with the Major Civil Construction (SSI-5100).<br><br>Some construction activities are underway or are due to commence within the next few years within the immediate vicinity of the rail alignment. This may decrease air quality due to dust and exhaust emissions independently from the NWRL.<br><br>The key features of the existing air quality environment in the study corridor are:<br><br>• Good air quality with concentrations of most pollutants well below the air quality goals except ozone and $PM_{10}$.<br><br>• Air quality within the study corridor is considered to be mainly influenced by regional air emissions. | of construction vehicles and plant. | |

## 3.4 Norwest Pedestrian Link Works

Table 5 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site. Information has been drawn from Norwest Pedestrian Link Review of Environmental Factors.

*Table 5 Air Quality Environment - Norwest Pedestrian Link*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **Norwest Pedestrian Link** | Norwest is a major employment area, characterised by large commercial buildings, including extensive car parking and road networks. The footprint of construction works will be located on Norwest Boulevard. Community facilities located within the surrounding area include Hillsong Church, Convent of St Joseph, retail facilities (Bunnings and Norwest Marketown), restaurants, gyms, and some residential buildings (mostly single detached dwellings, with some medium density dwellings currently being developed). | Ambient air is regarded as typical of a suburban environment. It is largely governed by regional factors such as seasonal variations, wind and temperature effects, varying pollutant sources, such as changing traffic volumes and industrial output, and natural sources such as bushfires.<br><br>The primary air pollutants in the area are traffic generated, as supplemented by key commercial activities such as service stations and garages. It is also affected to some degree by domestic activities (e.g. backyard burning). | Potential dust emissions may be generated from activities including:<br>• Earthworks<br>• Loading , transfer and transportation of spoil<br>• Exposed areas and stockpiles during periods of high wind speed.<br><br>Exhaust emissions would be generated from the operation of construction vehicles and plant.<br><br>Potential minor impact due to minor traffic delays as a result of implementing traffic management | • Hill Song Church and associated tertiary college<br>• Child Care Facility<br>• Residential Receivers<br>• Commercial Receivers |

## 3.5 33kV Underground Feeder Powerline Works

Table 6 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site. Information has been drawn from Willoughby to North Chatswood 33kV Underground Feeder Powerline Review of Environmental Factors.

*Table 6: Air Quality Environment – 33kV Underground Feeder Powerline Works*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **33kV Underground Feeder Powerline Alignment** | The route is located predominantly within a mixed commercial and residential precinct. | Ambient air quality of the surrounding environment is dominated by proximity to the surrounding local streets and the major transport corridor of the Pacific Highway and is fairly typical of an urban area.<br><br>The following sources have the potential to influence the local air shed to varying degrees:<br>• Traffic emissions from existing road networks (greatest source of air pollution)<br>• Light commercial and general residential sources<br>• Industrial activities occurring in the vicinity of the works, generally towards the southern end | Potential impacts to the local air quality would be limited to dust and emissions from vehicles, plant and equipment generated during the construction phase.<br><br>Dust generation would primarily limited to construction activities associated with trenching works. | • Residential Receivers<br>• Commercial Receivers<br>• Industrial Receivers |

## 3.6 Rouse Hill Temporary Bypass Powerline Works

Table 7 below provides a brief description of the NRT worksites and the surrounding areas, as well as the air quality contexts of each site.

*Table 7- Air Quality Environment - Rouse Hill Temporary Bypass Powerline*

| Construction Site | Existing Site Characteristics | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality | Potentially Sensitive Receivers |
|---|---|---|---|---|
| **Entire Alignment** | The route is located predominantly along Windsor Road and through the Castlebrook Memorial Park. | Ambient air quality of the surrounding environment is dominated by proximity to the surrounding local streets and the major transport corridor of Windsor Road and is fairly typical of an urban area.<br><br>The following sources have the potential to influence the local air shed to varying degrees:<br>• Traffic emissions from existing road networks (greatest source of air pollution)<br>• Commercial and general residential sources | Potential impacts to the local air quality would be limited to dust and emissions from vehicles, plant and equipment generated during the construction phase.<br><br>Dust generation would primarily limited to construction activities associated with trenching works. | • Residential Receivers<br>• Commercial Receivers<br>• Memorial Park |

# 4 Aspects and Impacts

The key aspects and potential impacts associated with the management of air quality during the delivery of Phase 1, ECRL Conversion, Phase 2, Norwest Pedestrian Link, 33kV Underground Feeder Powerline Works and Rouse Hill Temporary Bypass Powerline Works are listed in Table 8.

These identified risks have been taken into account in the development of the air quality management strategy and site-specific procedures for the works.

*Table 8 Summary of Overall Aspects and Potential Impacts*

| Aspects | Potential impacts/opportunities | Risk level (qualitative) |
|---|---|---|
| Worksite establishment | • Dust generation due to:<br>— Clearing, grubbing and stripping of vegetation<br>— Stockpiling of topsoil and mulched vegetation<br>— Demolition of buildings and associated infrastructure (asbestos is not addressed in this plan; refer to the Project WHS Management Plan)<br>— Wind erosion of exposed surfaces and stockpiles<br>— Wheel-generated dust from vehicular traffic on unsealed roads and work site access points<br>• Particulate matter ($PM_{10}$) generation due to:<br>— Operation of construction vehicles and plant<br>— Dust generating activities set out above | M |

| Aspects | Potential impacts/opportunities | Risk level (qualitative) |
|---|---|---|
| Earthworks | • Dust generation due to:<br>— Operation of excavators, front end loaders, bulldozers, dump trucks and other plant on exposed surfaces<br>— Loading/unloading trucks with spoil and aggregate<br>— Wind erosion of exposed surfaces and stockpiles<br>— Wheel-generated dust from vehicular traffic on unsealed roads and work site access points | M |
| Spoil handling, storage and transport | • Dust generation due to:<br>— Spoil stockpiles<br>— Spoil haulage (covered loads)<br>— Wheel-generated dust from heavy vehicle movements around construction sites and along haulage routes.<br>• Particulate matter ($PM_{10}$) generation due to:<br>— Operation of construction vehicles and plant<br>• Dust generating activities set out above | L |

| Aspects | Potential impacts/opportunities | Risk level (qualitative) |
|---|---|---|
| Plant and vehicle emissions movement | • Dust generation (wheel generated) from:<br>— Movement of construction vehicles over unsealed work areas<br>— Movement of construction equipment, generators and other plant over unsealed work areas<br>• Particulate matter ($PM_{10}$) generation due to:<br>— Operation of construction vehicles and plant<br>— Dust generating activities set out above | M |
| Track Removal | • Dust generation (wheel generated) from:<br>— Movement of construction vehicles over unsealed work areas<br>— Movement of construction equipment, generators and other plant over unsealed work areas<br>• Particulate matter ($PM_{10}$) generation due to:<br>— Operation of construction vehicles and plant<br>• Fumes from cutting of track | M |
| Equipment emissions within tunnel | • Particulate matter (PM10) generation due to:<br>— Operation of construction vehicles and plant within the tunnel | L |

# 5 Air Quality Management

The OTS works will be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site will be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, NRT will identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.

## 5.1 Air Quality and Dust Mitigation Measures

- Pre-construction:
  - Identify sensitive land uses/sensitive receivers in the SEP prior to works commencing.
  - Incorporate information on dust sources, impacts and mitigation measures and methods of managing emissions into Site Inductions, training and on-going Toolbox Talks.
  - Dust minimisation measures would be developed and implemented prior to commencement of construction

- Site establishment:
  - Waste or any other material must not be burnt on construction sites.
  - Temporary spoil stockpiles during site establishment are to be maintained, e.g. hosed down or covered.
  - Wind breaks, which may include site hoardings, may be constructed where construction works are in close proximity to sensitive receivers (where feasible and reasonable).

- Demolition:
  - Water suppression to be used during demolition as required.
  - The insides of buildings to be stripped where feasible and reasonable, before demolition.
  - Debris screens or sheeting would be used to screen buildings, where dust-producing activities are taking place.

- General construction:
  - Undertake on-going monitoring for dust (e.g. site inspections) to assess the effectiveness of mitigation measures).
  - A sweeper will be used to clean dirt tracked on hardstand, pavements, or roads.
  - Water sprays and/or water carts to be used as required for dampening exposed surfaces to control dust generation.
  - Burning or incineration is not permitted at any of the OTS Worksites.

- Silt accumulated in sediment control devices (e.g. silt fences and spoon drains) to be removed on a regular basis to prevent dust generation.
- Dust suppression measures, such as water lines, will be used if concrete/rock cutting is required.
- Enclosed rubble chutes and conveyors would be used where feasible and reasonable. Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment would be minimised and/or water used to suppress dust emissions from such equipment.
- Cutting, grinding or sawing equipment must only be used in conjunction with suitable dust suppression techniques, such as water sprays or local extraction
- Dust generating activities would be assessed during periods of strong winds and rescheduled, where required.
- Exhaust systems of construction plant, vehicles, and machinery to be maintained to minimise exhaust emissions to the atmosphere. All equipment and vehicles are to be regularly maintained and records kept of maintenance.
- Engines will be switched off when vehicles and plant are not in use, to minimise idling, and refuelling areas will be away from areas of public access and sensitive receivers.
- Construction plant and equipment will be well maintained and regularly serviced so that vehicular emissions remain within relevant air quality guidelines and standards.
- Plant must be well maintained and serviced in accordance with manufacturers' recommendations.
- Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable.
- Monitoring emissions of plant and construction vehicles to ensure they have appropriate emissions controls and are maintained correct
- Haul routes and plant (including generators) to be sited away from sensitive receivers, such as dwellings and schools, where feasible and reasonable.
- Workers will be encouraged to use public transport, and consider other modes of transport such as car-pooling (refer to Construction Traffic Management Plan and Green Travel Plan)
- Precautions would be implemented to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils.
- Tanks to be fitted with a conservation vent (to prevent air inflow and vapour escape until a pre-set vacuum or pressure develops).
- Strategies in place to reduce usage of chemical and fuels in additional to using alternative fuel technologies as recommended in the NSW Action for Air (NSW EPA 2009). Particular focus should be on those products with the potential to release high levels of air toxics.

- Excavation and earthworks:
  - Working face and areas of open excavation to be kept to a minimum, where feasible and reasonable
  - Water suppression to be used for active earthwork areas, stockpiles, gravel roads to reduce wind-blown dust emissions.

- The amount of excavated material stored on site is to be minimised.
- All vehicles carrying loose or potentially dusty material to and/or from the site must be covered.
- Vehicular and foot traffic would be restricted to designated areas.
- All new off-road construction equipment meets, at minimum, the United States Environmental Protection Agency Tier 2 emission standards for non-road diesel engines.

- Spoil handling, storage and transport:
  - Site access roads will be stabilised and rumble grids and wheel washers used where appropriate, to minimise tracking of dirt.
  - Vehicles hauling spoil to stay on the designated roads and access tracks
  - Trucks carrying spoil onto or off site are to be covered. Tailgates, under-rigs, wheels and towing apparatus of all trucks to be checked to ensure they are clean and secure, prior to leaving the worksite
  - Stockpiles will be located away from sensitive receivers, where feasible and reasonable, and protected from the elements through barriers, covering, or establishing a cover crop.
  - Unsealed haul roads must be regularly damped down with fixed or mobile sprinkler systems.
  - Appropriate site speed limits will be imposed and signed on haul routes.
  - Wheel-wash facilities or rumble grids to be provided and used near site exit points, and a street-cleaning regime would be implemented to remove any dirt tracked onto roads.
  - Longer term and/or heavily used haul roads to generally be sealed. The criteria for sealing haul roads would be defined during detailed construction planning. Sealed haul roads would be regularly cleaned.
  - All on-road trucks to comply with the emission standards.

- Asbestos removal:
  - A Hazmat report would be carried out on the remaining buildings on the site to identify if any asbestos is present
  - Asbestos handling and management would be in accordance with:
    - NSW Occupational Health & Safety Act 2000.
    - NSW Occupational Health & Safety Regulation 2001.
    - Code of Practice for the Safe Removal of Asbestos 2nd edition (NOHSC, 2005).
    - Code of Practice for the Management and Control of Asbestos in Workplaces
    - (NOHSC, 2005).
    - NSW Protection of the Environment Operations (Waste) Regulation 2005: ‘Section 42 Special Requirements Relating to Asbestos Waste’.
    - AS2601:1991 Demolition of Structures.

  - Any asbestos found would be managed under a site specific Asbestos Removal Control Plan prepared by a licenced asbestos removal contractor.
  - Air monitoring would be carried out during removal works.
  - Dust suppression would be used to minimise the generation of airborne asbestos fibres.
  - Any asbestos material stockpiled on site would be wetted and down and covered.

- Extreme weather conditions:
  - Reprogramming of dust generating activities during works is to occur during periods when control of dust cannot be achieved to reduce nuisance to neighbouring properties.
  - Dust generating activities would be assessed during periods of strong winds and rescheduled where required.

- Complaints:
  - Dust complaints will be handled by the Stakeholder and Community Relations Manager and the Project Environment Manager, in accordance with the complaints handling process in the Community Liaison Implementation Plan.

- Shutdown periods:
  - When site is to be closed for a period of longer than two days, a site inspection will be carried out to identify any additional measures be put in place to ensure the site is stable.

- Staging and rehabilitation:
  - Where reasonable and feasible, construction activities would be staged to minimise areas of exposed earth.
  - Landscaping would be completed progressively, where reasonable feasible, dependent on the:
    - Status of landscaping design package.
    - Availability of plant species.
    - Program of works to ensure newly landscaped areas would not be impacted by continuing construction activities.

## 5.2 Air Quality Inspection and Monitoring Program

### 5.2.1 Monitoring Dust Generating Activities

Monitoring the impact of dust generating activities will be undertaken by the Site Supervisor, Site and Project Engineers, and the Environmental Coordinators on a regular periodic basis. Monitoring will be conducted through visual inspection of the onsite activities to ensure that excessive amounts of dust is not generated nor impacting receivers in close proximity to the worksites. The visual inspections will target:

- Checking stockpiles have appropriate controls to reduce dust
- Ensuring movement of spoil is being undertaken with the appropriate controls
- Ensuring haul roads are being wet down or are not producing dust
- Ensuring truck and vehicle movements are not producing excessive amounts of mud or dust
- Inspection of public roads for tracked dust or mud
- Regular visual monitoring of dust generation from work zone
- Monitoring of works such as saw-cutting, grinding, drilling and ensuring appropriate controls are being applied.

If dust is being produced and is leaving site, the works generating this will be suspended or controlled/modified so that no further dust is leaving site. An Inclement Weather Inspection Form must be completed in the event of any visible dust leaving site.

### 5.2.2 Monitoring Plant and Vehicle Emissions

Prior to being used on site plant and vehicles will undergo a **Plant Induction** performed by the Safety team. This induction will include a mechanical inspection to ensure that the plant or vehicle is in good working order, and the appropriate emission controls are in place.

Site supervisors, Site Engineers and Environmental Coordinators will undertake visual inspections of the construction activities to ensure that plant and vehicles are not producing excessive smoke or emissions and no unnecessary idling of plant or vehicles.

### 5.2.3 Meteorological Monitoring

Monitoring local meteorological conditions provides information on when onsite construction activities and any exposed areas may be at a higher risk for dust to become airborne and mobilised offsite. The information would then be used to inform the required controls and management as per Section 5.1

In monitoring local meteorological conditions measures a weather station will be installed on the SMTF site, as well as obtaining data from the nearest Bureau of Meteorology Weather Station. The following parameters will be monitored

- Wind Speed and direction
- Temperature
- Rainfall
- Humidity.

# 6 Complaints Handling and Incident Response

The Community Liaison Implementation Plan defines the policies, protocols, procedures and processes for identifying and managing community specific issues arising from design and construction activities, including complaints relating to environmental issues.

The Environment Manager will assist the Communications and Stakeholder Manager in responding to environmental complaints and maintain a register of Environmental Complaints for reporting to the EPA and other relevant agencies.

In the event a complaint is received regarding air quality, the Environment Manager will conduct an investigation to determine the potential parameters of influence that could have led to the complaint and potential exceedance.

The investigation will examine amongst other aspects:

- The quantity of exposed areas, which may potentially generate dust
- The nature and volume of the materials being moved
- Whether there is potential to revegetate or cover these areas
- Whether there were any identified days of excessive high wind during the monitoring period
- The number of water-trucks operating within the area during the monitoring period
- An examination of construction activities conducted during this period
- If road sweeping was sufficient
- The potential for contaminated material to become air borne
- Recorded weather conditions reports for the day.

Corrective actions will be managed in accordance with the CEMP.

Incident management and classification will be managed in accordance with the CEMP.

# 7 Training, Reporting and Review

## 7.1 Training

All personnel working on the site will undertake a site induction, which will provide initial training on various environmental aspects including Air Quality.

Additional training will be provided to the workforce during toolbox talk which will explain the aspects of dust monitoring in further detail. The tool box will be presented when seasonal weather increases the risk of poor air quality.

## 7.2 Compliance and Reporting

Monitoring and inspection will be recorded on the Weekly Environmental Inspection Form. The weekly environmental inspection form will be used as an instrument to record the weather conditions, the construction activities and comments about air-quality impacts.

The Environmental Representative will inspect the site regularly and will inspect any air quality control measures.

Typical Compliance records would consist of:

- Inspections undertaken in relation to air quality management measures
- Environmental Inspection forms
- Inclement Weather Inspection Forms
- Toolbox training records
- Plant Induction forms
- Records of any meteorological condition monitoring
- Records of any management measures implemented as a result of adverse, windy weather conditions.
- Records of air quality and dust inspections undertaken.

Results and outcomes of inspections, monitoring and auditing will be reported internally on a monthly basis. Six-monthly construction compliance reports will be prepared to report on compliance with the Project Approval.

## 7.3 Review and Improvement

A non-conformance is an action or omission that does not conform to the requirements of this Plan or any legal and other requirements. Any member of the project team or the Environmental Representative can identify a non-conformance or opportunity for improvement. The CEMP identifies the process for identifying, reporting, recoding and reviewing non-conformances. This will ensure continual improvement.

The processes described in the CEMP may result in the need to update or revise this Plan. This will occur as needed. This Plan will be audited within six months of the commencement of construction and thereafter as per the CEMP. The Plan shall be reviewed and updated based on the findings of the audit

# Annexure A  Air Quality Management Measures and Compliance Matrix

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| **Project Approval  - Specific Management Plan Requirements** | | | | | |
| 1. | The SSI shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease. | During Construction | RTRF Approval SSI-5931 CoA E1<br>OTS Approval SSI-5414 CoA E9 | Environment Manager | Section 5.2 |
| 2. | A Construction Air Quality Management Plan to detail how construction impacts on air quality will be minimised and managed. The Plan shall include, but not necessarily be limited to: | Before Construction | RTRF Approval SSI-5931 CoA E29(g) | Environment Manager | This document |
| 3. | the identification of potential sources  of dust | Before Construction | RTRF Approval SSI-5931 CoA E29(g)i | Environment Manager | Section 4.0 |
| 4. | dust management objectives; | Before Construction | RTRF Approval SSI-5931 CoA E29(g)ii | Environment Manager | Section 1.3 |
| 5. | mitigation measures to be implemented, including measures during adverse weather conditions (such as strong winds in dry weather); | Before Construction | RTRF Approval SSI-5931 CoA E29(g)ii | Environment Manager | Section 5.2 |
| 6. | a monitoring program to assess compliance with the identified objectives; | Before Construction | RTRF Approval SSI-5931 CoA E29(g)iv | Environment Manager | Section 5.3 |
| 7. | mechanisms for the monitoring, review and amendment of this plan. | Before Construction | RTRF Approval SSI-5931 CoA E29(g)v | Environment Manager | Section 1.7 |
| 8. | A Construction Air Quality Management Plan to detail how construction impacts on air quality will be minimised and managed. The Plan shall include, but not necessarily be limited to: | Before Construction | OTS Approval SSI-5414 CoA E35(g) | Environment Manager | This document |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 9. | the identification of potential sources of air pollutants of concern, in particular $PM_{10}$ | Before Construction | OTS Approval SSI-5414 CoA E35(g)i | Environment Manager | Section 4.0 |
| 10. | Air quality management objectives; | Before Construction | OTS Approval SSI-5414 CoA E35(g)ii | Environment Manager | Section 1.3 |
| 11. | mitigation measures to be implemented, including measures during adverse weather conditions (such as strong winds in dry weather); | Before Construction | OTS Approval SSI-5414 CoA E35(g)iii | Environment Manager | Section 5.2 |
| 12. | a monitoring program to assess compliance with the identified objectives; | Before Construction | OTS Approval SSI-5414 CoA E35(g)iv | Environment Manager | Section 5.3 |
| 13. | mechanisms for the monitoring, review and amendment of this plan. | Before Construction | OTS Approval SSI-5414 CoA E35(g)v | Environment Manager | Section 1.7 |
| **Project Approval – Specific Requirements** | | | | | |
| 14. | The SSI shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease. | During Construction | RTRF Approval SSI-5931 CoA E1<br>OTS Approval SSI-5414 CoA E38 | Environment Manager | Section 5 |
| **EIS Revised Environmental Mitigation Measures** | | | | | |
| 15. | Working face and areas of open excavation would be kept to a minimum, where feasible and reasonable. | During Construction | RTRF EIS REMM SSI-5931 A1<br>EIS 2 REMM SSI-5414 A1 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 16. | Water suppression would be used for active earthwork areas, stockpiles, gravel roads and loads of soil being transported to reduce wind-blown dust emissions. | During Construction | RTRF EIS REMM SSI-5931 A2<br>EIS 2 REMM SSI-5414 A2 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 17. | Waste or any other material would not be burnt on construction sites. | During Construction | EIS 2 REMM SSI-5414 A3 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 18. | The amount of excavated material held on site would be minimised. | During Construction | RTRF EIS REMM SSI-5931 A4<br>EIS 2 REMM SSI-5414 A4 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 19. | Areas of exposed earth would be minimised by staging construction activities and progressively landscaping and vegetating completed areas as the construction activities proceed, where feasible and reasonable. | During Construction | RTRF EIS REMM SSI-5931 A5<br>EIS 2 REMM SSI-5414 A5 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 20. | Enclosed rubble chutes and conveyors would be used where feasible and reasonable. Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment would be minimised and/or water used to suppress dust emissions from such equipment. | During Construction | RTRF EIS REMM SSI-5931 A6<br>EIS 2 REMM SSI-5414 A6 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 21. | Cutting, grinding or sawing equipment would only be used in conjunction with suitable dust suppression techniques such as water sprays or local extraction. | During Construction | RTRF EIS REMM SSI-5931 A7<br>EIS 2 REMM SSI-5414 A8 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 22. | Dust generating activities would be assessed during periods of strong winds and rescheduled, where required. | During Construction | RTRF EIS REMM SSI-5931 A9<br>EIS 2 REMM SSI-5414 A8 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 23. | Wind breaks, which may include site hoardings, would be constructed, where construction works are in close proximity to sensitive receptors and where feasible and reasonable. | During Construction | EIS 2 REMM SSI-5414 A9 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 24. | All vehicles carrying loose or potentially dusty material to and/or from the site would be covered. | During Construction | RTRF EIS REMM SSI-5931 A10<br>EIS 2 REMM SSI-5414 A10 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 25. | Stockpiles would be located away from sensitive receivers, where feasible and reasonable, and protected from the elements through barriers, covering or establishing a cover crop. | During Construction | RTRF EIS REMM SSI-5931 A11<br>EIS 2 REMM SSI-5414 A11 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 26. | Longer term and/or heavily used haul roads would generally be sealed. The criteria for sealing haul roads would be defined during detailed construction planning. Sealed haul roads would be regularly cleaned. | During Construction | RTRF EIS REMM SSI-5931 A12<br>EIS 2 REMM SSI-5414 A12 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 27. | Unsealed haul roads would be regularly damped down with fixed or mobile sprinkler systems. | During Construction | RTRF EIS REMM SSI-5931 A13<br>EIS 2 REMM SSI-5414 A13 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 28. | Vehicular and foot traffic would be restricted to designated areas. | During Construction | RTRF EIS REMM SSI-5931 A14<br>EIS 2 REMM SSI-5414 A14 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 29. | Appropriate site speed limits would be imposed and signed on haul routes. | During Construction | RTRF EIS REMM SSI-5931 A15<br>EIS 2 REMM SSI-5414 A15 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 30. | Wheel-wash facilities or rumble grids would be provided and used near site exit points, and a street cleaning regime would be implemented to remove any dirt tracked onto roads. | During Construction | RTRF EIS REMM SSI-5931 A16<br>EIS 2 REMM SSI-5414 A16 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 31. | Water suppression would be used during demolition as required. | During Construction | RTRF EIS REMM SSI-5931 A17<br>EIS 2 REMM SSI-5414 A17 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 32. | The insides of buildings would be stripped where feasible and reasonable, before demolition. | During Construction | RTRF EIS REMM SSI-5931 A18<br>EIS 2 REMM SSI-5414 A18 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 33. | Biological debris (such as bird nests and droppings) would be bagged and removed or damped down prior to building demolition. | During Construction | RTRF EIS REMM SSI-5931 A19 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 34. | Debris screens or sheeting would be used to screen buildings, where dust-producing activities are taking place | During Construction | RTRF EIS REMM SSI-5931 A20 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 35. | An asbestos survey would be undertaken of buildings that would be demolished as part of the NWRL construction works. The survey would be conducted by a suitably qualified person. | Before Construction | RTRF EIS REMM SSI-5931 A21 | WHS Manager<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 36. | Asbestos handling and management would be in accordance with:<br>- NSW Occupational Health & Safety Act 2000.<br>- NSW Occupational Health & Safety Regulation 2001.<br>- Code of Practice for the Safe Removal of Asbestos 2nd edition (NOHSC, 2005).<br>- Code of Practice for the Management and Control of Asbestos in Workplaces<br>(NOHSC, 2005).<br>- NSW Protection of the Environment Operations (Waste) Regulation 2005: 'Section 42 Special Requirements Relating to Asbestos Waste'.<br>- AS2601:1991 Demolition of Structures. | During Construction | RTRF EIS REMM SSI-5931 A22 | WHS Manager<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 37. | Engines of on-site vehicles and plant would be switched off if left idling for extended periods of time. | During Construction | RTRF EIS REMM SSI-5931 A23<br>EIS 2 REMM SSI-5414 A23 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 38. | Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable. | During Construction | RTRF EIS REMM SSI-5931 A24<br>EIS 2 REMM SSI-5414 A24 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 39. | Plant would be well maintained and serviced in accordance with manufacturers' recommendations. | During Construction | RTRF EIS REMM SSI-5931 A25<br>EIS 2 REMM SSI-5414 A25 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 40. | Haul routes and plant (including generators) would be sited away from sensitive receivers, such as dwellings and schools, where feasible and reasonable | During Construction | RTRF EIS REMM SSI-5931 A26<br>EIS 2 REMM SSI-5414 A26 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| 41. | Vehicle emissions would be minimised through methods such as using alternative modes of transport, such as encouraging car-pooling by construction workers, and maximising vehicle utilisation by ensuring full loading and efficient routing. | During Construction | RTRF EIS REMM SSI-5931 A27<br>EIS 2 REMM SSI-5414 A27 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 42. | Precautions would be implemented to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils | During Construction | RTRF EIS REMM SSI-5931 A28<br>EIS 2 REMM SSI-5414 A28 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |
| **North West Rail Link Construction Environmental Management Framework** | | | | | |
| 43. | The following air quality management objectives will apply to the construction of the project:<br>i. Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable.<br>ii. Identify and control potential dust and air pollutant sources. | During Construction | NWRL CEMP Framework Section 16.1 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 1.3 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 44. | "NWRL Principal Contractors will develop and implement an Air Quality Management Plan which will include, as a minimum:<br>i. The air quality mitigation measures as detailed in the environmental approval documentation.<br>ii. The requirements of any applicable EPL conditions.<br>iii. Site plans or maps indicating locations of sensitive receivers and key air quality / dust controls.<br>iv. The responsibilities of key project personnel with respect to the implementation of the plan.<br>v. Air quality and dust monitoring requirements.<br>vi. Compliance record generation and management." | Before Construction | NWRL CEMP Framework Section 16.2 a | Environment Manager | This table and Section 5<br>Refer to SEP Section 2.4<br>Section 5.3<br>Section 7 |
| 45. | Air quality and dust monitoring on the NWRL will involve the following as a minimum:<br>i. Meteorological conditions will be monitored and appropriate responses organised and undertaken periodically by the Principal Contractor.<br>ii. Regular visual monitoring of dust generation from work zones.<br>iii. Monitoring emissions from plant and construction vehicles to ensure they have appropriate emission controls and are maintained correctly. | During Construction | NWRL CEMP Framework Section 16.2 b | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.3 |
| 46. | The following compliance records will be kept by the Principal Contractor:<br>i. Records of any meteorological condition monitoring.<br>ii. Records of any management measures implemented as a result of adverse, windy weather conditions.<br>iii. Records of air quality and dust inspections undertaken. | During Construction | NWRL CEMP Framework Section 16.2 c | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.3 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 47. | Examples of air quality mitigation measures include:<br>- Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes.<br>- Water suppression will be used for active earthwork areas, stockpiles, unsurfaced haul roads and loads of soil being transported to reduce wind-blown dust emissions.<br>- Wheel-wash facilities or rumble grids will be provided and used near the site exit points, as appropriate.<br>- Dust extraction and filtration systems will be installed for tunnel excavation works and deep excavation with limited surface exposure | During Construction | NWRL CEMP Framework Section 16.3 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.2 |
| **EPL Requirements** | | | | | |
| 48. | Dust<br>The licensee must minimise the emission of dust at the premises and prevent its emission from the premises to the greatest extent practicable. | During Construction | O3.1 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5 |
| 49. | Weather monitoring<br>The licensee must monitor hourly temperature, humidity, wind velocity and rainfall at the nearest Australian Bureau of Meteorology weather station or the project weather station. | During Construction | M4.1 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.2.3 |
| **ECRL Determination Report Conditions of Approval** | | | | | |
| 50. | Dust Emissions<br>All construction activities shall be carried out in a manner that minimises or prevents the emission of dust including the environmental management measures documented in the EIA. | During Construction | CoA 36 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1<br>Annexure A |
| **ECRL REF Environmental Management Measures** | | | | | |
| 51. | Dust minimisation measures would be developed and implemented prior to commencement of construction. | Prior to Construction | ECRL REF REMM G1 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 52. | Methods for management of emissions should be incorporated into proposal inductions, training and pre-start talks. | | ECRL REF REMM G2 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 5.1, 7.1 |
| 53. | Activities with the potential to cause significant emissions such as earthworks or track removal should be identified in the CEMP. Work practices which minimise emissions during these activities should be investigated and applied where reasonable and feasible. | | ECRL REF REMM G3 | Environment Coordinator<br>Project Engineer<br>Site Supervisor | Section 4 |
| 54. | A mechanism for responding to complaints from the community should be put in place for the duration of the construction phase. | | ECRL REF REMM G4 | Communications and Stakeholder Relations Manager | Section 6 |
| 55. | Construction plant and equipment should be well maintained and regularly serviced so that vehicular emissions remain within relevant air quality guidelines and standards | | ECRL REF REMM G5 | Site Supervisor | Section 5.1 |
| 56. | Emissions from trucks and other heavy vehicles should be regulated in accordance with the requirements prescribed in the National Environment Protection Measure (NEPM) (Diesel Vehicle Emissions). | | ECRL REF REMM G6 | Site Supervisor | Section 2.3 |
| 57. | Ensure that all construction vehicles are tuned to not release excessive level of smoke from the exhaust and are compliant with OEH's Smokey Vehicles Program under the NSW Protection of the Environment and Operations Act 1997and NSW Protection of the Environment and Operations Regulations 2010. | | ECRL REF REMM G7 | Site Supervisor | Section 2.3 |
| 58. | All on-road trucks to comply with the emission standards | | ECRL REF REMM G8 | Site Supervisor | Section 5.1 |
| 59. | All new off-road construction equipment meets, at minimum, the United States Environmental Protection Agency Tier 2 emission standards for non-road diesel engines. | | ECRL REF REMM G9 | Project Engineer<br>Site Supervisor | Section 5.1 |
| 60. | Tanks to be fitted with conservation vent (to prevent air inflow and vapour escape until a pre-set vacuum or pressure develops). | | ECRL REF REMM G10 | Site Supervisor | Section 5.1 |
| 61. | Strategies in place to reduce usage of chemical and fuels in additional to using alternative fuel technologies as recommended in the NSW Action for Air (NSW EPA 2009). Particular focus should be on those products with the potential to release high levels of air toxics. | | ECRL REF REMM G11 | Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| **Norwest Pedestrian Link Determination Report Conditions of Approval** | | | | | |
| 62. | The Project shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of minimising visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease. | During Construction | CoA 22 | Site Supervisor | Section 5.1 |
| **Norwest Station Subsurface Pedestrian Link and Northern Entry REF Environmental Management Measures** | | | | | |
| 63. | Prepare a Construction Air Quality Management Plan to minimise and managed impacts.<br>The plan shall include, but not necessarily be limited to:<br>• The identification of potential sources of air pollutants of concern, in particular dust.<br>• Air quality management objectives.<br>• Mitigation measures to be implemented, including measures during adverse weather conditions (such as strong winds in dry weather).<br>• A monitoring program to assess compliance with the identified objectives.<br>• Mechanisms for the monitoring, review and amendment of this plan.<br>• The requirement that engines of onsite vehicles and plant would be switched off rather than left idling for extended periods of time. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 50 | Environment Manager | This document |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 64. | All vehicles carrying loose or potentially dusty material to and/or from the site would becovered.<br><br>Waste or any other material would not be burnt on construction sites.<br><br>Dust generating activities would be assessed during periods of strong winds and rescheduled, where required.<br><br>Wind breaks, which may include site hoardings, would be constructed, where construction works are in close proximity to sensitive receptors and where feasible and reasonable.<br><br>Re-vegetating or stabilising disturbed areas would occur as soon as feasible.<br><br>The proposal shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads.<br><br>All activities on the site shall be undertaken with the objective of minimising visible emissions of dust from the site. Should such visible dust emissions occur at any time, all feasible and reasonable dust mitigation measures shall be identified and implemented including cessation of relevant works, as appropriate, such that emissions of visible dust cease. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 51 | Site Supervisor | Section 5.1 |
| 65. | Working face and areas of open excavation would be kept to a minimum, where feasible and reasonable. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 52 | Site Supervisor | Section 5.1 |
| 66. | Water suppression would be used for active earthwork areas, stockpiles and loads of soil being transported to reduce wind-blown dust emissions. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 53 | Site Supervisor | Section 5.1 |
| 67. | Wind breaks, which may include site hoardings, would be constructed, where construction works are in close proximity to sensitive receptors and where feasible and reasonable. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 54 | Site Supervisor | Section 5.1 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 68. | Appropriate site speed limits would be imposed and signed within and on entry and exit from the proposal footprint to minimise dust propagation. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 55 | Site Supervisor | Section 5.1 |
| 69. | Wheel-wash facilities or rumble grids would be provided and used near site exit points and a street-cleaning regime would be implemented to remove any dirt tracked onto roads. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 56 | Site Supervisor | Section 5.1 |
| 70. | Engines of onsite vehicles and plant would be switched off rather than left idling for extended periods of time.<br><br>Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable.<br><br>Plant would be well maintained and serviced in accordance with manufacturers' recommendations. | During Construction | Norwest Subsurface Pedestrian Link and Northern Entry REF Environmental Safeguard 57 | Site Supervisor | Section 5.1 |
| **Willoughby to North Chatswood 33kV Underground Feeder Powerline Submissions Report Revised Environmental Management Measures** | | | | | |
| 71. | The following mitigation measures would be implemented during site establishment:<br>▪ Prior to construction, any sensitive land uses/sensitive receivers would be identified.<br>▪ Waste or any other material would not be burnt on construction sites. | Before Construction | REMM 19 | Environment Coordinator | Section 5 |
| 72. | The following mitigation measures would be implemented during spoil handling, storage and transport:<br>▪ Trucks carrying spoil onto or off site are to be covered.<br>▪ Any stockpiling of materials would be located away from sensitive receivers, where feasible and reasonable, and protected from the elements through barriers or appropriate coverings. | Construction | REMM 20 | Site Supervisor | Section 5 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 73. | The following mitigation measures would be implemented during general construction:<br>■ On-going monitoring for dust (e.g. site inspections) would be undertaken during trenching works to assess the effectiveness of mitigation measures.<br>■ Water sprays and/or water carts would be used as required for dampening exposed surfaces to control dust generation.<br>■ Silt accumulated in sediment control devices (e.g. silt fences and spoon drains) would be removed on a regular basis to prevent dust generation.<br>■ Cutting, grinding or sawing equipment (such as for concrete/bitumen surfaces) must only be used in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.<br>■ Dust generating activities would be assessed during periods of strong winds and rescheduled, where required.<br>■ Exhaust systems of construction plant, vehicles and machinery would be maintained to minimise exhaust emissions to the atmosphere. All equipment and vehicles are to be regularly maintained and records kept of maintenance. Engines would be switched off when vehicles and plant are not in use, to minimise idling, and refuelling areas would be away from areas of public access and sensitive receivers.<br>■ Plant would be well maintained and serviced in accordance with manufacturers' recommendations.<br>■ Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable.<br>■ Plant and other machinery (including generators) would be sited away from sensitive receivers, such as dwellings and schools, where feasible and reasonable.<br>■ The amount of excavated material stored on site would be minimised, and replaced within the open trench as soon as possible.<br>■ Dust generating activities would be assessed during periods of strong winds and rescheduled where required. | Construction | REMM 21 | Site Supervisor | Section 5 |

| No. | Measure | Timing | Requirement | Responsibility | Reference |
|---|---|---|---|---|---|
| 74. | The following mitigation measures would be implemented for complaints:<br>■ Dust complaints would be handled by the Community and stakeholder Relations Manager and the Project Environment Manager, in accordance with the complaints handling process in the Community Liaison Implementation Plan. | Construction | REMM 22 | Community and Stakeholder Relations Manager<br>Environment Manager | Section 6 |
| 75. | The following mitigation measures would be implemented for shutdown periods:<br>■ When site is to be closed for a period of longer than 2 days, a site inspection would be carried out to identify any additional measures be put in place to ensure the site is stable. | Construction | REMM 23 | Site Supervisor | Section 5 |
| **Rouse Hill Temporary Bypass Powerline EIA** | | | | | |
| 76. | • Plant and equipment would be maintained in accordance with manufacturer's specifications<br>• Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently<br>• Plant or machinery would not be left idling<br>• Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust<br>• Trucks transporting spoil and other waste materials from site would be covered appropriately | Construction | EIA Control Measure | Site Supervisor | Section 5 |

# Annexure B Glossary

| Term | Definition |
|---|---|
| **AEC** | Areas of Environmental Concern |
| **AHIMS** | Aboriginal Heritage Information Management System |
| **AMS** | Activity Method Statement |
| **ANZECC** | Australian and New Zealand Environment Conservation Council |
| **ARI** | Average Recurrence Interval |
| **ARMCANZ** | Agriculture and Resources Management Council of Australia and New Zealand |
| **ASS** | Acid Sulfate Soil |
| **Blue Book** | Managing Urban Stormwater: Soils and Construction (Landcom 2004) |
| **BOM** | Bureau of Meteorology |
| **CAQMP** | Construction Air Quality Management Plan |
| **CBD** | Central Business District |
| **CCAMP** | Construction Compounds and Ancillary Facilities Management Plan |
| **CEEC** | Critically Endangered Ecological Community |
| **CEMF** | Construction Environmental Management Framework |
| **CEMP** | Construction Environmental Management Plan |
| **CFFMP** | Construction Flora and Fauna Management Plan |
| **CHMP** | Construction Heritage Management Plan |
| **CNVIS** | Construction Noise and Vibration Impact Statement |
| **CNVMP** | Construction Noise and Vibration Management Plan |
| **CoA** | Condition of Approval |
| **CoPC** | Contaminants of Potential Concern |
| **CPESC** | Certified Professional in Erosion and Sediment Control |
| **CSWMP** | Construction Soil and Water Management Plan |
| **DACHA** | Darug Aboriginal Cultural Heritage Assessments |
| **DACHi** | Darug Aboriginal Land Care Inc. |
| **DCAC** | Darug Custodian Aboriginal Corporation |

| Term | Definition |
|---|---|
| **DECC** | Department of Environment and Climate Change (now OEH and EPA) |
| **DECCW** | Department of Environment, Climate Change and Water (now OEH and EPA) |
| **DLALC** | Darkinjung Local Aboriginal Land Council |
| **DLO** | Darug Land Observations |
| **DLWC** | Department of Land and Water Conservation (now NSW Office of Water) |
| **DP&E** | Department of Planning and Environment |
| **DPI** | Department of Primary Industries |
| **DTAC** | Darug Tribal Aboriginal Corporation |
| **EM** | Environment Manager |
| **EC** | Environmental Coordinator |
| **ECRL** | Epping to Chatswood Rail Link |
| **EEC** | Ecologically Endangered Community |
| **EIA** | Environmental Impact Assessment |
| **EIL** | Ecological Investigation Levels |
| **EIS** | Environmental Impact Statement |
| **EIS 1** | EIS for SSI-5100 – NWRL Early Works and Major Civil Construction Works (Incorporating Staged Infrastructure Modification Assessment) |
| **EIS 2** | EIS for SSI-5414 – NWRL works associated with the construction and operation of stations and wider precincts, service facilities, rail infrastructure and systems |
| **EMS** | Environmental Management System |
| **EP&A Act** | *Environmental Planning and Assessment Act 1979* |
| **EP&A Regulation** | Environmental Planning and Assessment Regulation 2000 |
| **EPA** | Environment Protection Authority |
| **EPBC Act** | *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)* |
| **EPL** | Environment Protection Licence |
| **EPM** | Environmental Planning and Approvals Manager |
| **ER** | Environmental Representative |
| **ERP** | Emergency Response Plan |
| **ESCP** | Erosion and Sediment Control Plan |
| **GDE** | Groundwater Dependant Ecosystems |

| Term | Definition |
|---|---|
| **IC** | Independent Certifier |
| **IFD** | Intensity-Frequency-Duration |
| **IJV** | Infrastructure Joint Venture (of NRT) |
| **ITP** | Inspection and Test Plan |
| **JHET** | John Holland Event Tracking |
| **JHPL** | John Holland Propriety Limited |
| **LCPL** | Leighton Contractors Propriety Limited |
| **LOR** | Limits of Reporting |
| **MLALC** | Metropolitan Local Aboriginal Land Council |
| **NEPM** | National Environment Protection Measure |
| **NHMRC** | National Health and Medical Research Council |
| **NOW** | NSW Office of Water |
| **NPW Act** | *National Parks and Wildlife Act 1974* |
| **NPWS** | National Parks and Wildlife Service |
| **NRT** | Northwest Rapid Transit |
| **NTU** | Nephelometric Turbidity Units |
| **NWRL** | North West Rail Link (now Sydney Metro Northwest) |
| **OEH** | Office of Environment and Heritage |
| **OpCo** | OTS Operating Company |
| **OTS** | Operations, Trains and Systems |
| **PAD** | Potential Archaeological Deposit |
| **PASS** | Potential Acid Sulfate Soil |
| **PIMS** | Project Integrated Management System |
| **PIRMP** | Pollution Incident Response Management Plan |
| **PMF** | Probable Maximum Flood |
| **POEO Act** | *Protection of the Environment Operations Act 1997* |
| **PPP** | Public Private Partnership |
| **Project** | Sydney Metro Northwest OTS Project |
| **Project Approval** | Minister for Planning and Infrastructure's Approval for SSI-5414, SSI-5931 and TfNSW's Approval for the ECRL Conversion Works |

| Term | Definition |
|---|---|
| **RAP** | Registered Aboriginal Parties |
| **REF** | Review of Environmental Factors |
| **REMM** | Revised Environmental Mitigation Measures |
| **RFP** | Request for Proposal |
| **RFT** | Request for Tender |
| **RMS** | Roads and Maritime Services |
| **RTRF** | Rapid Transit Rail Facility (now Sydney Metro Trains Facility) |
| **RTRF EIS** | EIS for SSI-5931 – Rapid Transit Rail Facility |
| **SDS** | Safety Data Sheet |
| **SEP** | Site Environment Plan |
| **SEPP** | State Environmental Planning Policy |
| **SES** | State Emergency Service |
| **SEWPaC** | Department of Sustainability, Environment, Water, Population and Communities (now Department of the Environment) |
| **SM** | OTS Sustainability Manager |
| **SMP** | Spoil Management Plan |
| **SMTF** | Sydney Metro Trains Facility (formerly the Rapid Transit Rail Facility) |
| **Spoil** | Material generated by excavation into the ground |
| **SPR** | Scope and Performance Requirements |
| **SQERM** | Safety, Quality and Environment Risk Management |
| **SSI** | State Significant Infrastructure |
| **SVC** | Surface and Viaduct Civil Works |
| **SWTC** | Scope of Works and Technical Criteria |
| **TBM** | Tunnel Boring Machine |
| **TDS** | Total Dissolved Solids |
| **TfNSW** | Transport for New South Wales |
| **TRA** | Task Risk Assessment |
| **TSC** | Tunnels and Station Civil Works |
| **TSC Act** | *Threatened Species Conservation Act 1995* |
| **TSS** | Total Suspended Solids |

| Term | Definition |
|---|---|
| **VAMP** | Visual Amenity Management Plan |
| **VENM** | Virgin Excavated Natural Material – natural material (such as clay, gravel, sand, soil and rock) that is not mixed with any other type of waste and/or has been excavated from areas of land that are not contaminated |
| **WAD** | Works Authorisation Deed |
| **WBNM** | Watershed Bound Network Model |
| **WM Act** | *Water Management Act 2000* |
| **WMRP** | Waste Management and Recycling Plan |
| **WRA** | Workplace Risk Assessment |
| **WRAPP** | Waste Reduction and Purchasing Policy |
| **WTP** | Water Treatment Plant |