ATTACHMENT

ITEM NORTH WEST RAIL LINK - ENVIRONMENTAL IMPACT STATEMENT 2 (FP50)

A MOTION WAS MOVED BY COUNCILLOR KEANE AND SECONDED BY COUNCILLOR GANGEMI THAT the recommendation contained in the report be adopted with the following change:-

A) Additional Point 1.5, to read:

"1.5 The Hills Shire Council requests that the station known as "Showground" in the exhibited EIS 2 documentation be renamed as "Sydney Hills" station."

B) Delete Point 6.5 (which is a duplicate of Point 6.4).

THE MOTION WAS PUT AND CARRIED.

RESOLUTION

This report and the following recommendations form the basis of The Hills Shire Council's response to EIS 2 and the modification to the Showground Station.

Project Description

1.1 Details of fire fighting, passenger evacuation and rescue arrangements along the entire route of the NWRL be referred to the relevant emergency services (Fire & Rescue NSW, Rural Fire Service, Police Service, Ambulance Service, State Emergency Service) for their consideration and endorsement prior to the commencement of operations.

1.2 Heavy vehicle access be provided at ground level along the route of the elevated Skytrain for maintenance and emergency vehicle access.

1.3 A detailed Maintenance Management Plan for all above ground facilities be prepared in consultation with the relevant Councils, to ensure that all structural and landscaped assets are maintained by the NWRL operators to a high standard. Particular attention is to be given to graffiti removal, litter removal, soft and hard landscaping maintenance.

1.4 Detailed designs of bus interchanges be undertaken in consultation with the relevant bus operators with such designs to include appropriate amenity facilities for bus drivers.

1.5 The Hills Shire Council requests that the station known as "Showground" in the exhibited EIS 2 documentation be renamed as "Sydney Hills" station.

Sustainability

2.1 Expressed under the commitment to leadership in the Sustainability Policy is a commitment to "Explore new benchmarks for the transport infrastructure sector by requiring high standards from our designers, contractors and suppliers".

This commitment is the key principle to assure the success of the project in the context of sustainability. Specifications for further work and design parameters must demonstrate innovation and leadership in the pursuit of the best practical

sustainability outcome to assure the overall impacts of the project are acceptable in the community and that the benefits of the project are optimised.

2.2 A number of the initiatives and targets are not yet quantified. Clear targets should be adopted to establish clear performance standards for project deliverables and future contractors' specifications. For example, offsets for electricity needs of 100% of the operation and 20% of the construction phase of the project should be a commitment rather that undertaking to merely explore options.

Consultation

3.1 It is recommended that Transport for NSW involve Council through on-going consultation and involvement as part of the further planning for the North West Rail Link and the railway station precincts.

Soil and Groundwater

4.1 A post construction monitoring program for ground movement and groundwater levels to be established for land slip area.

4.2 A process Manual be implemented and kept on-sites at all times for any contaminant spill or accident that may occur.

4.3 A management plan be implemented for the reuse of captured groundwater.

Noise and Vibration

6.1 It is recommended that a cautious approach be taken in deciding where vibration attenuation is not needed. Where there is any doubt about the impact of vibration, apply attenuation measures.

6.2 The adopted residential trigger or planning goals for night time noise should be 50dB(A) rather than the proposed 55dB(A) in consideration of the area in which the train line is proposed. Further the draft Rail Infrastructure Noise Guideline recommends 50 dB at night for light rail. It provides 55 dB at night for heavy rail which is defined as operating passenger and / or freight trains. No freight trains are proposed. The Industrial noise policy also recommends general planning goals of 45 or 50dB(A) as the maximum for an urban area at night.

6.3 Continuous welded rail be provided.

6.4 A schedule of periodic noise monitoring of the operation of the rail line (at least every two years) as noise attenuation methods will largely be reliant upon noise dampeners and noise absorption materials which can perish and wear over time resulting gradual increases in noise levels.

European Heritage

7.1 Views to Mungerie House from Windsor Road must also be considered in the design and placement of the viaduct and its piers.

7.2 During the detailed design of the viaduct and consideration of view corridors, Transport NSW should consult the Mungerie House Conservation Management Plan (2007) prepared for Lend Lease by Tanner Architects and endorsed by Council as it contains important information regarding view corridors and the setting of Mungerie House.

Local Business Impact

9.1 The Small Business Commissioner commence a study into the structural adjustment and support required for specific small businesses directly affected by the construction work.

Land Use and Community Facilities

10.1 It is requested that Transport for NSW work with Council as part of the planning for Key development sites around the future railway stations which may occur prior to the completion of the precinct planning process. On-going consultation is imperative to ensure that any future development at these key sites integrates with the future railway stations and supports the on-going operation of the North West Rail Link.

10.2 Negotiations should continue with Council and the Castle Hill RSL Sub Branch regarding the relocation of the war memorial and other historic monuments within Arthur Whitling Park. Transport for NSW should also consult with the Hills District Historical Society with regard to the railway heritage and war memorial monument within the Arthur Whitling Park.

10.3 It is requested that Transport for NSW continue to consult Council on the potential implications of the project on the Balmoral Road Release Area.

10.4 Transport for NSW should ensure that appropriate consultation is carried out with resident and land owners within the vicinity of the railway corridor and railway station sites that will be affected by the construction and operation of the North West Rail Link.

Ecology

11.1 Offset sites should be identified and procured prior to works commencing that involve the removal of ecology. It is requested that specific priority be given to securing offset sites as near to the location of the impact/loss as possible, to assist with the preservation of the specific endemic community of the area and assure that the ecological and amenity benefits of retaining endemic vegetation remain within the Local Government Area.

11.2 Lighting for the skytrain should be designed to minimize light spill.

Visual Amenity

12.1 EIS2 is still silent on the ultimate design of the viaduct, however, it is expected that the detailed design stage will give particular consideration to making the structure interesting and visually appealing. The ultimate design should incorporate measures to reduce the visual impact and where possible use engineering art to decorate and provide visual interests where landscaping cannot be adequately provided.

12.2 The possible use of the viaduct structure for advertising is an ongoing concern for Council.

Climate change and Greenhouse Gas

13.1 Adaptation response be implemented with particular reference to Design specifications for the trains Air conditioning systems and adequate emergency and evacuation procedures should be implemented to adequately address the High (unacceptable) likelihood of heat stress related health impacts on customers associated with failure of train air conditioning units.

13.2 As many of the adaptation responses relate to active/energy consuming systems, a commitment to green power for the rail project should be made to assure that Climate Change adaptation actions are not contributing to further intensification of the impacts of climate change.

13.3 the future operator of the rail should be bound to strict GHG emissions targets consistent with the NSW government Sustainability Policy.

Surface Water and Flooding

14.1 All site staff should be engaged through toolbox talks or similar with appropriate training on soil and water management practices.

14.2 A stormwater management plan which identifies the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks for each construction site should be developed.

14.3 An excavation plan should be developed which ensures procedures that threats to human safety and damage to infrastructure are not exacerbated during the construction period.

ITEM-10	**NORTH WEST RAIL LINK - ENVIRONMENTAL IMPACT STATEMENT 2 (FP50)**
THEME:	Balanced Urban Growth
HILLS 2026 OUTCOME/S:	BUG 1 I can get where I need to go.
COUNCIL STRATEGY/S:	BUG 1.1 Facilitate the provision of integrated transport alternatives that link residents to their home, places of work and services and facilities.
GROUP:	**STRATEGIC PLANNING**
AUTHORS:	**FORWARD PLANNING COORDINATOR** BRONWYN SMITH **SENIOR PLANNER** BRENT WOODHAMS
RESPONSIBLE OFFICER:	**MANAGER FORWARD PLANNING** STEWART SEALE

EXECUTIVE SUMMARY

The Environmental Impact Statement 2 (EIS 2) – *Stations, Rail Infrastructure and Systems* for the construction of the Northwest Rail Link (NWRL) has been placed on public exhibition. Comments close on 3 December 2012.

The Minister granted approval for the State Significant Infrastructure Application relating to the Major Civil Construction Works for NWRL Project on 25 September 2012. In addition, the Minister also granted approval to a modification relating to the alignment of the Showground Station.

Transport for NSW is seeking approval from the Minister for Planning and Infrastructure for a further modification of the State Significant Infrastructure approval (SSI-5100) granted on 25 September 2012. The proposed modification is associated with minor changes to Showground Station (Construction Site 6 as identified in the Environmental Impact Statement for Stage 1: Major Civil Construction Works (EIS 1)) and includes:

- Minor change to the location of Showground Station, to the south east and parallel with Carrington Road, and associated modification of the horizontal alignment of the tunnels;
- Vertical alignment changes to accommodate the changed location of Showground Station;
- Change to Showground Station construction site boundary (Site 6); and
- Change to the Showground Road and Carrington Road construction access/egress arrangements.

The modifications to the Showground Station (formerly The Hills Centre Station) will be assessed as part of this report. The modifications would not give rise to significant changes to European Heritage, Indigenous Heritage, Local Business Impacts, Visual Amenity, Climate Change and Greenhouse Gas Emissions, Air Quality, General Waste Management and Cumulative Impacts.

The EIS has been assessed by a number of Council's Officers during the exhibition period and this report outlines the issues, provides some assessment and gives recommendations for Council to consider.

It is essential that the project delivery incorporate engagement activities that allow the community to be involved in the projects actual delivery. This will help manage the impacts on residents by providing an opportunity for them to influence and feel part of the project. Community liaison or reference groups that include key staff would provide a successful model.

HISTORY

(Refer to Attachment 1 for a complete history)

INTRODUCTION

Over the next 25 years North West Sydney will experience considerable population growth. In order to accommodate this growth additional public transport services must be provided to ensure that future residents and workers are provided efficient, convenient and affordable travel options.

The North West Rail Link (NWRL) has been identified by the NSW Government as a priority transport infrastructure project and will consist of a heavy rail line extending from Epping, through the North West Growth Centre, to Cudgegong Road. The rail line will be 23kms in length and will provide 8 additional railway stations at: Cherrybrook, Castle Hill, Hills Centre, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road. In addition to this it is also planned that approximately 4,000 commuter car parking spaces will be provided at various locations along the route.

The proponent for the North West Rail Link project is Transport for NSW (TfNSW), which is the lead agency of the NSW transport portfolio, with primary responsibility for:

- Transport coordination.
- Transport policy and planning.
- Transport services.
- Transport infrastructure.

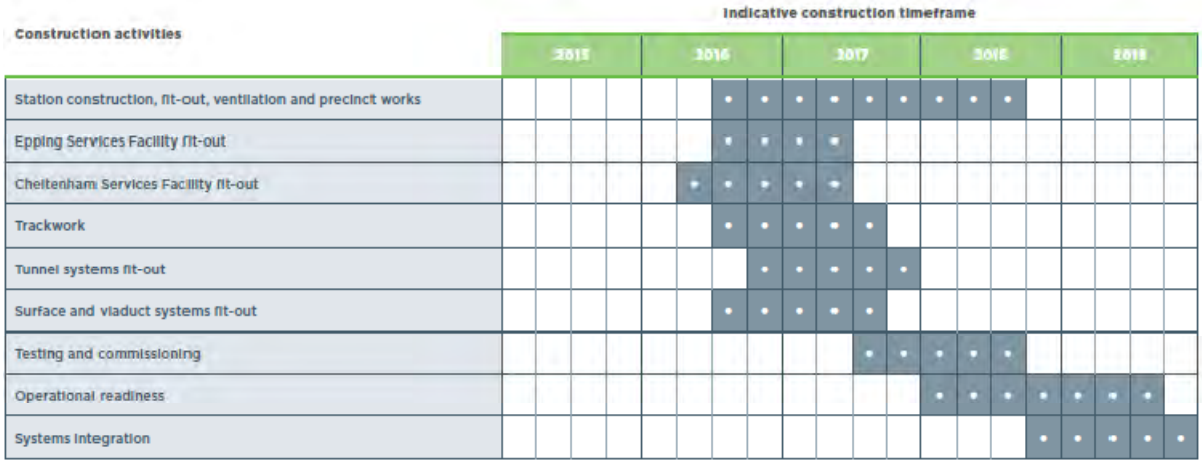
The North West Rail Link will support metropolitan planning objectives by putting in place a key transport project which extends the connectivity of the existing rail network and will support future growth within North West Sydney. A map of the proposed North West Rail Link is included below. The map indentifies the proposed railway corridor, railway stations and commuter car parking locations.

North West Rail Link Corridor
(Source Transport for NSW)

The project has been declared as Critical State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) through *Environmental Planning Policy (State and Regional Development)* 2011 (SRD SEPP). Before major work can commence on the project a detailed environmental impact assessment must be undertaken and approved by the Minister for Planning and Infrastructure in conjunction with the final project approval.

In light of the above, a two staged environmental impact assessment process (EIS 1 and EIS 2) have been prepared as part of the planning for the North West Rail Link. This approach has been adopted to streamline the delivery of the North West Rail Link by enabling the planning for the proposed railway station precincts to be carried out without holding up the major tunnel construction process.

The rail systems and stations construction work component of the NWRL would commence in 2016 as the sites are progressively handed over from contractors undertaking the Stage 1 major civil construction works (detailed in EIS 1). The total period of rail systems and stations construction works is expected to be approximately four years. This program is shown below.



Indicative construction Timeframe
(Source Transport for NSW)

Environmental Impact Statement (EIS) 1 for major civil construction works focused on the tunnel work along the route, excavation of the station boxes, as well as construction of a twin elevated rail viaduct, referred to as the 'Skytrain', from just north of Bella Vista to Rouse Hill. The State Significant Infrastructure application for the major civil construction works was determined by the Minister for Planning and Infrastructure on 25 September 2012. The approval had regard to the assessment presented in the EIS 1, issues raised in submissions and the responses provided in the Submissions Report and the Director-General's Report.

Environmental Impact Statement (EIS) No. 2, which is currently on public exhibition, seeks approval for future station design, railway operating systems, and the remaining construction.

Public exhibition of EIS 2 commenced on 31 October 2012 and will conclude on 3 December 2012. Full copies of the document have been available for viewing on the Department of Planning and Infrastructure (DP & I) website, with hard copies also available for viewing at a number of locations including Council's Administration Centre. In addition, the North West Rail Project Team have been conducting community information sessions.

REPORT

The purpose of this report is to provide a description of the second stage of the NWRL project, identify and assess the potential impacts and highlight any issues of concern that could then form the basis of a submission from Council. Further this report will assess the modifications to the Showground Station (formerly The Hills Centre Station).

Environmental Impact Statement (EIS) No.1

Environmental Impact Statement (EIS) 1 for major civil construction works was the first stage of environmental assessment for the North West Rail Link and was exhibited from 4 April 2011 to 21 May 2011. EIS 1 sought approval for major civil construction work including:

- Excavation of the two 15 kilometre rail tunnels between Epping and Bella Vista;
- Excavation for underground railway stations;
- Above ground construction including the 4 kilometre skytrain viaduct between Bella Vista and Rouse Hill.

A submission to EIS 1 was considered by Council at its meeting on 22 May 2012 and subsequently forwarded to Department of Planning & Infrastructure. This submission to EIS 1 highlighted key concerns relating to community liaison, heritage, transport, construction methods and impact on local businesses.

Transport for NSW prepared a Submissions/Preferred Infrastructure Report which was submitted to Department of Planning and Infrastructure on 30 July 2012 to respond to issues raised in submissions and to address the proposed changes to the project description. The report provided responses to Council's concerns as raised in the previous submission.

EIS1 was approved by the State Government on 25 September 2012. The Minister attached a number of conditions to the approval to address issues raised across all submissions, including requirements to:

- Restrict above-ground construction activities, not associated with tunnelling, to 7am to 6pm on weekdays and 8am to 1pm on Saturdays, with no construction on Sundays;

- Prepare a business management strategy and engage in ongoing consultation with business owners affected during construction;

- Agree, in consultation with the relevant local council, on mitigation measures where community and council facilities are impacted by construction, including Cheltenham Oval, Beecroft Reserve, Castle Hill Showground and Arthur Whitling Park;

- Offset the loss of native vegetation and prepare a management plan to manage potential impacts on flora and fauna;

- Undertake detailed water quality monitoring of nearby waterways during and following the completion of construction.

Environmental Impact Statement (EIS) No.2

Environmental Impact Statement (EIS 2) No.2 forms the second stage of environmental assessment for the North West Rail Link and includes the operation of the railway and the elements of the construction phase which were not previously addressed as part of EIS 1. The assessment covers the following broad matters:

- Operation and construction of the stations, including architecture, station fit-out, platforms and buildings;

- Station precincts, including transport interchanges, commuter car parks, kiss-and-ride, bus stops, taxi ranks and bicycle facilities;

- Design and architectural aspects of the skytrain;

- Services facilities;

- Stabling facility at Tallawong Road, Rouse Hill;

- Rail infrastructure and systems including railway tracks, signalling systems, ventilation systems, overhead power supply and substations; and

- Any additional land required for stations (such as road works, pedestrian/cycle facilities, landscaping).

1.1 PROJECT DESCRIPTION – OPERATION

CONTEXT

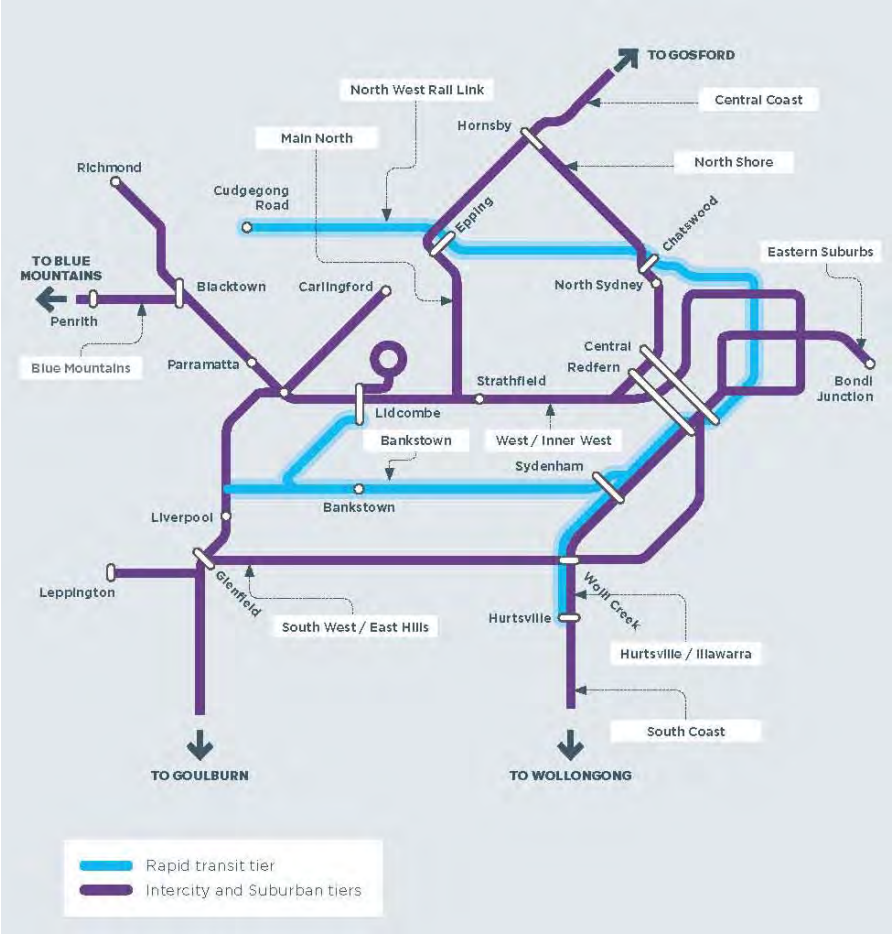
a) Project Vision

In June 2012 Transport for NSW announced a new rail plan for Sydney, *Sydney's Rail Future*. This is a long term plan to increase the capacity of Sydney's rail network through investment in new services and the upgrading of existing infrastructure. It is also an integral part of the *NSW Government Long term Transport Master Plan*.

The NWRL would be the first stage of a new modern high frequency rail network providing a train every five minutes during peak times running between Cudgegong Rd,

Rouse Hill and Chatswood. At Chatswood, NWRL customers would be able to simply cross the platform to board a train on the existing rail network going into the city. Subject to a value for money analysis, the NWRL would be operated by the private sector, with train frequency and fares to be set by the NSW Government in line with the rest of the Sydney rail network.

As part of future stages, the NWRL would be extended to the CBD via a second harbour crossing and ultimately convert the Bankstown and Illawarra lines (to Hurstville) to rapid transit operations.



Sydney's Rail Future – Network Plan

b) Design of the North West Rail Link

The detailed design phase of the NWRL project will involve further survey, geotechnical and other investigations and may result in further refinement of the tunnel alignment with the corridor.

The built form of stations, associated service buildings and facilities would be an important design element in the visual environment and is intended to meet high quality design principles. These principles would guide future detailed design, which would be reviewed by a Design Review Panel that is to be established and engaged for the duration of the project to provide independent design advice.

Public art would be provided to connect the stations with the communities they serve and contribute to the success of the NWRL through promoting station identity, amenity, safety, security, community values and the public domain.

The new stations would be designed to provide:

- ease of access for all customers including those with specific accessibility needs;
- a safe environment;
- emergency access and egress;
- a comfortable environment (e.g. weather protection, ventilation / cooling, daylighting);
- customer facilities (e.g. toilets, seating, ticket facilities, telecommunication access and bicycle storage);
- paid areas (i.e. unpaid concourse, paid concourse and platforms);
- activation opportunities such as retail space;
- staff facilities; and
- station systems including electrical and mechanical services.

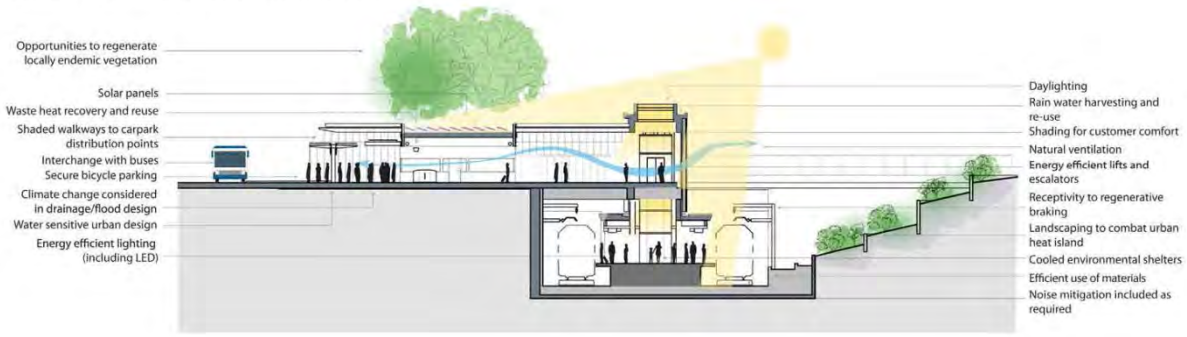
There would be three types of stations on the NWRL as illustrated below:

- Underground – Castle Hill, Showground and Norwest
- Open Cut – Cherrybrook, Bella Vista and Cudgegong Rd
- Elevated – Kellyville and Rouse Hill

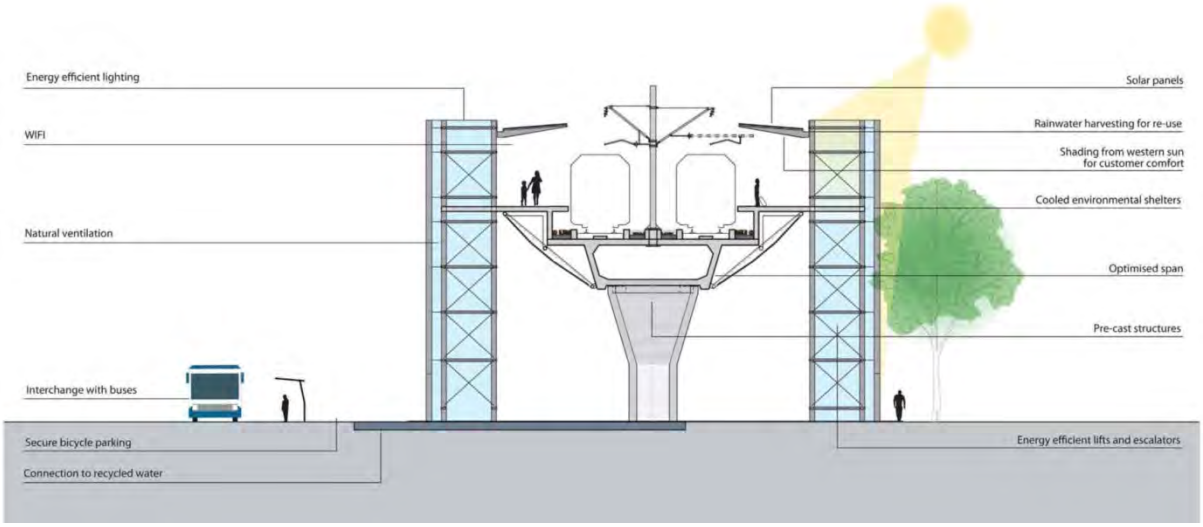
Commuter parking for 4,000 cars is being provided at five of the eight new stations (Cherrybrook, Showground, Bella Vista, Kellyville and Cudgegong Rd). A further two stations (Castle Hill and Rouse Hill) will be major bus interchanges.

Underground Station (indicative only)

Figure 6.8 A generic open cut station (indicative only)



Open Cut station (indicative only)



Elevated Station (indicative only)

c) Trains

All trains on the NWRL will be new, modern single deck trains designed to deliver a fast, safe and reliable journey with high performance standards. Each train will have eight carriages and be capable of transporting up to 1,300 passengers. They will operate at speeds of up to 100 km/h in both the tunnels and above ground.

The rapid transit trains will feature:

- at least three doors per side per carriage to enable passengers to quickly enter and leave the train;
- air conditioning;
- a mixture of seating arrangements;
- grab handles for standing passengers;
- wheelchair spaces;
- priority seating for mobility impaired, the elderly and parents with prams;
- level access between platform and train;

- modern passenger information systems; and
- advanced train control and safety systems.

Single deck trains have been selected as they allow passengers to get on and off more quickly than double deck trains. The trains will be controlled by modern operating systems and signalling technology to maximize the number of trains that can be used. To operate a train every five minutes the new rail link will start operations with a fleet of 20 trains.

d) Train Operations

The NWRL will deliver frequent rapid transit rail services seven days a week, with trains running from early morning until late at night. Initial operating hours will be designed to make sure passengers can catch a train from the start of the line at Cudgegong Rd and be at work in the Sydney CBD by 6.00am. There will also be extended operating hours on Friday and Saturday nights and train operations will be integrated with other public transport.

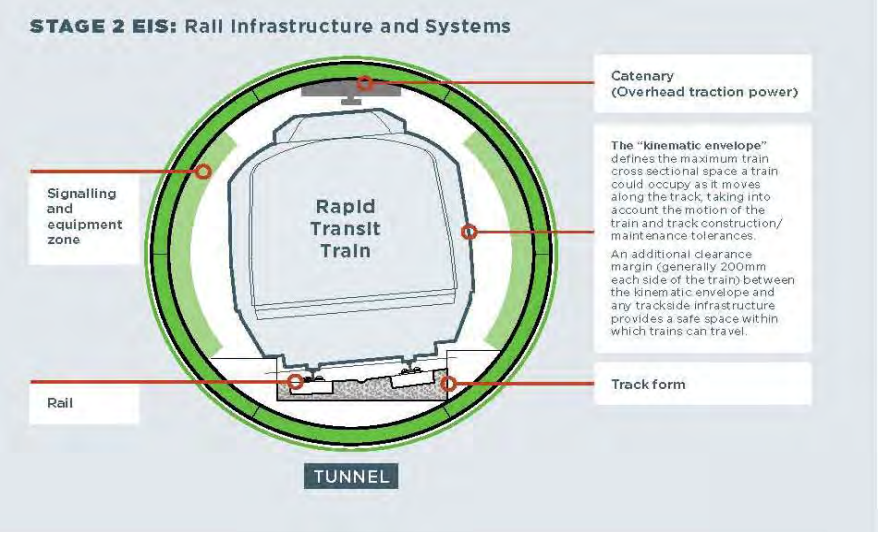
The trip from Cudgegong Rd to Chatswood will take about 37 minutes. The complete journey from Cudgegong Rd to Wynyard, including the interchange at Chatswood, will take just under an hour. Train timetables on the North Shore line will be organized to ensure that passengers only wait a few minutes to switch from a NWRL train to a city-bound train in the peak.

e) Tunnels

Twin underground rail tunnels will extend from Epping Station for 15km to a tunnel portal near Bella Vista Station. The tunnels are circular and have an internal lined diameter of approximately six metres. They will be lined with pre-cast concrete segments for long term life and to help keep groundwater out of the tunnel.

In addition to space for the trains and tracks, the tunnels provide space for equipment including signaling, control and communication systems, overhead power, fire systems and an emergency access walkway.

Typically the two tunnel track centrelines would be approximately 12.3m apart, with emergency access, cross passages planned at maximum intervals of 240m.



Tunnel Cross Section

The tunnels will have a maximum vertical grade of 4.1 percent with the radius of curves designed for a maximum operating speed of 100 km/h. The vertical gradient of the tunnels is influenced by topography, geological constraints and watercourses. The top of the tunnel at its deepest point is approximately 63m below ground and 10m at its shallowest point.

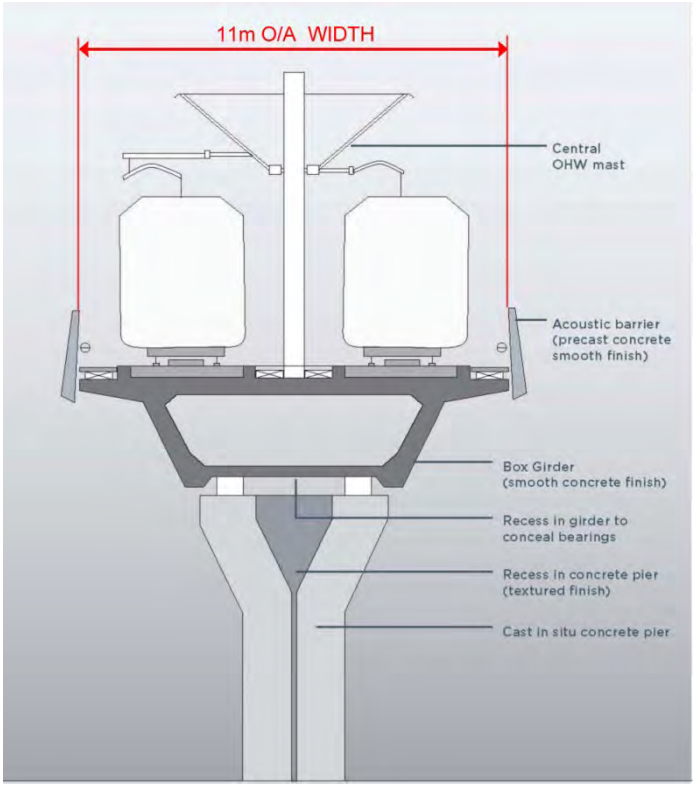
f) Skytrain

The NWRL emerges at a tunnel portal north of Celebration Dr in the Norwest Business Park into a cutting at Bella Vista Station. From Bella Vista Station the line continues in a cutting for about 500m and then rises on an earthwork embankment. From the embankment the line runs onto the Skytrain viaduct.

The Skytrain then continues for about 4.2km to Rouse Hill Town Centre. Two stations, Kellyville and Rouse Hill, are on the Skytrain viaduct.

The Skytrain will be about 11m to 14m wide, and will feature two railway lines as well as signaling, overhead wiring, noise walls and maintenance walkways. It will have spans between piers ranging from 36m to 48m. Longer spans may be required where it passes over roads or watercourses, while shorter spans may be necessary to avoid piers being too close to existing infrastructure.

Although the detailed design of the Skytrain will be determined as part of the ongoing planning and design work, an indicative design is shown below. The detailed design will also be subject to review by the Design Review Panel.



Design Concept for Skytrain

g) Services Facilities

Services facilities would be located at Epping and Cheltenham within Hornsby Shire. These facilities provide support services such as power and fresh air ventilation which are required for the safe operation of the railway. The Cheltenham facility also provides emergency access and egress to and from the rail tunnels.

h) Train Stabling

A train stabling and cleaning/maintenance facility will be located at a site on Tallawong Rd, Rouse Hill within the Blacktown City area.

i) Fire and Life Safety

Key features of the fire and life safety measures to be implemented during operation and maintenance would include:

- meet performance requirements of the International Fire Engineering Guidelines and Australian Standards such as the Building Code of Australia;
- emergency access/egress shafts at the Cheltenham Services Facility;
- one train per tunnel ventilation segment where possible with two as a maximum to retain a simple egress strategy;
- end detrainment (provision of an evacuation route for passengers in an emergency or breakdown) with egress along the trackway on the Skytrain and other surface areas;
- side detrainment with egress along the walkway in the tunnels;
- evacuation in the opposite direction to which the train is travelling as smoke moves in the direction of train travel;
- cross passages (maximum of 240m apart) to provide a means of escape and fire fighting access via the non-incident tunnel;
- a primary escape route from the tunnel via the stations (through end of platform fire stairs);
- longitudinal smoke control to prevent back layering of smoke and to dilute smoke downstream of a fire;
- a four hour structural fire rating in the tunnel;
- emergency lighting and signage in the tunnel, with CCTV and public address speakers at cross passages and crossovers;
- automatic fire detection in the plant areas, cross passages and other risk areas. Sprinkler (or pre-action sprinklers) in the risk rooms and high value plant rooms. Gas suppression in communication rooms and other areas where protection of equipment is a key requirement;
- hydrants throughout the tunnel;

- fire stairs in stations; and

- provision for assisted evacuation for the mobility impaired.

j) Safety and Security

Public spaces in the stations have been designed to minimize obstructions and projections, providing clear routes for passengers with poor vision and eliminating blind spots where people can hide.

The following safety in design items are proposed for adoption as part of the design:

- ticket gates included in design and used as operational control;

- separation between platform end and maintenance walkway in the tunnel to be adopted where practical on underground stations to discourage access. Fixed barriers would be attached to platform ends to further discourage trespass;

- retail concessions located on unpaid side of ticket gate only and to use materials consistent in performance for stations (non-combustible);

- no areas in station where devices may be left unattended where they cannot be readily seen/observed;

- tunnel lighting located on the inside of the tunnel face so as not to encourage trespass into tunnels;

- lighting outside in landscaped and plaza areas and street entrances.

k) Operational Staff

Depending on future operator requirements, up to 200 to 300 full time equivalent jobs would be required to operate and maintain the NWRL.

STATION DETAIL

a) Cherrybrook Station

Cherrybrook Station will be located adjacent to Castle Hill Rd between Franklin Rd and Robert Rd within the Hornsby Shire. The station is a shallow open cut arrangement with a mid platform entry and concourse. It has been designed as a park and ride station that integrates with the surrounding natural and built environment.

Due to its location, the station will provide rail access and a public transport interchange to residents of both Hornsby and The Hills Shires.

The station island platform would be located approximately seven metres below street level, with a proportion of the platform area covered by a canopy to provide shading and protection for passengers.

As an established arterial road, Castle Hill Rd provides good existing road links to the east and west. The station would have high visibility from Castle Hill Rd and the layout and access arrangements present an opportunity to improve the existing pedestrian environment and vehicular safety along and across Castle Hill Rd.

A new precinct access road would be constructed to provide access to the station entry plaza and park and ride facility. This new road would be parallel to Castle Hill Rd and run between Robert Rd and Franklin Rd. The bus and taxi stops/waiting areas and kiss and ride would also be located along this new access road.

Cherrybrook Station – Indicative Layout

To facilitate access to the station, sections of surrounding roads would be modified and upgraded as required. The intersection of Castle Hill Rd and Glenhope Rd would be signalized and provide pedestrian access across Castle Hill Rd for residents living within The Hills Shire.

The intersection of Castle Hill Rd and Robert Rd would also be signalised and provide pedestrian access across these roads. In addition, a right turn bay would be provided on Castle Hill Rd to enable a right turn, westbound into Robert Rd and the station precinct.

A two to three storey stepped park and ride facility would be located to the east of the station entry plaza and provide approximately 340 car parking spaces. An on-grade park and ride facility for approximately another 60 cars would be located north of the proposed access road and adjacent to and beneath the existing high voltage overhead power lines.

There will also be a stormwater detention pond to collect and reuse rain water for irrigation and other non-drinking uses.

Four areas within the site on the southern and northern sides of the new access road have been designated for future uses that will be determined by a Master Planning process.

b) Castle Hill Station

Castle Hill Station will be a major public transport interchange that that is designed to contribute to the growth and operation of Castle Hill as an accessible and vibrant major centre.

The underground station will be adjacent to Castle Towers Shopping Centre and integrated with Arthur Whitling Park above it. The park will be redesigned in consultation with local stakeholder groups, providing a quality public open space for the Town Centre. This will include recognition of the current war memorial.

Given its location and role as a major bus interchange, commuter parking will not be provided at this station.

Castle Hill Station – Indicative Layout

The station entry plaza will be at the western end of Arthur Whitling Park, at the intersection of Old Northern Rd and Old Castle Hill Rd with good access and visibility in all directions. The station design includes a large area of skylights, integrated within Arthur Whitling Park, providing natural light to the concourse below.

The bus interchange will be beside Old Northern Rd, at the southern end of the park between Terminus St and Crane Rd.

The potential for underground pedestrian links below Castle Hill Rd to connect into Castle Towers will be safeguarded into the design.

c) Showground Station

The design proposal for Showground Station is for a cut and cover station adjacent to Carrington Rd. The station reinforces one of the few remaining functioning showgrounds in Sydney and provides rail access to existing residential and employment areas.

According to EIS 2, the new Showground Station could be a catalyst for the evolution of the showground precinct into a village centre.

Pedestrian access will be primarily from Carrington Rd with a range of local connections.

Showground Station – Indicative Layout

A significant number of passengers will arrive by car and park in a 600 space three level car park. To provide access to the car park and station, new internal roads will include:

- a new road providing access between Carrington Rd and Showground Rd;
- a new road off Carrington Rd to the west of Ashford Ave ;
- a new road linking Doran Dr and Showground Rd with Middleton Ave being extended to link to this road; and
- traffic lights to be installed at the intersection of Doran Dr and Carrington Rd and at the intersection of the new road and Showground Rd.

Doran Dr will provide weather-protected bus stands, kiss and ride spaces and taxi ranks close to the station entrance. Doran Dr will also allow access to the Showground precinct itself.

The location of the station has been moved slightly to the south-east from the location identified in EIS 1 to bring it beside Carrington Rd. This will also assist in reducing construction impacts on regular users of the Showground including the annual Show.

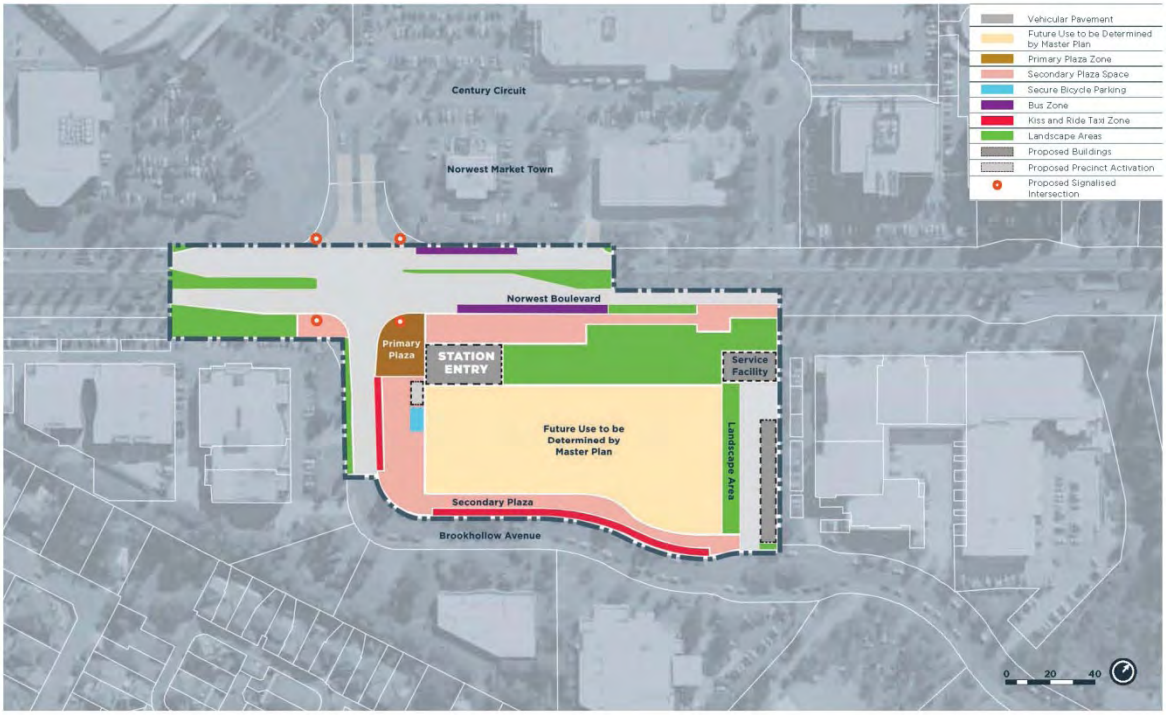
Following Council's decision to move its administration functions to the Norwest Business Park, the NSW Government has decided to acquire both The Hills Centre and the existing

Administration Centre sites. Future use of these sites will be determined by a Master Planning process.

d) Norwest Station

Norwest Station would be an underground station located within the Norwest Business Park and close to the Norwest Marketown Shopping Centre, commercial and residential developments, and within close proximity to the Hillsong Church.

The station architecture consists of a street edge pavilion that would be integrated into the scale and built form of the surrounding business park development. The station entrance would be located at the intersection of Norwest Blvd and Brookhollow Ave with at grade access via new signalized pedestrian crossings to the Town Centre and employment area. The underground station concourse and island platform would be accessible from the street level.



Norwest Station – Indicative Layout

Being located on Norwest Blvd, the station is highly accessible by road with direct access to the M7 Motorway, Windsor Rd and Old Windsor Rd. The precinct design does not provide any additional park and ride opportunities but is primarily focused on enabling transport connections from bus, pedestrian and kiss and ride connections.

Provision for a future underground connection to the north-eastern side of Norwest Blvde would be safeguarded.

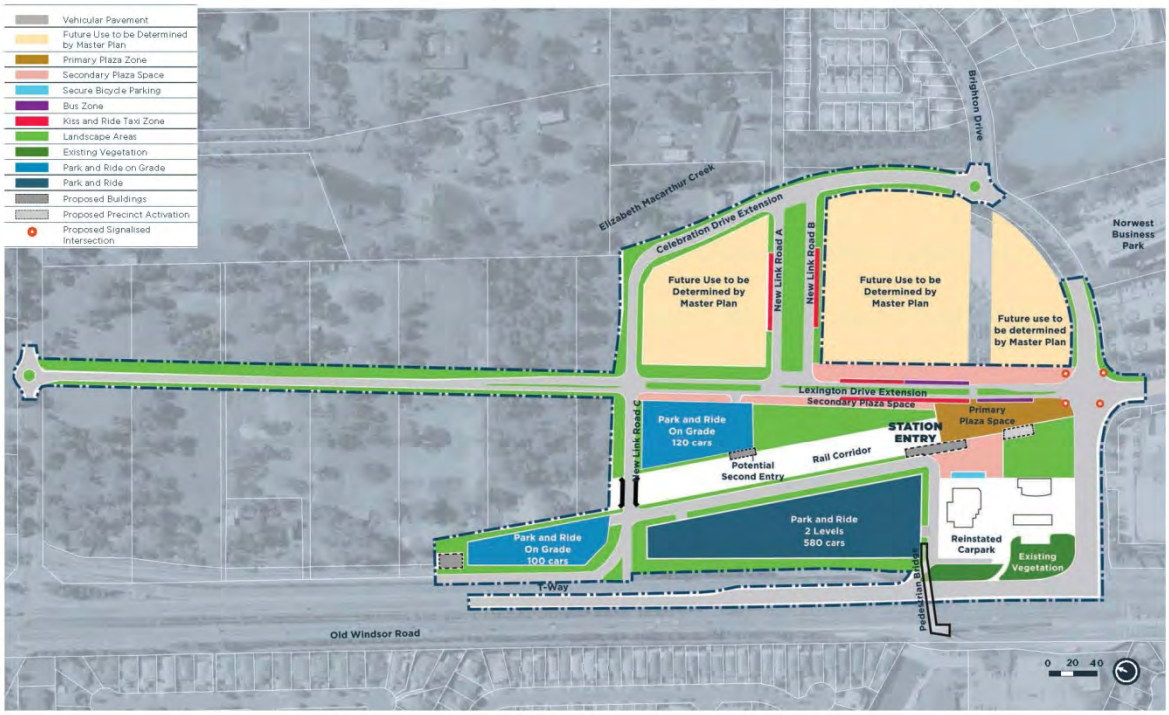
To facilitate access to the station, sections of surrounding roads and footpaths on Norwest Blvd and Brookhollow Ave would be modified and upgraded as needed.

At the intersection of Norwest Blvd and Brookhollow Ave, the existing roundabout would be replaced by a signalized intersection and pedestrian access.

The area of land to the north-east of the station would be landscaped, including planting along Norwest Blvde. Station skylights may be integrated within this landscaped area. Future use of a large area immediately to the south west of the station would be determined by a Master Planning process.

e) Bella Vista Station

Bella Vista Station precinct is located at a critical linking point between the existing wedge of the Norwest Business Park and the southern edge of a future growth corridor that runs between Elizabeth Macarthur Creek and Old Windsor Rd. The station has the potential to be a key landmark within this new commercial/mixed use centre.



Bella Vista Station – Indicative Layout

The station has been designed as a park and ride station and would improve public transport to this area of the Norwest Business Park. The station would be in a cutting that is about 1,200m long. At its deepest point the cutting would be 15m deep, retained on both sides, and wide enough for a twin track railway with a separate maintenance access road along the eastern edge. As the station is in open cut, it benefits from natural light and ventilation. The rail alignment north of the station transitions from a cutting to an elevated structure.

The station entry and concourse would be at street level and have been designed to provide access to the emerging town centre of Bella Vista and the surrounding residential catchment. Access to and parking at McDonalds would be reconfigured.

It is anticipated that a significant number of station users will arrive by private car, with cars accommodated in a series of on-grade and multi-storey car parks located further along the new extended Lexington Dr. Some 800 commuter parking spaces will be provided adjacent to the station.

The newly extended Lexington Dr to Balmoral Rd would provide the primary street address for local bus routes and kiss and ride users with weather protected bus, taxi and

kiss and ride facilities along its length. In addition a pedestrian bridge will also be built to over Old Windsor Rd to provide pedestrian access to and from the residential areas within the Blacktown City area.

A service building would be located adjacent to Old Windsor Rd west of the proposed car park and would include a track and station substation.

Future use of three large sites immediately to the east of the Lexington Dr extension would be determined by a Master Planning process.

f) Kellyville Station

The Kellyville Station precinct is located at the junction of Samantha Riley Dr and Old Windsor Rd to the east of the existing T-Way bus stops and car park and would provide rail access and a public transport interchange for the existing residents of Kellyville, Beaumont Hills and Stanhope Gardens. With future major development potential to the east and in the Balmoral Rd Release Area, the precinct would serve a growing and evolving local community.

The station would be a significant destination on day one for park and ride users for both the NWRL and the T-Way with extensive parking facilities adjacent to the station. Some 1,200 car parking spaces would be located close to the station. A two level park and ride facility would be located to the east of the station entry, with a further two on-grade facilities located beneath the rail viaduct north and south of Samantha Riley Dr. An additional 160 car parking spaces would be provided to replace affected T-Way parking.

The railway would be located on the elevated Skytrain viaduct through this precinct and the elevated station alignment offers the opportunity to design a simple transport interchange facility that maximizes connectivity between transport modes at ground level.

Platforms on either side of the track would be elevated approximately 13m above street level and would be accessed from the ground level station entry and concourse. The station entry addresses a new boulevard connector parallel to Old Windsor Rd which would provide direct access to Samantha Riley Dr and would allow unimpeded interchange to the existing T-Way to the west and the car park and potential future development to the east.

Kellyville Station – Indicative Layout

Artist's Impression of Kellyville Station

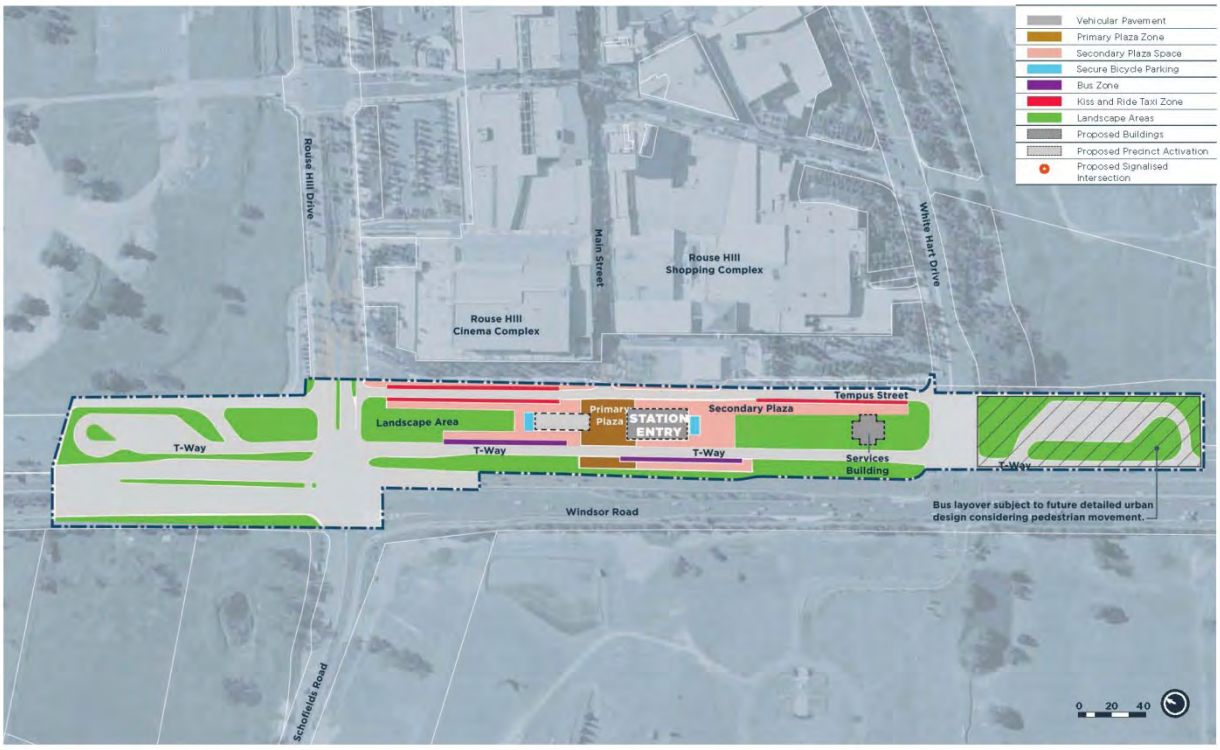
New access roads will be built and parts of surrounding roads and footpaths will be modified and upgraded. Weather protected taxi and kiss and ride stops and waiting areas would be provided along the new precinct access roads. In addition a pedestrian bridge will be built over Old Windsor Rd and the T-Way at the intersection with Samantha Riley Dr and Newbury Ave to provide pedestrian access to and from residential areas within the Blacktown City Area.

Future use of two large sites immediately to the east of the station entry would be determined by a Master Planning process.

g) Rouse Hill Station

Rouse Hill Station would be located adjacent to the existing western Town Centre entry forecourt. The station platforms would be elevated approximately 12m above street level and a canopy would provide weather protection for passengers. The station passenger areas would be naturally ventilated.

Sections of surrounding roads and footpaths would be modified and upgraded as required to facilitate access to the station.



Rouse Hill Station – Indicative Layout

As the station would be a major public transport interchange facility, the existing T-Way would be modified to accommodate the station transport interchange. The weather protected bus stops would be located between the station and Windsor Rd.

1.1. PROJECT DESCRIPTION - CONSTRUCTION

OVERVIEW

The proposed activities that would be undertaken for the rail systems and stations construction works for the NWRL include:

- station construction and fit-out;
- precinct works;
- services facility construction and fit-out at Epping and Cheltenham;

- stabling and maintenance facility construction and fit-out at Tallawong Rd;
- tunnel systems fit-out;
- at-grade surface and viaduct systems fit-out; and
- testing and commissioning.

In order to describe the potential impacts and mitigation measures the alignment has been divided into three distinct sections, being:

- Epping to Bella Vista Station – predominantly within tunnel;
- Bella Vista Station to Rouse Hill Station – predominantly on viaduct; and
- Rouse Hill Station to Tallawong Rd – predominantly at-grade or bridge structures

Site	Area (m²)	Station construction and fit-out	Station precinct works	Services facility construction and fit-out	Stabling facility construction and fit-out	Tunnel systems fit-out	At-grade surface and viaduct systems fit-out	Testing and commissioning
Epping to Bella Vista Station								
Epping Services Facility	12,000			•		•		•
Cheltenham Services Facility	9,750			•		•		•
Cherrybrook Station	75,000	•	•			•		•
Castle Hill Station	18,000	•	•			•		•
Showground Station	85,000	•	•			•		•
Norwest Station	21,000	•	•			•		•
Bella Vista Station	63,000	•	•			•		•
Bella Vista Station to Rouse Hill Station								
Balmoral Road	190,000						•	•
Memorial Avenue	120,000						•	•
Kellyville Station	100,000	•	•				•	•
Samantha Riley Drive to Windsor Road	50,000						•	•
Old Windsor Road to White Hart Drive	97,000						•	•
Rouse Hill Station	18,000	•	•				•	•
Rouse Hill Station to Tallawong Stabling Facility								
Windsor Road Viaduct	61,000						•	•
Windsor Road Viaduct to Cudgegong Road	83,000						•	•
Cudgegong Road Station to Tallawong Stabling Facility	590,000	•	•		•		•	•

Note: Site 2 described within EIS 1 was deleted as part of the EIS 1 preferred infrastructure report

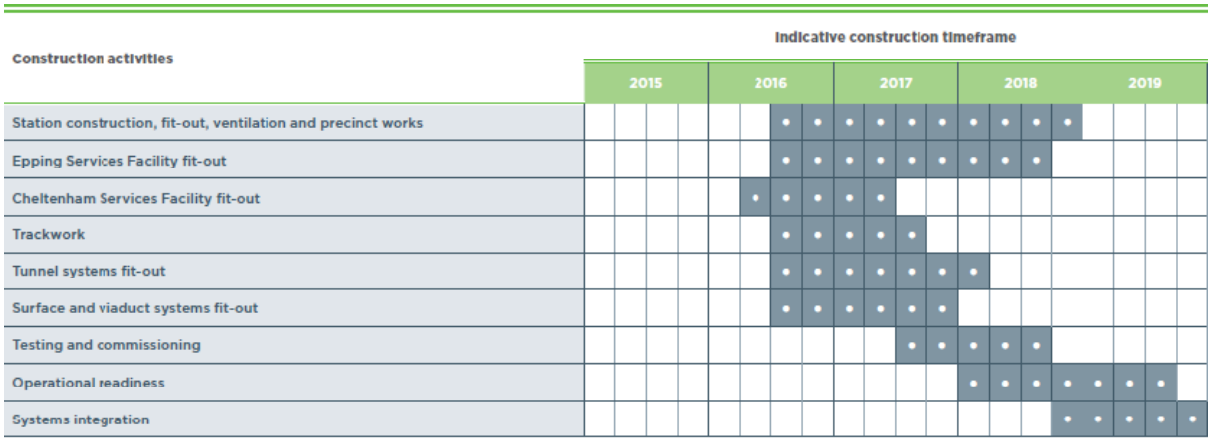
Construction Site Activities

CONSTRUCTION PROGRAM

The rail systems and stations construction work component of the NWRL would commence in 2016 as the sites are progressively handed over from contractors undertaking the Stage 1 Major Civil Construction Works detailed in EIS 1.

The major civil works contractor(s) would demobilize plant and equipment from the sites which would not be required by the subsequent Stage 2 Rail Systems and Stations contractor(s) and hand over the site. Any sites which would not be required to undertake the Stage 2 construction works would be rehabilitated and re-vegetated by the Stage 1 contractor.

The total period of rail systems and stations construction works is expected to be approximately four years. This program is shown below



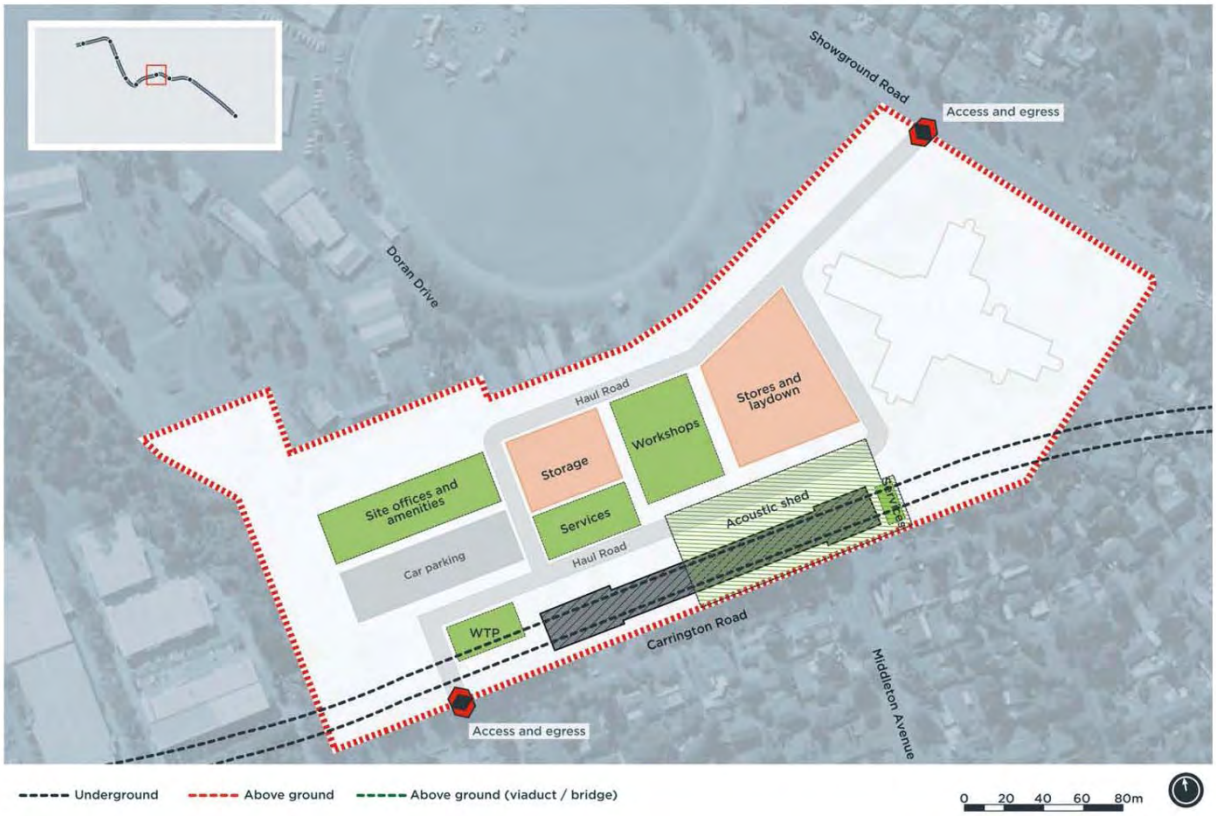
Indicative Construction Program

STATION CONSTRUCTION AND FIT-OUT

Castle Hill, Showground and Norwest Stations are proposed to be located underground within the tunnelled component of the project. The underground station works would involve the construction of:

- platforms
- vertical supports
- intermediate supports
- roof slabs

An indicative construction site layout for Showground Station is shown below.

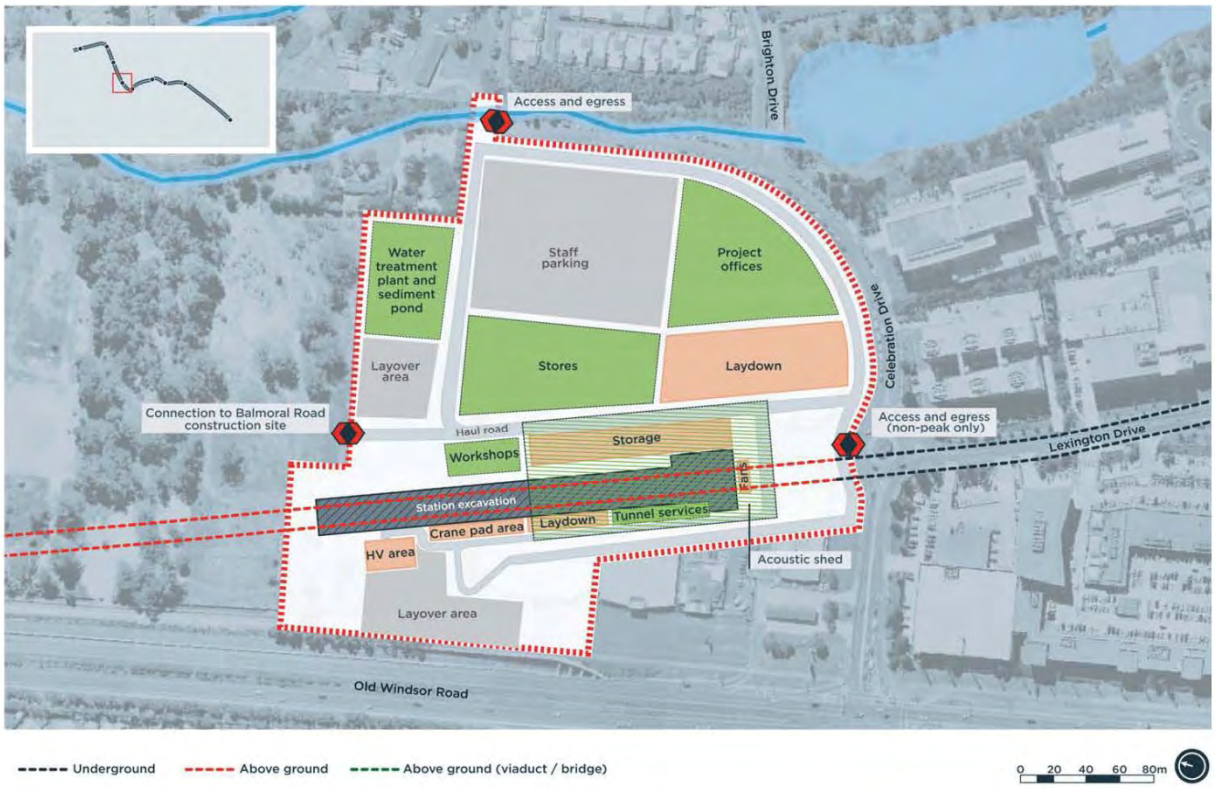


Showground Station – Indicative Construction Layout

Cherrybrook and Bella Vista Stations are in an open cut. The construction includes:

- support columns and foundations for vertical transport structures and the station buildings;
- the platform structure;
- vertical transport structures and pedestrian accesses;
- platform canopies;
- emergency egress stairs; and
- station buildings.

An indicative construction site layout for Bella Vista Station is shown below.

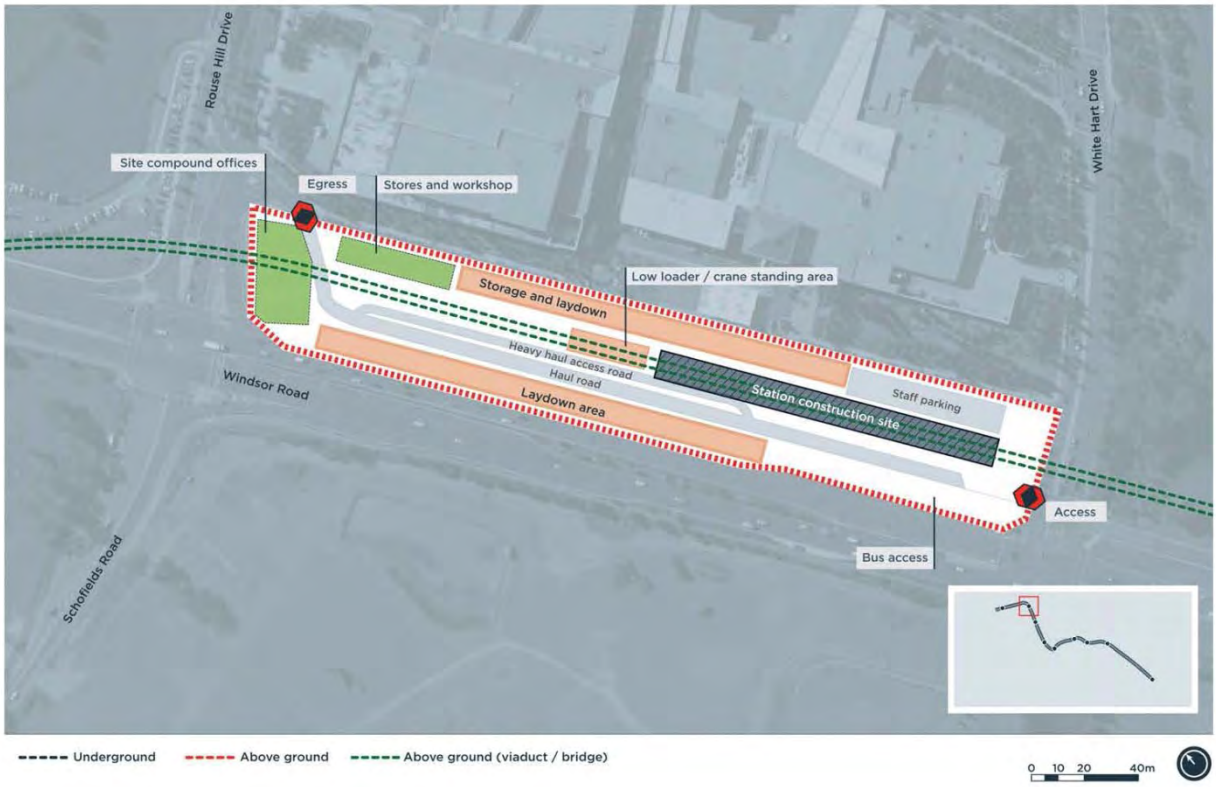


Bella Vista Station – Indicative Construction Layout

Kellyville and Rouse Hill Stations are proposed to be located on the Skytrain viaduct structure which would have been completed during Stage 1 major civil construction works. The construction of the elevated stations would include:

- support columns and foundations for the station structure;
- emergency egress stairs;
- platform structure;
- vertical transport structure;
- platform canopy; and
- station buildings.

An indicative construction site layout for Rouse Hill Station is shown below.



Rouse Hill – Indicative Construction Layout

TUNNEL RAIL SYSTEMS FIT-OUT

Tunnel and tunnel rail systems fit-out works would include:

- ventilation fit-out;
- rail track slab and rail fastenings;
- rail installation, fixing and welding;
- cable and equipment installation including signaling, communication and electricity;
- overhead wiring installation; and
- other equipment including lighting, drainage works, and fire and life safety systems.

Access points for tunnel fit-out would include the portal at Bella Vista, Showground and Cherrybrook Stations. The Balmoral Rd and/or Memorial Ave construction sites would be utilized for the storage and co-ordination of material delivery into the tunnels. Alternate access via the underground stations may be possible; however this access would reduce as the station fit-outs progress.

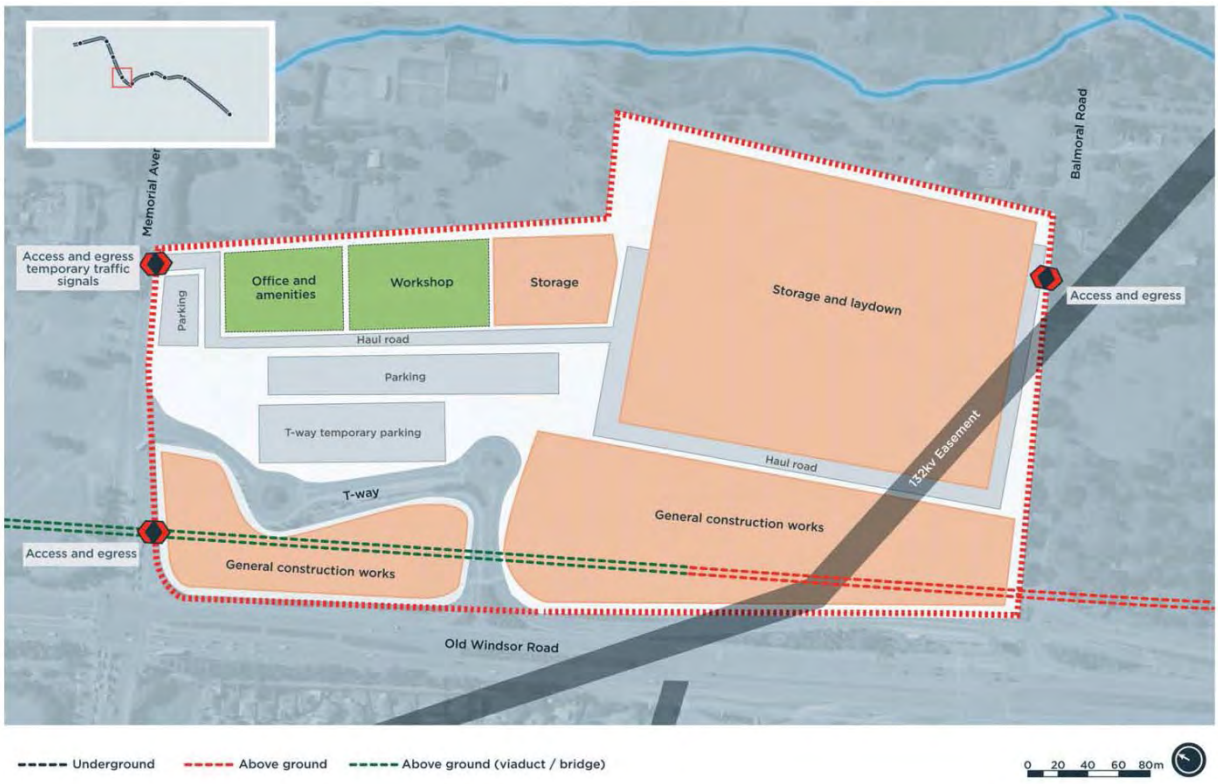
SURFACE AND VIADUCT RAIL SYSTEMS FIT-OUT

The rail systems fit-out for the surface and viaduct sections of the alignment would follow similar processes to the tunnel fit-out and include:

- track and rail fastening;
- rail installation, fixing and welding;
- cable and equipment installation including signaling, communications and electricity;
- overhead wiring structures installation; and
- other equipment including lighting, drainage works, and fire and life safety systems.

The main access point for the viaduct fit-out would be the Tallawong Rd Stabling Facility and the Balmoral Rd and/or Memorial Ave construction sites, with secondary access provided via other surface work sites.

An indicative construction site layout for Memorial Ave is shown below.



Memorial Ave – Indicative Construction Site Layout

TESTING AND COMMISSIONING

The rail systems at each individual site would be commissioned as standalone entities.

Once all services fit-out work is complete, testing and commissioning would occur in the following three stages:

- **Assemble testing procedures and pre-checks** – the collection of safety and quality assurance documentation and commissioning readiness checks;

- **Installation and operation tests** – all tests and checks with installation elements of work; and

- **Site acceptance tests** – the final inspection, testing, commissioning and validation of individual systems.

During the final stages of commissioning, test trains would be run on the line for final signal system testing and commissioning, and traction power testing.

OTHER CONSTRUCTION ISSUES FOR THE HILLS SHIRE

a) Traffic Management

The proposed access to the construction worksites is detailed in the table below along with anticipated daily heavy and light vehicle movements. These vehicle movements are associated with waste removal, material deliveries, and the arrival and departure of construction workers. Wherever possible, access is proposed to be gained from major arterial roadways. A vehicle movement is defined as a vehicle entering or leaving the site. Therefore each vehicle would generate two movements.

Cherrybrook Station	Castle Hill Road at Glenhope Road (All movements)[1] Robert Road (left in, left out)[1] Franklin Road (left in, left out, right out)	150	60
Castle Hill Station	Old Northern Road / Terminus Street (all movements) McMullen Avenue (left in, left out) Crane Road (left out only)	150	30
Showground Station	Showground Road (all movements) Carrington Road (all movements)	120	60
Norwest Station	Norwest Boulevard Brookhollow Avenue	150	20
Bella Vista Station	Celebration Drive (all movements) Balmoral Road (right in, left out)	100	20
Balmoral Road / Memorial Avenue	Balmoral Road (left in, right out) Memorial Avenue (all movements)	200	300
Kellyville Station	Samantha Riley Drive (all movements)	100	40
Rouse Hill Station	White Hart Drive (left in) Rouse Hill Drive (left out)	100	40
Windsor Road Viaduct	Rouse Hill Drive (left in, right out) Commercial Road (right in, left out) Windsor Road (left in, left out)	150	60

Access Routes to Construction Sites

EIS 2 works are expected to commence after EIS 1 works are largely or fully complete, and as such the peak vehicle movements nominated in EIS 1 and EIS 2 would not coincide at the nominated sites.

b) Materials

The rail systems and stations construction works would require the use of a variety of construction materials. The major items and indicative quantities would be:

- concrete – 250,000 m3
- steel – 35,000 tonnes

c) Construction Hours

The proposed construction hours for the underground and aboveground activities are outlined below

Activity	Construction Hours	Comments or Exceptions
Underground Construction Activities		
Trackwork, tunnel systems and tunnel rail systems.	24 hours per day, seven days per week	Activities on the surface that support trackwork, tunnel systems and tunnel rail systems may need to occur 24 hours per day, up to seven days per week.
Above ground Construction Activities		
Above ground construction	❖ 7am – 6pm Monday to Friday ❖ 8am – 1pm Saturdays ❖ No works on Sundays or Public Holidays	Surface works supporting underground construction (eg concrete pumping, truck loading) would be expected to be required 24 hours per day, up to seven days per week at sites where noise impact management measures have been established. Non-disruptive preparatory work, repairs or maintenance may be carried out on Saturday afternoons between 1pm and 5pm or Sundays between 8am and 5pm. Activities requiring the temporary possession of roads may need to be undertaken outside the standard daytime construction hours during periods of low demand to minimise safety impacts and inconvenience to commuters. Activities requiring rail possessions may need to be undertaken outside the standard construction hours up to 24 hours per day, seven days per week.

Proposed Construction Hours

Other works which are proposed to be undertaken outside of the standard daytime construction hours without any further approval include:

- works that are determined to comply with the relevant noise management level (NML) at the nearest sensitive receiver;

- works required to be undertaken during rail possessions;

- works required to be undertaken by RMS outside the standard hours;

- the delivery of materials outside of approved hours as required by the Police or other authorities (including RMS) for safety reasons;

- where it is required to avoid the loss of lives, property and/or to prevent environmental harm in an emergency; and

- where agreement is reached with affected receivers.

With the exception of emergency works, activities would not take place outside standard daytime construction hours without prior discussion with and/or notification of local residents, businesses and the EPA.

d) Construction Plant and Equipment

The table below lists the typical plant and equipment likely to be used for EIS 2 construction activities.

Plant and Equipment	Number per site[1]
Excavator (3 tonne)	1
Excavator (6 tonne)	4
Excavator (10 tonne)	2
Excavator (20 tonne)	2
Excavator (30 tonne)	1
Skidsteer loader	2
Backhoe / front end loader	2
Bulldozer	1
Grader	2
Vibratory roller (10 tonne)	3
Dump truck (15 tonne)	5
Concrete truck	2
Concrete pump	2
Concrete vibrator	2
Bored piling rig (60 tonne)	1
Bored piling rig (20 tonne)	4
12 tonne track mounted drill rig	2
Compressor (600 CFM)	1
Compressor (1500 CFM)	2
Concrete saw	1
Rockbreaker	1
Jackhammer	1
Generator	1
Lighting tower	1
Crawler crane (50 tonne)	1
Mobile crane	3
Alimak hoist	1
All terrain forklift	3
Elevated work platform	6
Low loader	1
Water treatment plant	1
Hi Rail cable installation vehicles	18 in total across the project
Hi Rail overhead wiring vehicles	9 in total across the project
Specialised on track plant	9 in total across the project
Rail maintenance vehicles	9 in total across the project
Hand tools	Numerous

Note 1: Plant and equipment numbers are per site unless otherwise indicated

This list is indicative only. The actual plant and equipment used on site and the numbers required would be further refined during the detailed design phase of the project.

e) Workforce

During the rail systems and station construction works, approximately 600 jobs are expected to be directly created during the peak construction period. Further jobs would be indirectly created by the project.

A breakdown of the peak construction workforce across the alignment is provided below.

Construction Workforce

RECOMMENDATIONS

1.1 Details of fire fighting, passenger evacuation and rescue arrangements along the entire route of the NWRL be referred to the relevant emergency services (Fire & Rescue NSW, Rural Fire Service, Police Service, Ambulance Service, State Emergency Service) for their consideration and endorsement prior to the commencement of operations.

1.2 Heavy vehicle access be provided at ground level along the route of the elevated Skytrain for maintenance and emergency vehicle access.

1.3 A detailed Maintenance Management Plan for all above ground facilities be prepared in consultation with the relevant Councils, to ensure that all structural and landscaped assets are maintained by the NWRL operators to a high standard. Particular attention is to be given to graffiti removal, litter removal, soft and hard landscaping maintenance.

1.4 Detailed designs of bus interchanges be undertaken in consultation with the relevant bus operators with such designs to include appropriate amenity facilities for bus drivers.

2. SUSTAINABILITY

The EIS acknowledges that sustainability is a priority throughout the life cycle of the NWRL. The planning around the project responds to the ESD principles as stated in the EP&A Act to varying degrees.

The Document contains both the Environment and Sustainability policy and Strategy and responds to the Director-General Requirements, conditions of Approval and Statement of Commitments.

a) The North West Rail Link Sustainability Policy

The Sustainability Policy establishes the overarching framework for the development. The Policy acknowledges that the project has the potential for both positive and negative

sustainability related impacts and aims to maximise the potential sustainability benefits while minimising negative impacts. The policy establishes five areas of commitments;

- Leadership - includes coordinated decision making and new benchmarks for design and contractor performance;
- Community and Customer – Includes access and community engagement;
- Land use integration and place making – includes broader land use planning objectives;
- Embedding sustainability – includes a commitment to systems to maintain and monitor sustainability performance; and
- Accountability – includes public reporting and accountability.

b) The North West Rail Sustainability Strategy

The Sustainability Strategy contains 14 more specific sustainability objectives with specific initiatives and targets. Potential contractors will be required to address each of these objectives in any tender.

RECOMMENDATIONS

2.1 Expressed under the commitment to leadership in the Sustainability Policy is a commitment to "Explore new benchmarks for the transport infrastructure sector by requiring high standards from our designers, contractors and suppliers"

This commitment is the key principle to assure the success of the project in the context of sustainability. Specifications for further work and design parameters must demonstrate innovation and leadership in the pursuit of the best practical sustainability outcome to assure the overall impacts of the project are acceptable in the community and that the benefits of the project are optimised.

2.2 A number of the initiatives and targets are not yet quantified. Clear targets should be adopted to establish clear performance standards for project deliverables and future contractors' specifications. For example, offsets for electricity needs of 100% of the operation and 20% of the construction phase of the project should be a commitment rather that undertaking to merely explore options.

3. CONSULTATION

It is essential that the delivery of the NWRL provides active, meaningful engagement processes to help The Hills Shire residents be a part of the delivery. Significant construction impacts will arise and opportunities for affected residents to be informed, engaged and part of the solution will prove valuable.

Extensive consultation has occurred over the last 10 years on the provision of a rail link to the north west of Sydney. T he first consultation occurred in 2002 with the community, local business and industry groups and included:

- Publication of the initial Overview Report (2002);
- Consultation for the Environmental Assessment and Concept Plan (2005-7); and

- Publication of the Preferred Project Report (2007) Supplementary Submissions Report (2008).

Transport for NSW has taken a proactive approach to consulting the community from April 2011 when the NSW Government announced its intention to proceed with the NWRL. Since that time the following activities have been undertaken:

- A project Community Information Centre at Castle Hill opened (June 2011);
- Implementing an information/feedback line and an interactive website;
- Local newspaper advertising to advise of Information Sessions and to provide
- Project Updates;
- Consultation about the Project Overview Report (July 2011);
- Place Managers appointed to liaise with residents, businesses and community
- organisations (October 2011);
- Ongoing consultation following Ministerial announcement of the project in December 2011;
- An interactive Industry engagement process has been ongoing since December 2011;
- Consultation throughout the exhibition of the Environmental Impact Statement for Major Civil Construction Works (EIS 1); and
- Public submissions received during exhibition and following exhibition of EIS 1 and the publication of a Submissions Report responding to the issues raised.

Transport for NSW will continue to engage with government agencies, local councils, industry, key stakeholders and the community throughout all phases of the project.

EIS 2 will be placed on public exhibition for a minimum period of 30 days. Transport for NSW will continue to commit significant resources to maintaining a broad based community and stakeholder consultation process during the public exhibition of EIS 2 and throughout this project. It is anticipated that a range of activities will be undertaken to enable stakeholders to learn more about EIS 2 and assist in better informing public submissions.

These activities will include:

- A range of displays and other information at NWRL Community Information Centre in Castle Hill;
- A range of written material that describes the plans and their impacts, customised to each location. An EIS 2 summary booklet ™. Community information and feedback sessions including access to fact sheets, maps, information display boards and technical specialists;
- NWRL will involve DP&I in the information sessions to ensure the community has access to information about wider precinct planning around the stations;

- All information sessions will be widely promoted including advertising in the local

- press, handing-out information at key locations, and through letters of invitation to key community and government stakeholders and letterbox dropping information newsletters along the corridor;

- Each session will display information that describes project proposals for the area. Information and feedback sessions will be held at venues along the corridor;

- An EIS 2 exhibition newsletter will be delivered to approximately 45,000 residents and businesses along the alignment;

- A submissions and 'have your say' guide to assist people, groups and agencies that wish to make a submission to the Department of Planning & Infrastructure;

- Tailored deliberative research forums will also be held along the alignment to seek community input into station precinct design; and

- Key stakeholder briefings will be given to:
  - Government agency and council staff;
  - Councillors – Hornsby Shire, The Hills Shire and Blacktown City Councils;
  - SEWPaC;
  - Key land owners;
  - Community organisations/interest groups; and
  - Peak bodies.

Information about EIS 2 on the project is available through:

- Interactive online forums and material will be available on the project website;

- The 1800 information line will continue to operate; and

- Place Managers who actively engage with stakeholders to ensure they are aware EIS 2 is on exhibition.

Transport for NSW will continue to proactively engage with the community. NWRL will maintain a whole of project stakeholder engagement, communications and community engagement function following determination of EIS 2.

RECOMMENDATIONS

3.1 It is recommended that Transport for NSW involve Council through on-going consultation and involvement as part of the further planning for the North West Rail Link and the railway station precincts.

4. SOIL AND GROUNDWATER

For the purposes of this assessment, existing environmental conditions are assumed to be those that exist at the time of publication of EIS 2. However, as the EIS 2 related works would only proceed upon completion of the major civil construction works (assessed in EIS 1), the future environment would be altered as a result of those works.

a) Operational impacts for groundwater

Potential operation impacts to groundwater drawdown include:

- Localised drawdown within a narrow corridor in which the tunnel and station boxes are centred; and
- A fall in long term local groundwater levels to levels governed by the level of drainage infrastructure.

Drawdown is the impact on the water table levels as a result of water movement into the tunnel system incurred by bed cracking or interference with geological features beneath drainage lines. A long term drawdown of more than two metres is estimated for the water table underneath the upper reaches of Cattai Creek (as a result of tunnelling and station construction addressed in EIS 1). A long term drawdown of less than one metre is estimated for the water channels of Second Ponds Creek and an unnamed tributary, increasing to more than two metres at the confluence of the drainage channels at about Ch 43,000 where the tunnel comes close to the surface (refer to Appendix C Geotechnical Long Section for chainage locations). The drawdown estimates are for the water table, not for the water flowing in the channel. Mitigation measures E14 in EIS 1 describes the requirement to undertake visual inspections of creeks above the tunnel to monitor for drawdown impacts to creeks.

Note that Section 15.5.4 of EIS 1 discusses the identification of impacts to Groundwater Dependent Ecosystems. It was identified that the potential impacts and risk level associated with the loss of aquatic fauna habitat, general hydrological changes and altered groundwater recharge were all low.

b) Construction impacts for soil erosion

The proposed construction associated with station development would include road development and earthmoving for precinct development. The proposed construction works (described in Chapter 7) has the potential to generate erosion and sedimentation impacts. Each of the defined construction sites along the alignment would be subject to site specific potential impacts from:

- Soil erosion and soil disturbance;
- Stockpiling procedures and locations;
- Dust generation (addressed in Chapter 19); and
- Land remediation on completion of construction.

Potential impacts that could arise during construction of works as described in Chapter 7 include:

- Turbid, saline or contaminated water collected within excavations and station boxes
- requiring disposal;
- Contaminants such as oils and chemicals from construction activities leaking to the water table where excavations are above the water table;

- The lowering of the water table could result in loss of output from wells in the vicinity of the rail line;

- Any deep excavations are likely to require localised dewatering during the construction phases. Dewatering programmes would likely involve construction of extraction bores, gravity drainage systems and/or pumping to extract groundwater. Discharge of the extracted groundwater would depend on the groundwater quality but options include discharge to creeks or temporary storage in detention basins to reduce turbidity prior to discharge. Potential groundwater drawdown impacts from the Stage 2 construction works are considered to be negligible.

Mitigation measures developed to address construction impacts would form part of the Construction Environmental Management Framework, provided in Appendix B which details the environmental, stakeholder and community management systems and processes for the construction of the NWRL.

These mitigation measures and their application to the construction sites for the NWRL are presented in Chapter 8. A number of mitigation measures detailed in other chapters would also be relevant to soils and groundwater.

These include:

- Mitigation measures relevant to water discharge to surrounding waterways, and the storage and handling of hazardous substances and dangerous goods - refer Chapter 18 (Surface Water and Hydrology); and

- Mitigation measures relevant to contaminated spoil - refer Chapter 19 (Non-Key Issues – Waste Management)

RECOMMENDATIONS

Mitigation measures proposed in EIS 2 are considered satisfactory.

5. TRAFFIC AND TRANSPORT

An Operational Environmental Management Plan would be developed in the future detailing the processes to manage environmental impacts during the operation of the project. Mitigation measures have been developed to avoid, reduce and manage identified potential operational impacts.

The proposed mitigation measures are outlined below:

No.	Mitigation Measures	Applicable Areas
OpT1	Advisory and way finding signage would be used to provide multi modal guidance to, from and within the station precincts.	Stations
OpT2	Maximising pedestrian accessibility to the stations with a view to reducing car based travel to and from the stations.	Stations
OpT3	Provision of cycle storage facilities at stations to increase the opportunity and catchment for non-motorised forms of transport to and from the stations.	Stations
OpT4	Provision of commuter car parking at selected stations to reduce total car based trip lengths and encourage the use of rail.	Stations
OpT5	Permanent Variable Message Signs, where feasible and reasonable, would be provided to advise drivers of any potential delays, traffic diversions, speed restrictions, or alternative routes.	Wider road network

No.	Mitigation Measures	Applicable Sites
T1	Directional signage and line-marking would be used to direct and guide drivers, cyclists and pedestrians past construction sites and on the surrounding network. This would be supplemented by permanent and portable Variable Message Signs, where reasonable and feasible, to advise drivers of any potential delays, traffic diversions, speed restrictions, or alternative routes.	1 – 17
T2	The public would be notified of proposed traffic changes by newspaper, radio, project web site and other forms of community liaison.	1 – 17

No.	Mitigation Measures	Applicable Sites
T3	Co-ordination would occur with TfNSW and RMS via the Transport Management Centre's Traffic Operations Manager in the event of incidents or undue congestion.	1 – 17
T4	Management of pedestrian, cyclist and vehicular access to and past construction sites would occur to ensure safe entry and exit procedures. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals and modification to existing signals or, on occasions, police presence.	1 – 17
T5	Access to existing properties and buildings would be maintained.	1 – 17
T6	Traffic controllers would manage heavy vehicle movements at worksites, and monitor the need for pedestrian control.	1 – 17
T7	All trucks would enter and exit the worksites in a forward direction, where feasible and reasonable.	1 – 17
T8	The management of buses at key transport interchanges such as Castle Hill and Rouse Hill would be reviewed during detailed construction planning to minimise impacts on existing services.	5 and 14
T9	The T-way operations including car parking would be maintained at all times during the construction of the NWRL. This includes maintained existing sight lines to T-way bus stops and within T-way car parks, where possible. Where this is not possible, suitable alternative measures would be implemented (eg CCTV with active surveillance) where reasonable and feasible.	9 – 14
T10	The need for, and provision of, alternative remote parking locations and shuttle bus transfers for daytime and night time construction staff would be considered for all construction sites during detailed construction planning.	1 – 17
T11	Special event bus services for Sydney Olympic Park (Royal Easter Show, and Major Sporting and Entertainment Events) would be managed, in particular, in Carrington Road at the Showground Station site, to ensure minimal disruption.	6
T12	The Traffic and Transport Liaison Group established for the NWRL would consider individual events and any other special event needs, and make reasonable and feasible short-term adjustment to the construction phase activities and / or review and update detailed Construction Traffic Management Plans.	1 – 17
T13	Site traffic would be managed, where reasonable and feasible, to avoid significant movements in the AM peak in the critical southbound direction and in the PM peak in the critical northbound direction on Beecroft Road at Epping.	1
T15	Access would be maintained to sections of the pedestrian bush track at Cheltenham which would not be affected by construction works. Additionally, the provision of an alternative track would be considered during construction planning.	3
T16	Access to the Bella Vista Station site during the daytime would be at a location off Celebration Drive to the east of the Lexington Avenue intersection, to minimise traffic impacts at the Celebration Drive / Lexington Avenue intersection.	8

No.	Mitigation Measures	Applicable Sites
T17	If construction of NWRL occurs before the Schofields Road upgrade, interim upgrading of the road would be undertaken (unless otherwise agreed with RMS) with improved pavement quality and wider sealed shoulders to accommodate heavy vehicle usage.	15 – 17
T18	A dilapidation report would be prepared prior to construction for all affected local roads from the construction access / egress point to the arterial road.	1 – 17
T19	An alternative pedestrian route via Ray Road and Kandy Avenue would be appropriately signposted for pedestrian movements between Epping Town Centre and the Beecroft Road M2 Motorway overbridge.	1
T20	Truck movements on Ray Road would be restricted during the AM and PM peak periods. During these times, truck access and egress to and from the site would be via Beecroft Road only.	1
T21	Staff working at the Epping Services Facility would be discouraged from parking on local roads and encouraged to: ▪ Use public transport. ▪ Car share. ▪ Park in a designated off-site area and access the site via shuttle bus.	1
T22	Where schools occur in the immediate vicinity of the construction sites, heavy vehicle movements would be minimised (where reasonable and feasible), between 8:00-9:30 am and 2:30-4:00 pm Monday to Friday (on school days).	1 – 17
T23	Access and egress via Norwest Boulevard would be intermittent and only outside peak periods.	7
T24	Signage would be established at Epping to direct pedestrians via the alternative pedestrian route along Ray Road and Kandy Avenue.	1
T25	Construction traffic to and from the Cheltenham Services Facility would be directed to treat Beecroft Road / Kirkham Street intersection as left in / left out only.	3
T26	Alternative access to the Showground would be developed and detailed in the relevant Construction Traffic Management Plan.	6
T27	Alternative car parking would be provided, in consultation with The Hills Shire Council and the Castle Hill and Hills District Agricultural Society, for car spaces lost within the Showground precinct.	6
T28	Provision for buses to safely pull up to the indented bus bay located on Norwest Boulevard east of Century Circuit would be investigated as part of the relevant Construction Traffic Management Plan.	7
T29	Alternative car parking would be provided for car spaces lost at the Burns T-way bus stop. The alternative parking may be accommodated at the Balmoral Road T-way bus stop.	10

No.	Mitigation Measures	Applicable Sites
T30	Alternative car parking would be provided for car spaces lost at the Riley T-way bus stop. The alternative parking is likely to be provided to the north of Samantha Riley Drive.	11
T31	An alternative location for the cycle lockers at Rouse Hill would be identified during detailed construction planning.	14
T32	Alternative car parking would be provided for car spaces lost at the Rouse Hill Station Construction site.	14
T33	Either Cudgegong Road or Tallawong Road would remain open to traffic and bus services to maintain a route from Guntawong Road to Schofields Road.	17

Site 1 - Epping Services Facility, Site 2 – NOT USED, Site 3 - Cheltenham Services Facility, Site 4 - Cherrybrook Station, Site 5 - Castle Hill Station, Site 6 - Showground Station, Site 7 - Norwest Station, Site 8 - Bella Vista Station, Site 9 - Balmoral Road, Site 10 - Memorial Avenue, Site 11 - Kellyville Station, Site 12 - Samantha Riley Drive to Windsor Road, Site 13 - Old Windsor Road to White Hart Drive, Site 14 - Rouse Hill Station, Site 15 - Windsor Road Viaduct, Site 16 - Windsor Road Viaduct to Cudgegong Road, Site 17 - Cudgegong Road Station and Tallawong Stabling Facility, and Tunnels

RECOMMENDATIONS

Mitigation measures proposed in EIS 2 are considered satisfactory.

6. NOISE AND VIBRATION

The assessment and review of noise and vibration has been limited and cannot be specific as the design for the viaduct sky train, the design for the station structures and the design for the ventilation systems have not been done and the exact trains and their noise output are not known.

The report has accumulated the data from current and past background noise assessments to develop project specific noise level goals. The consultants have then considered noise from what they thought to be a similar train, modelled the likely sound level contours and provided a prediction of extent of the impact. There are however still a lot of variables and if the detailed design stage results in significant changes a reassessment will be required.

Design of the stations and ancillary facilities is to conform to the noise limit goals of the assessment.

The design option of an elevated sky train is particularly challenging in regards to noise as it is likely project noise further compared to a rail line at ground level or lower than ground level. The report found that noise and vibration mitigation is required and recommends the use of barriers and dampeners to reduce noise.

Noise mitigating recommendations have also been provided for the multi storey car parks at the Showground Road station and Cherrybrook Station where noise levels are predicted to exceed the intrusiveness criteria at both stations by up to 4 dB without any intervention.

This assessment also provides information on construction of stations and other infrastructure that was not included in EIS 1.

a) Existing Environment

Only 25 sites were monitored to determine the background noise level for the entire length of the project and the sites were only measured once. Ten sites were monitored between October and November 2011. This information was supplemented with other monitoring undertaken in relation to the line since 2005. Older assessments may not reflect the current background noise level. In many cases the background noise level may have risen because of increases in traffic but also may have decreased because construction has ceased.

Unattended noise monitors were left for one week and the background noise levels were reported as Rating Background Level (RBL). This is a valid means of measuring noise over time but a drawback is that the median of the results is used. In locations where there is a large difference between noise at peak hour and quieter times through the day the impact during the quiet times will be underappreciated.

Given the scale of the project it would be appropriate that further background noise assessments be undertaken at additional locations and at varying times through the year to assure the accuracy of the modelling and confirm the extent of the impacts.

b) Potential Impacts

It is proposed that during peak hour trains will run every five minutes with 302 train trips in a 24 hour period and a predicted future increase to 422 trips.

The noise imposed on residents is assessed and expressed as LAeq. This is the equivalent continuous noise level, that is, the level of noise equivalent to the energy average of noise occurring over a measured period. It provides information on the total amount of noise but not the noise level of each train.

In the report the review of noise has concentrated on airborne operational noise which is noise directly from the trains. Other potential noise source would be structural vibration noise from the viaduct but as this has not been designed in detail this has not be fully assessed.

In regards to airborne operational noise, is it has been assumed that all the noise from the trains will be from the noise of the metal wheels on the metal rails. The consultant considers that the smaller wheels of the trains proposed will cause less noise that Sydney's conventional trains. Therefore barriers, if place down level with the wheels need only be approximately a metre in height to be effective.

The report does not provide consideration of noise from elsewhere from the trains such as squeaks or rattles.

The investigation found that mitigation of direct noise through barriers, use of noise absorption materials on the barriers and dampeners would be required in all areas of surface track.

Source noise control in the form of rail dampers would be expected to provide around a 4 dB reduction in direct noise. The full benefit of rail dampers would be for the receivers where direct airborne noise is dominant, particularly for receivers that are elevated relative to the tracks. At locations where structure-radiated noise dominates, the net benefit would be reduced to around 2 dB to 3 dB.

Noise barriers one metre in height, located on the viaduct edge have been recommended and are predicted to give an approximate 6 dB reduction in net noise to existing detached houses around 50 metres to 100 metres from the proposed viaduct. As with rail dampers, the benefit of noise barriers is reduced at locations where structure-radiated noise dominates.

The report states:

> *"The reductions in direct airborne noise expected from source control and noise barriers are cumulative in areas where the track is at grade, in cutting or on embankment. However in the viaduct sections, the net noise benefit for typical existing one or two-storey detached houses is limited by the noise contribution from the viaduct structure. Once the direct airborne noise level is reduced to below the structure-radiated noise, further reductions in airborne noise would not significantly reduce the overall noise levels. To be effective, noise mitigation efforts must concentrate on the dominant noise source.*
>
> *On the basis of the preliminary investigations, the baseline noise mitigation measures in* ***Table 10.6*** *have been adopted for the more detailed assessment."*

The modelled noise levels represented as sound contours and overlaid on to aerial photographs provided in the Technical Paper show that elevated noise levels extend well beyond the railway corridor. The noise contours for 49 and 47 dB(A) extend , beyond the calculation area and therefore are not plotted on the maps. So the full spread of noise has not been provided.

The report recognised that there were five areas where an exceedance of the adopted residential trigger levels was expected and where additional noise attenuation was recommended. This involved five detached houses in the area of Fitzroy Place to Lycettt Avenue, Kellyville.

There was no discussion in the report of noise resulting from the use of brakes other than in the marshalling yards at the end of the line which is in the Blacktown Local Government Area. It is unclear if this was not considered or known not to be a problem. Brake noise from trains is a current problem on other rail lines and particularly in the Beecroft area.

The report considered that noise of trains from the tunnels escaping through the ventilation exhaust could be controlled but there were no specific details provided on the exhaust system.

Noise from the operations at stations is a significant issue that was not fully addressed as detailed designs have not yet been produced. It is expected that station activities will be required to conform to the adopted residential trigger levels or planning goals.

The proposed tracks are to be continuously welded. Old lines have tracks that are jointed where sections are bolted together leaving gaps and causing the familiar clacking noise. It is essential that the new tracks are continuously welded. Crossovers, where lines merge or cross can cause additional noise. In this Council's area a crossover is located north of the Bella Vista Station.

The noise of trains used for the modelling was based on trains travelling at 80km. The potential speed of the trains is more than 80 and over 120 between Rouse Hill and Kellyville stations and over 100 between Kellyville and Bella Vista. The accuracy of the model to correctly calculate the increased noise of the trains at speed is not known.

Vibration in tunnel areas

The means of mitigating the impact of vibration is to provide a resilient (rubber) layer between the rail and the tunnel foundation.

Some areas along the tunnel have been identified as needing high or very high attenuation based on depth of tunnel, proximity to stations and sensitive land uses. Sensitive land uses can change. In fact in their list of medical premises the relocation of the Castle Hill Day Surgery has not been identified (Table 10.12).

RECOMMENDATIONS

6.1 It is recommended that a cautious approach be taken in deciding where vibration attenuation is not needed. Where there is any doubt about the impact of vibration, apply attenuation measures.

6.2 The adopted residential trigger or planning goals for night time noise should be 50dB(A) rather than the proposed 55dB(A) in consideration of the area in which the train line is proposed. Further the draft Rail Infrastructure Noise Guideline recommends 50 dB at night for light rail. It provides 55 dB at night for heavy rail

which is defined as operating passenger and / or freight trains. No freight trains are proposed. The Industrial noise policy also recommends general planning goals of 45 or 50dB(A) as the maximum for an urban area at night.

6.3 Continuous welded rail be provided.

6.4 A schedule of periodic noise monitoring of the operation of the rail line (at least every two years) as noise attenuation methods will largely be reliant upon noise dampeners and noise absorption materials which can perish and wear over time resulting gradual increases in noise levels.

6.5 A schedule of periodic noise monitoring of the operation of the rail line (at least every two years) as noise attenuation methods will largely be reliant upon noise dampeners and noise absorption materials which can perish and wear over time resulting gradual increases in noise levels.

7. EUROPEAN HERITAGE

Assessment Methodology

A European Heritage Report was prepared by Godden Mackay Logan which assessed the impacts on European heritage from the construction and operation of the stations and rail infrastructure associated with the NWRL.

The methodology for the report included:

- Review of statutory heritage lists, including the State Heritage Register, heritage schedules on Local Environmental Plans (LEPs) and Regional Environmental Plans (REPs), State Agency Section 170 heritage and conservation registers and the Register of the National Estate, National Heritage List and Commonwealth Heritage List;

- Review of non-statutory heritage lists, including the National Trust Register and the Royal Australian Institute of Architects Register of Significant 20th Century Buildings;

- Review of relevant archaeological assessments and zoning plans as available.

- Desktop research and historical research, including a review of relevant conservation management plans and plans of management;

- Consultation with heritage advisors at local councils and state agencies regarding items on their heritage registers;

- Assessments of heritage significance for the assessed heritage items, including heritage curtilages and assessments of condition, based on the NSW heritage criteria as set out in the NSW Heritage Manual guideline Assessing Heritage Significance, prepared by the NSW Heritage Council 2002; and

- Site inspections of the NWRL route undertaken by GML.

It should be noted that for the purpose of this assessment, existing environmental conditions are assumed to be those that exist upon completion of the major civil construction works (assessed in EIS 1). As much of the NWRL route will comprise

underground tunnels the heritage impact assessment focuses on areas where construction work will take place at or above the surface. The impacts will result primarily from demolition and clearing, removal of vegetation and site preparation works such as excavation and establishing foundation. A separate report will be prepared for the stations, rail infrastructure and systems components.

Existing Environment

a) Cherrybrook Station Construction Site (Site 4)

The area around Cherrybrook station was predominantly rural until the 1960s. The station site on the Hornsby Shire side of Castle Hill Road consists of a number of residential properties, some areas of open space, as well as bushland and an electrical transmission line easement. Some large houses established during the late nineteenth century and early twentieth century, are located nearby. Inala School, located to the east of Franklin Road, is a good example of a large early Federation Bungalow style house.

Glenhope, a large two storey residence is situated within The Hills Shire on the southern side of Castle Hill Road, directly opposite the proposed station site. The house, which faces the road, is set back within a landscaped garden setting and extensive grounds.

b) Castle Hill Station Construction Site (Site 5)

Arthur Whitling Park was established in the 1930s on the site of a former tramway terminal and later Castle Hill railway station, to perpetuate the memory of a former local Councillor and Shire President. An Anzac Memorial Hall was located at the southern end of the park until 2005 before being demolished. It was constructed for use as the first Castle Hill RSL and was later used as a cinema and community centre. A number of potentially significant items are located within the grounds of the park including a war memorial, several other memorials and commemorative trees, as well as some other mature trees.

c) iii) Showground Station Construction Site (Site 6)

Castle Hill Showground has hosted the annual Castle Hill Show since the 1890s and is regularly used by a number of local community groups. The showground has retained its rural character which is reinforced by the vernacular nature of the majority of sheds and pavilions located to the north and west of the show ring.

d) Norwest Station Construction Site (Site 7)

Historically the area was characterised by large land grants made in the early years of the colony, the largest being to Foveaux and Grimes in 1799 and known as Bella Vista farm from 1821. The transformation of the area into residential and commercial has occurred over the past 20 years.

e) Bella Vista Station Construction Site (Site 8)

The designated site for Bella Vista station is located on the eastern side of Old Windsor Road and its historical character is similar to the Norwest station site. The connection of the area to Sydney by Old Windsor Road was established in 1794.

f) Balmoral Road Construction Site (Site 9)

There are no known heritage items or potential heritage items within the proposed Balmoral Road construction work zone. No known archaeological sites have been identified.

g) Memorial Avenue Construction Site (Site 10)

The area of the Memorial Avenue construction site has historically been rural, with the area sparsely developed and populated.

h) Kellyville Station Construction Site (Site 11)

The site for Kellyville Station on the eastern side of Old Windsor Road is located within an area along an original alignment of the road. The area of the station remained predominantly rural until the 1990s, when residential subdivisions and development occurred.

i) Samantha Riley Drive to Windsor Road Construction Site (Site 12)

The area of this construction site has historically been rural and sparsely populated until comparatively recently when development has occurred.

j) Old Windsor Road to White Hart Drive Construction Site (Site 13)

The area of this construction site remained predominantly rural following European settlement in the area and the construction of Old Windsor Road/Windsor Road in the late eighteenth century. Residential subdivisions have occurred since the late twentieth century and are transforming the visual character of the area.

One heritage item is located in the vicinity of the construction site, Mungarie, a late nineteenth century house located on the eastern side of Windsor Road, south of White Hart Drive. The house is located within an allotment that has been landscaped to mimic the historical rural setting of the building. The house has been refurbished for use as the Rouse Hill Visitor Information Centre.

k) Rouse Hill Station Construction Site (Site 14)

The proposed Rouse Hill station would be located in an area that includes a number of sites with historical associations with the colonial period including the site of the Battle of Vinegar Hill, Windsor Road and Rouse Hill farm.

l) Windsor Road Viaduct Construction Site (Site 15)

This site is to occupy the north-east and north-west corners of the intersection of Windsor Road, Schofields Road and Rouse Hill Drive, plus a small zone in the median. No heritage context was identified for this area.

Potential Impacts

In order to assess the potential impacts of the proposed works, a ranking measuring their severity was developed and is detailed in the table below:

Rating	Definition
Major adverse	Actions which will have a severe, long-term and possibly irreversible impact on a heritage item. Actions in this category would include partial or complete demolition of a heritage item or addition of new structures in its vicinity that destroy the visual setting of the item. These actions cannot be fully mitigated.
Moderate adverse	Actions which will have an adverse impact on a heritage item. Actions in this category would include removal of an important part of a heritage item's setting or temporary removal of significant elements of fabric. The impact of these actions could be reduced through appropriate mitigation measures.
Minor adverse	Actions which will have a minor impact on a heritage item. This may be the result of the action affecting only a small part of the place or a distant/small part of the setting of a heritage place. The action may also be temporary and/or reversible.
Neutral	Actions which will have no heritage impact.
Minor positive	Actions which will bring a minor benefit to a heritage item, such as an improvement in the item's visual setting.
Moderate positive	Actions which will bring a moderate benefit to a heritage item, such as removal of intrusive elements or fabric or a substantial improvement to the item's visual setting.
Major positive	Actions which will bring a major benefit to a heritage item, such as reconstruction of significant fabric, removal of substantial intrusive elements/fabric or reinstatement of an item's visual setting or curtilage.

a) Cherrybrook Station (Construction Site 4)

Cherrybrook station is to be open retained cut box structure. The proposed civil construction works at the Cherrybrook Station site will involve excavation of the station cavern to a depth of 18 -29m below ground level and removal of large quantities of spoil material from the cavern and tunnel excavation works. There will also be provision of TBM launch and support services, a large acoustic shed, formation of a car parking area, introduction of a temporary water treatment plant or sediment basin and introduction of a signalised intersection to help manage traffic.

Based on the location of the heritage sites with respect to the proposed works, there is potential for two heritage items to be affected by the NWRL. The potential impacts on these items are addressed below: It should be noted that only "Glenhope" is located within The Hills Shire Council.

Item	Glenhope
Image	 **Figure 3.10** Glenhope, viewed from Castle Hill Road. (Source: GML 2011)
Significance	State
Statement of Significance	Glenhope is an intact early Federation period mansion characteristic of its type. It is particularly important for its retained internal finishes and architectural features which heralded new trends in late nineteenth century interior decoration. Its prominent ridge-crest location, remnant garden features and mature trees provide Glenhope with an outstanding setting which is rare for this area. (Adapted from the Australian Heritage Places Inventory)
Heritage Impact	The construction works will have some temporary adverse impacts upon the setting of (and the outlook from) the heritage-listed property known as Glenhope, which is directly opposite the road from the site designated for Cherrybrook Station. Existing vegetation on the northern side of the road (within the construction zone) forms part of the visual setting for Glenhope house. Much of this vegetation will be removed for the proposed civil construction works. This will have a moderate adverse impact on the visual setting of (and the outlook from) Glenhope.
Item	**Inala**
Image	 **Figure 3.11** Inala as seen from Castle Hill Road. (Source: GML 2011)
Significance	Local
Statement of	*Good example of a large early Federation Bungalow style house. Elegant design with distinctive*

Significance	*tall chimneys and pair of gablets. Integrity affected by some unsympathetic modifications.* (State Heritage Inventory)
Heritage Impact	There may be some minor impact upon the setting of this property resulting from the station construction works if trees are to be removed from near Franklin Road. It is considered that such loss of vegetation would have only a minor adverse impact upon the general setting of Inala. The main outlook from this heritage item would not be greatly affected.

Any archaeological remains associated with the two structures identified on the 1920s plan and subsequent 1947 aerial would be located within the perimeters of the proposed deep excavations for the construction of Cherrybrook Station. The proposed earthworks required for the station would result in the removal of any potential archaeological resource that may have survived at the site. This would be a moderate adverse impact.

b) Castle Hill Station Construction Site No. 5

Castle Hill station will be a cut and cover box structure constructed to a depth of 25m below ground level. The proposed construction works will involve partial closure of Old Northern Road as well as removal (and possible relocation) of the war memorial, relocation of the existing bus interchange open cut excavation works for the station, and excavation of tunnel crossovers beside the station. It is estimated that approximately 150,000m^3 of spoil would be removed from this site during the excavation operations.

There are one potential heritage item in the vicinity of the construction site that could be impacted, Arthur Whitling Park.

The potential heritage impacts on Arthur Whitling Park are detailed below;

Item	Arthur Whitling Reserve
Image	 Figure 3.14 Arthur Whitling Reserve viewed from the east. (Source: GML 2012)
Significance	Local
Statement of Significance	Arthur Whitling Reserve has significance at the local level for its historic use as the site of the Castle Hill railway station and terminus, and as the first site of the Castle Hill RSL, in the Anzac Memorial Hall (demolished 2005). The reserve land has a long history of community use, being the site of Castle Hill's first community hall in 1879. However, no physical evidence of these past significant uses remain within the reserve; rather, its history is reflected in the numerous plaques and memorials to local people that are scattered throughout the reserve and the construction of a new war memorial at its northeastern corner. The war memorial and commemorative elements have social value at a local level as places of remembrance and ceremony. Arthur Whitling Reserve has some aesthetic significance for its elegant arrangement of mature trees and planted garden beds.

The potential archaelogical remains associated with the Parramatta to Castle Hill tramway and terminus are located within the perimeters of the proposed deep excavations for the construction of the proposed Castle Hill Station involving a cut and cover method. The proposed cut and cover construction method would require a total removal of any potential archaeological resource, if present which would be considered a moderate adverse impact.

c) Showground Station Construction Site

Item	Castle Hill Showground
Image	 **Figure 3.16** Show pavilions on the southwestern side of the main arena. (Source: GML 2011)
Significance	Local
Statement of Significance	Castle Hill Showground has significance at the local level for its historic, rarity and representative values. The showground has been the home of the Castle Hill Show since 1890, which by the 1950s was the second largest show in Sydney region, after the Royal Agricultural Society's show at Moore Park. It provides evidence of the historical importance of agriculture to the Baulkham Hills district and is a reminder of the vital role the area once played in providing produce for Sydney. Castle Hill Showground is a representative example of rural showgrounds in NSW, with a large show ring and pavilions arranged around it. It is a rare example of a rural-style showground within the Sydney metropolitan area. While the shape of the show ring has changed over time, the essential layout of the showground, with the pavilions arranged around the north and western edges of the show ring, remains unchanged since at least 1930. The Showground is an important and much used cultural and recreational facility in The Hills Shire.
Heritage Impact	The showground facility has existed in this location since the 1890s and the place still retains its rural character, although it is considered that very few of the existing showground pavilions and associated structures have high heritage values as individual built elements. The designated construction zone would have major adverse impacts upon the affected portions of the Castle Hill Showground, and some component items within this zone. Areas and component elements of the Showground that are well outside the construction zone would remain relatively unaffected by the works.

Any potential archaeological remains associated with the two pre 1920s buildings identified on historic plans and aerials would be located within the area designated for earthworks construction of the Showground Station. The nature of the proposed earthworks involving open cut excavation would require that any archaeological remains in situ be removed prior to the construction phase. This would be a moderate adverse impact.

d) Norwest Station Construction Site

The construction zone for Norwest Station will not result in any adverse impacts on any known European heritage items. The context of the station is an existing built-up area with few heritage items in the immediate vicinity. The construction works are unlikely to have any appreciable impacts upon Bella Vista Farm or its immediate context.

There are no archaeological potential within the construction zone and therefore the construction works are unlikely to result in any archaeological impacts.

e) Bella Vista Station Construction Site

The proposed works at the Bella Vista Station will involve the demolition of the Homemaker Centre, open cut excavation works for the station cavern and the provision of TBM support services including supply of necessary electricity, ventilation and water services, offices, workforce facilities, water treatment plant plus storage and vehicle access zones. An acoustic shed would be built to enclose the TBM operations and the handling area for pre-cast concrete units. A significant quantity of excavated material would be removed from this location.

There are no archaeological potential within the construction zone and therefore the construction works are unlikely to result in any archaeological impacts.

f) Balmoral Road Construction Site

There are no known heritage items or potential heritage items within the proposed Balmoral Road construction works zone. No known archaeological sites have been identified within the proposed Balmoral Road construction works zone.

g) Memorial Avenue Construction Site

There are no known heritage items or potential heritage items within the proposed Memorial Avenue construction zones. However, a number of boundary stones along Old Windsor Road were identified in the Windsor Road and Old Northern Road Conservation Management Plan to the north of Memorial Avenue. These boundary stones were most likely buried during construction of the Northwest Transitway during the past decade.

The construction works would have no perceived impacts upon any known European heritage items. The construction works zone is not located in the vicinity of any listed heritage precincts of Old Windsor Road.

h) Kellyville Station Construction Site

The proposed Kellyville Station will be an elevated station constructed in conjunction with the viaduct. The construction works site will extend east from the Northwest Transitway to just west of Elizabeth Macarthur Creek and south from Samantha n Riley Drive. The proposed civil works would involve provision of temporary and permanent roadworks including the temporary relocation of some Transitway facilities.

The two cisterns/wells are located within the perimeters of the ground disturbance works required for the construction of the proposed above-ground Kellyville Station. There is the potential that other known and potential archaeological features associated with the former household still remain within the designated for the construction of the station. It is also possible that remains of boundary stones may have survived in this region. The nature of the proposed earthworks for the construction of the elevated station would have the potential to disturb or destroy the known and potential archaeological resource.

Given that the exact location of the site of the battle of Vinegar Hill has not been accurately identified there is potential, although minor, of survival of archaeological evidence associated with this significant event. The nature of the proposed earthworks for the construction of the elevated station would have the potential to disturb or destroy the known and potential archaeological resource.

i) Samantha Riley Drive to Windsor Road

The construction works between Samantha Riley Drive and Windsor Road would have no perceived impacts upon any known European heritage items. The eucalyptus trees would be located outside the construction works zone. No mitigation measures are recommended.

The boundary stones, if extant, would be located outside the construction works zone. As no other archaeological sites have been identified within the proposed Samantha Riley Drive to Old Windsor Road construction site, the construction works are unlikely to result in any archaeological impacts.

j) Old Windsor Road to White Hart Drive

The site is to be a support site for the construction of the elevated twin track viaduct structure. Internal access roads would be established along the viaduct corridor. The road works involve major changes to the Northwest Transitway and the establishment of materials handling and storage areas plus workforce amenities.

Based on the location of the heritage sites with respect to the proposed works, one heritage item is likely to be impacted by the NWRL project. The potential impacts on this heritage item is listed below:

Item	Windsor Road Heritage Precinct 14 (WR 14) Caddies Creek Alignment
Image	 **Figure 3.21** Part of Caddies Creek Alignment (Source: Windsor Road and Old Windsor Road CMP, Clive Lucas, Stapleton and Partners, 2005 p.14)
Significance	State
Statement of Significance	*Surviving section of the old alignment of Windsor Road and approach to old bridge crossing at Caddies Creek. Remains of the old road alignment also exist on the eastern side of the creek.* (Windsor Road and Old Windsor Road CMP 2005) Assessed as having high historic, associative, research and rarity values in the Windsor Road and Old Windsor Road CMP 2005, this precinct was altered to some extent during the Northwest Transitway works. However, some elements of the precinct remain in situ, including the original alignment.

Item	Mungerie
Image	 **Figure 3.22** The older section of Mungerie house. (Source: GML 2011)  **Figure 3.23** View looking southeast towards Mungerie from near White Hart Drive. Part of the Northwest Transitway is visible on the right of the image. (Source: GML 2011)
Significance	Local
Statement of Significance	*Evidence of late nineteenth century farming. If a Pearce property, the place is also significant for its association with and evidence of the Pearce family as major graziers, orchardists and land dealers in the part of the Shire.* (Baulkham Hills Shire Council Heritage Inventory Sheet)
Heritage Impact	It is considered that there would be a major adverse impact upon the setting and curtilage of Mungerie. The proposed rail corridor cuts across the original entrance driveway into the Mungerie property and the construction of the viaduct structure involving the removal of a number of trees would substantially reduce the remnant curtilage of the house, dominate views towards the heritage item from the west and interrupt important traditional links between the main road and the 1890s house. The proposed work would therefore result in further erosion of the traditional setting of the house and would constitute a major adverse heritage impact.

The site of the former Swan Inn is located within the proposed Old Windsor Road to White Hart Drive construction site. The proposed works will result in a major adverse impact on the site of the former Swan Inn.

k) Rouse Hill Station Construction Site

The character of the area has changed greatly in recent years with the construction of the Rouse Hill Town Centre and nearby residential developments. Although the proposed construction works may be visible in views from the Battle of Vinegar Hill Memorial and from the Mean Fiddler Hotel, it is considered that these impacts would be of a relatively minor and temporary nature.

As no archaeological potential has been identified within the proposed Rouse Hill Station site, the construction works are unlikely to result in any archaeological impacts.

l) Windsor Road Viaduct Construction Site

The Windsor Road Viaduct construction site is to be established to facilitate the construction of the elevated pre-cast concrete rail viaduct structure crossing over Windsor Road. The rail bridge would have a 90 metre span and two side spans of approximately 70 metres.

As no archaeological potential has been identified within this construction site, the construction works are unlikely to result in any archaeological impacts.

m) Windsor Road Viaduct to Cudgegong Road

Construction activities at this site include general civil works associated with the formation of the Schofield Road Cutting, the Cudgegong Road overbridge, and the railway bridge crossing over Second Ponds Creek.

Due to the topography of the area and the existing vegetation on either side of the proposed construction site, it is considered that no heritage items in the vicinity of the Construction Site will be impacted by the works.

Since the potential for archaeological remains to survive in situ within the construction site is low, the construction works here are likely to result in anything other than minor archaeological impacts.

n) Cudegong Road Station and Tallawong Stabling Yard

The proposed Cudgegong Road Station would be located within a shallow cutting immediately to the west of Cudgegong Road. This site would be used during the major construction phase for a range of general civil construction activities and bulk earthworks associated with the construction of the proposed Station. T he principle access road to the site would be via Cudegong Road. An internal access road would be formed to link the station site with the adjacent Tallawong Stabling Yard construction site.

The major civil construction works at the Tallwong Stabling Facility would involve general earthworks associated with the formation of the yard cutting and for carrying out extensive drainage works. The maximum depth of the cutting would be 13.5m below existing ground level and the associated earthworks would generate about 340,000m^3 of spoil which is intended to be deposited in suitable locations elsewhere along the NWRL corridor as noise mounds and also as fill material at the nearby disused quarry near the junction of Windsor and Schofields Roads. The construction site is likely to also be used to accommodate site offices, car parking areas, and space for an amenities compound. The main access points into the construction site would be from Tallawong and Schofields roads.

The earthworks associated with construction of the station and stabling yard which include a shallow cutting would require the removal of any surviving archaeological

remains within the designated area. As the archaeological potential of the area is considered to be low, this is considered to be a minor adverse impact.

Management and Mitigation

a) Operation

An Operational Environmental Management Plan would be developed in the future detailing the processes to manage environmental impacts during the operation of the project.

In the event that archaeological remains are encountered during operation or construction works in the area of the designated route not specifically identified as archaeological sites or areas of archaeological potential, the NSW Heritage Branch would be advised and the measures set out in the Heritage Act for the management of archaeological remains would be implemented.

Mitigation measures have been developed to avoid, reduce and manage identified potential operational impacts on Indigenous heritage, including avoiding and minimising harm, development of an Aboriginal Heritage Management Plan, educating workers, undertaking archaeological test and salvage excavation and public interpretation.

b) Construction

The Construction Environmental Management Framework details the environmental, stakeholder and community management systems and processes for the construction of the NWRL.

RECOMMENDATION

7.1 Views to Mungerie House from Windsor Road must also be considered in the design and placement of the viaduct and its piers.

7.2 During the detailed design of the viaduct and consideration of view corridors, Transport NSW should consult the Mungerie House Conservation Management Plan (2007) prepared for Lend Lease by Tanner Architects and endorsed by Council as it contains important information regarding view corridors and the setting of Mungerie House.

8. INDIGENOUS HERITAGE

Assessment Methodology

The methodology for the Indigenous Heritage Report (IHR) undertaken for the project (Godden Mackay Logan and Jo McDonald CHM, March 2012) involved a review of previous Aboriginal Archaeological Assessments that were prepared during the preliminary stages of the project. These included an initial impact assessment for the NWRL undertaken by Mills Archaeological and Heritage Services Pty Ltd in 2003, and a second preliminary assessment undertaken by Jo McDonald CHM Pty Ltd in 2006. These reports identified a number of Aboriginal sites associated with the proposed alignment of the NWRL project.

To prepare the IHR extensive consultation with relevant stakeholders and Registered Aboriginal Parties was undertaken, together with field surveys.

Existing Environment

For the purpose of EIS 2 existing environmental conditions are assumed to be those that exist upon completion of the major civil construction works. The 27 known Aboriginal sites identified as being located within or close proximity to the NWRL rail line. Newly recorded Aboriginal sites from the field survey are not included in this count but would be registered on the AHIMS database.

a) Cherrybrook Station Construction Site (Site 4)

This construction site contained a mixture of disturbed (from residential development) and undisturbed (containing dense vegetation) land. A registered Aboriginal site (45 – 6 – 2861, Stone Artefact Concentration (SAC)) was found to be located within the centre of this construction site. Therefore this area was assessed as possessing a low to moderate potential for sub-surface Aboriginal objects and Potential Archaeological Deposits (PAD).

b) Castle Hill Station Construction Site (Site 5)

This construction site is highly disturbed by landscaping, including gardens, lawns and exotic trees and the construction of the adjacent roads and bulk excavation around the buildings at the eastern end of the park. No Aboriginal objects and/or sites were observed within the construction site and therefore it was determined that there was a very low potential for intact Aboriginal sites to be present.

c) Showground Station Construction Site (Site 6)

The eastern portion of this construction site has been heavily impacted by building and construction activities. Therefore it is considered to have no archaeological potential. However the western portion of the site has a moderate level archaeological potential for Aboriginal objects to be located within a subsurface context.

d) Norwest Station Construction Site (Site 7)

This construction site is highly disturbed by modern buildings, cut and imported fills, roads and landscaping and was assessed as having low to no potential for intact Aboriginal sites.

e) Bella Vista Station Construction Site (Site 8)

Construction has already been highly impacted by development and the course of the creek bank along the northern end of Celebration Drive has been modified in the past. As such the site was assessed as having low to no potential for Aboriginal heritage sites.

f) Balmoral Road Construction Site (Site 9)

This construction site was found to have been impacted by housing development and service installations. However despite this, Aboriginal objects have previously been recorded within this construction site, and a new site was also observed. As a result, construction site 9 was assessed as having archaeological potential associated with two properties within it at 2 and 12 Cumberlege Lane.

g) Memorial Avenue Construction Site (Site 10)

In general this construction site was found to have been subject to a low level of disturbance, primarily through historical vegetation clearing. Site preparation for

surrounding residential development and the Burns Road –T-Way station have resulted in significantly modified soil horizons.

A number of aboriginal sites have previously been recorded within and adjacent to the construction site with the most recent survey identifying that the ridge top, hill slope and flat landforms overlooking Elizabeth Macarthur Creek have the potential for relatively undisturbed archaeological deposits.

h) Kellyville Station Construction Site (Site 11)

This construction site was found to have been impacted by the T-Way car park, some residential development and historical vegetation clearing. Three aboriginal sites had previously been identified directly adjacent to this construction site and one (a stone artefact site with PAD within its boundary. The assessment determined that this construction site has moderate archaeological potential for relatively undisturbed archaeological deposits.

i) Samantha Riley Drive to Windsor Road Construction Site (Site 12)

Some disturbances were identified at this construction site, including earthworks adjacent to Elizabeth Macarthur Creek, stockpiling of gravels, fills and concrete dumping, and native vegetation clearing. An area of PAD covers the whole construction site due to its proximity to the creek and landforms suitable for Aboriginal occupation.

j) Windsor Road to White Hart Drive Construction Site (Site 13)

The northern areas of this construction site were found to contain several previously recorded Aboriginal sites, some of which have been subject to prior Aboriginal Heritage Impact Permits issued under Section 90 of the National Parks and Wildlife Act. However they could not be relocated due to limited ground surface visibility. Creek flat landforms 100m either side of the two creek lines were found to have archaeological potential for relatively undisturbed archaeological deposits.

k) Rouse Hill Station Construction Site (Site 14)

The majority of this construction site has been cleared and subjected to extensive urban development. Section 90 permits have been previously granted for all lands in the Rouse Hill Town Centre and it was determined that there is no archaeological potential for intact Aboriginal sites to remain within the previously developed land. The Caddies Creek precinct was subject to archaeological salvage excavation in 2007, with the heritage outcome being the retention of all identified Aboriginal grinding grooves.

The south west portion of this construction site has not been developed. As such it was determined that the lower slope landforms closer to Caddies Creek, retain a potential for relatively undisturbed archaeological deposits.

l) Windsor Road Viaduct Construction Site (Site 15)

This construction site has had a low level of previous impact, including vegetation stripping and grazing. The ridge top and ridge spur landforms in this site have potential to contain intact Aboriginal sites. These locations have provided good views to adjacent landforms and are located close to Caddies Creek and second Ponds Creek, both locations with significant archaeological deposits.

Potential Impacts

a) Operations

The potential impacts on Indigenous Heritage arising from rail operations are not considered to be significant.

b) Construction

The EIS 1 Major Civil Works construction activities would have resulted in the complete removal of all top soil horizons and in most cases, deep excavation through the underlying bedrock of all the proposed construction sites. As such there is no potential for the retention of original intact soil horizons within any of the proposed construction sites at the commencement of the proposed EIS 2 Stations, Rail Infrastructure and Systems works.

As noted in EIS 1 Major Civil Works the footprints of a number of Aboriginal heritage sites extend outside the boundaries of the construction sites. No significant construction works would be undertaken for EIS 2 Stations, Rail Infrastructure and Systems outside of the areas assessed in EIS 1 Major Civil Construction Works.

The avoidance and conservation of these areas would be continued throughout the proposed construction works and operations. Therefore, no additional Aboriginal heritage sites would be affected.

Prior to site works the boundary of the works at each Aboriginal site would be delineated with a physical barrier and a sign erected to prevent accidental access. All areas with Aboriginal sites which are to be conserved would have zero vehicle access across their extent and no earthworks or stockpiling of materials would occur within their boundaries. A site inspection protocol would be implemented to ensure that all work personnel are aware of their responsibilities in this regard.

Mitigation measures have been developed to avoid, reduce and manage identified potential operational impacts on Indigenous heritage, including avoiding and minimising harm, development of an Aboriginal Heritage Management Plan, educating workers, undertaking archaeological test and salvage excavation and public interpretation.

The proposed mitigation measures in relation to archaeological impacts are considered appropriate.

RECOMMENDATIONS

Mitigation measures proposed in EIS 2 are considered satisfactory.

9. LOCAL BUSINESS IMPACT

A local business impact assessment was undertaken to identify and provide a qualitative assessment of the potential impacts on local businesses within the immediate vicinity of the Project during the construction and operation of Stations, Rail infrastructure and Systems as described in EIS 2.

Overall, the NWRL would become a major employer and user of goods and services during the construction phase. It is estimated that the project would support more than 16,200 jobs and inject $25 billion (directly and indirectly) during construction into the NSW economy. Professions and trades would include, among others, engineers, draftsmen, environmental scientists, designers, electricians, plumbers, carpenters,

bricklayers, drivers, storepersons, crane operators, dogmen, riggers, security guards and labourers. At the same time, upon operation, the increased number of patrons passing through each of the project's localities is expected to provide substantial opportunities to existing and new local businesses as part of the wider project.

The NSW Small Business Commissioner should be encouraged to assist in the education of business operators with construction issues that may impact their business. Putting in place business continuity strategies now could help them manage the impacts of this $8 billion dollar major infrastructure project in the future.

Businesses should be encouraged to prepare well in advance for any impacts caused by the construction of the North West Rail Link. They will need to consider how their staff and customers might be impacted, for example, travelling to and from business premises, especially close to construction zones such as Castle Hill, Carrington Rd, and Norwest Boulevarde.

Specifically an awareness campaign regarding their Small Biz Connect program, which is delivered in partnership with the University of Western Sydney, could provide comprehensive business continuity education for small businesses affected by the Northwest Rail.

Existing Environment

The Hills Shire LGA is predominantly residential and semi-rural with minor commercial and industrial land use. The Shire covers an area of 380 km2. Based on ABS (2011) data, approximately 179,716 residents reside in the LGA, which represented approximately 4% of Sydney's total population. The LGA has experienced steady population growth from 2005 to 2010, growing by 2% over this period. The Hills Shire contains a number of commercial, high tech employment and high end retail activity including:

- The Norwest Business Park which houses the headquarters of some of Australia's leading brands, including Woolworths and ResMed;
- Castle Towers, a major regional shopping centre; and
- A major automotive/commercial/bulky goods/light industrial area centred around Victoria Avenue, Castle Hill and the Castle Hill Trading Zone.

The business environment of The Hills Shire has the following business characteristics:

- The dominant number of businesses by employment size are categorised as small businesses (94%). Based on the ABS data no large employers were registered within The Hills Shire although it is noted businesses that display this characteristic are present (for example Woolworths Headquarters and ResMed).
- Small turnover businesses comprise the largest share (47%) of businesses in The Hills Shire, followed by businesses with a medium turnover (39%).

Assessment of Impacts – Operation

The following section assesses the potential impacts on local businesses during the operation of station facilities.

It includes:

- Identification of the potential impacts (positive and negative) on local businesses during the operation of the Project;
- Identification and classification of existing businesses in the immediate vicinity Project's operation based on targeted site surveys at each station and service facility site. Businesses were classified in accordance with ABS (2011); and
- Assessment of the type, direction and magnitude of potential impacts by qualitatively discussing the impacts at each of the sites.

a) Epping Services Facility to Bella Vista Station

As an established precinct, the locality provides a mix of smaller scale retail, cafes, restaurants, and health and community services.

b) Castle Hill Station

Road and within the Castle Hill Piazza precinct identified the following businesses:

- Retail (25)
- Accommodation, cafes and restaurants (26)
- Transport and storage (3)
- Finance and Insurance (6)
- Property and Businesses Services (2)
- Education (1)
- Health and Community Services (8)
- Personal and other services (12)

An overview of the businesses located within the Castle Towers Shopping centre found that out of the 339 retail stores within the centre, approximately 10% consisted of food outlets.

- Increased competition for businesses may potentially arise once the station is in operation. Combined with an expected strong growth in residential and employment activity, it is expected that demand for goods and services would result in new businesses being established, including Accommodation, Cafes and Restaurants.
- Increased accessibility and connectivity provides potential for new businesses within the Property and Business Services, and Finance and Insurance industries to be developed to service the growth. Existing businesses in these industries are likely to be affected by increased competition.
- Existing businesses may experience increased rents as competition for businesses spaces grows. In particular, businesses within the Professional Services Industry

(i.e. Property and Business Services, and Finance and Insurance) may experience greater competition due to the relatively small number of businesses in this category, and demand for new businesses to be established.

- The expected growth in resident numbers at Castle Hill is expected to provide opportunities for new businesses to be established to support this growth. Businesses in retail and food outlets could be expected to benefit from the increase in patron activity associated with the NWRL.

- Increased connectivity and accessibility would enable residents and consumers to better access Castle Hill. Businesses within the Castle Towers shopping centre are likely to attract an increasing number of patrons.

- Similarly those businesses located within the existing Castle Hill Piazza and those on Old Northern Road may be expected to experience the flow on benefits of increased visitation, providing goods and services to consumers and visitors to Castle Hill.

- The provision of greater accessibility for existing residents across Sydney provides an added impetus for sharing of labour resources which may potentially lead to enhanced business productivity and provide for further availability of skilled labour for those professional businesses within Castle Hill.

- Steady employment and residential growth at this locality is likely to lead to increased expenditure and greater use of local business services. Businesses within the accommodation, cafes and restaurants and retail industries would most likely receive the greatest benefit from the expected growth

c) Showground Station

The site verification addresses the area surrounding the proposed station and the Castle Hill Trading Zone. The area largely consists of retail outlets and other social community infrastructure. Businesses include education (Hills College TAFE, Carrington Pre-School Long Day Care), health and community services (Castle Hill Baptist Church) and retail (e.g. Car sales yards – Holden, Ford, Mitsubishi, Toyota). The Castle Hill Tavern is located east of the proposed station location.

- The anticipated growth in patronage, population and employment may result in increased competition for retail spaces within close proximity to the station, potentially leading to increased rental for these spaces.

- The increase in rents may in turn lead to business operators re-establishing their businesses further away from Showground Station where rents may be lower, providing the incumbents with increased competition. This may be particularly evident for small food outlets or cafes which may relocate to other premises due to increased cost pressures.

- The Carrington PreSchool and low rise commercial businesses surrounding the station are expected to undergo minor changes in accessibility due to an increase in through traffic in the locality.

- The Castle Hill Showground which provides for a range of activities during the weekday and on weekends as well as annual events, would benefit from the increased accessibility to the area, including reduced journey times for patrons.

- The precinct north of Showground Road which provides for exhibitions and events on weekends, and other recreational facilities in the locality (e.g. Castle Hill Indoors Sports Centre, Fred Caterson Tennis Centre, and Hills Basketball Centre) would benefit from the increased accessibility to the area, including reduced journey times for patrons.

- The incoming patrons to the recreational facilities would provide flow-on effects to associated businesses (i.e. food stalls, canteens), including the Castle Hill Tavern.

- Commercial businesses providing trade services and bulky goods within the Castle Hill Trading zone could be expected to benefit from an enlarged pool of workers travelling to and from the North West.

d) Norwest Station

Norwest Station would be located within the major employment and specialty centre of Norwest Business Park. The area has experienced recent strong growth and the proposed station location is intended to promote further growth and employment and residential development opportunities. Patrons from the Norwest station will be served through the existing Norwest Market Town which contains an abundance of retail and food outlets. The location of the proposed station is within close proximity to low rise commercial businesses situated to the west and north east of the station. This is likely to allow convenient access for employees. Norwest is expected to experience steady growth in residential and employment.

The site survey identified businesses impacted directly north and north west of the proposed works. These businesses include:

- Retail (10);

- Accommodation, cafes and restaurants (16);

- Transport and storage (1);

- Finance and Insurance (3);

- Property and Business Services (2);

- Health and Community Services (5);

- Cultural and Recreational Services (1); and

- Personal and other services (7).

The low rise commercial businesses adjacent to the site were not included in the business survey as their impacts were envisaged to minimal.

- As a result of population and employment growth it is expected that existing businesses (i.e. Cafes, Food outlets, Retail) surrounding Norwest Station would experience increased competition from new businesses seeking to establish themselves to meet the increase in demand.

- Existing businesses, particularly those located within the Norwest Market Town may experience upward pressure in rents as demand for retail space (e.g. Retail, Accommodation, Cafes and Restaurants) increases.

- Accessibility for businesses in the precinct is unlikely to be reduced as Norwest Boulevard would continue to support traffic movements. As a Specialised Employment Centre, the Norwest Business Park encompasses many retail, highly skilled employment and commercial businesses. The Station provides improved accessibility and availability of businesses, customers, visitors and employees to the region.

- It is expected that increased connectivity to the Norwest Business Park would provide for concentration and clustering of businesses and employees. This may potentially create opportunities for further employment growth and diversification of businesses.

e) Bella Vista Station to Rouse Hill Station

Two local businesses exist along Old Windsor Road and both businesses are likely to experience impacts during the station's operation. These businesses are:

- McDonalds; and

- BP service station.

There are also low rise commercial businesses along Celebration Drive.

- The close proximity of Bella Vista Station to the low rise commercial estates and improvements in transportation afforded by the project is likely to attract new business operators to the area. New commercial businesses may establish themselves in surrounding areas due to the increased connectivity and accessibility. This may result in enhanced competition for incumbents if similar businesses were established.

- The potential for the Norwest Business Park to extend further north provides added incentive for new businesses to relocate to Bella Vista to complement the surrounding services. In this regard the demand for property spaces may increase for new and incumbent commercial businesses operators at Bella Vista.

- It is envisaged that the McDonalds located adjacent to the station may experience increases in demand for their product. Additionally the BP service station may also experience increased passing traffic and hence increased demand for goods and services.

- At the same time, the operation of the station would complement the development of the Norwest Business Park. As a Specialized Employment Centre, improved network connectivity will enable enhanced movement of people, greater geographical concentration and clustering of businesses and employees.

f) Kellyville Station

A survey was undertaken adjacent to the proposed station along Old Windsor Road. Businesses in the area are located on Old Windsor Road in the vicinity of Miami Street. These businesses include:

- Accommodation, cafes and restaurants (3);

- Personal and other services – car wash (1); and

- Retail – Caltex service station (1).

- It is envisaged that retail space (e.g. cafes, minimarkets, dry cleaners) within the station and its surrounds would develop over time. The notable increase in patronage growth may put upward pressure on rents despite the provision of additional businesses, as demand increases for the limited number of retail spaces.

- With employment growth in Kellyville expected to be significant, new businesses may be established, leading to greater competition for existing businesses along Old Windsor Road (i.e. Accommodation, Cafes and Restaurants).

- As the station is located at some distance from the surveyed businesses, it is expected that minimal accessibility and visibility impacts would be experienced.

- The proposed station would provide improved services for current and future residents of Kellyville as a result of the station's operation. A larger availability of workers for businesses within the north-west sub-region is also expected, given the increased accessibility provided by the station.

g) Rouse Hill Station to Tallawong Stabling Facility

A site verification of the businesses within the Rouse Hill Town Centre identified the predominant businesses in the Rouse Hill Town Centre to be:

- Retail Trade (132);

- Accommodation, cafes and restaurants (47);

- Health and community services (14);

- Finance (8);

- Professional Services (4); and

- Other (17).

A small cluster of businesses is also located south of the Rouse Hill Town Centre along Windsor Road in the vicinity of Merriville Road.
These businesses include:

- Accommodation, cafes and restaurants (2);

- McDonalds and Ettamogah Pub; and

- Retail Trade (2) – Dan Murphy's and Caltex service station.

Rouse Hill Station provides enhanced accessibility to over 225 businesses at Rouse Hill Town Centre for visitors and consumers from across Sydney. Those businesses within the Accommodation, Cafes and Restaurant industry in the locality are expected to be best placed to benefit from the increase in passing trade.

Assessment of Impacts – Construction

The following section assesses the potential impacts on local businesses during the operation of station facilities.

a) Showground Station

The construction works at Showground Station would require a workforce of approximately 60 FTEs during the peak construction period. Further jobs such as those associated with servicing the construction workforce (e.g. material suppliers, servicing agents) would also be indirectly created by the project.

- Potential construction traffic and transport impacts on businesses are discussed in Chapter 9.

- Potential construction noise and vibration impacts on businesses such as Hills College TAFE, Carrington Pre-School Long Day Care and Castle Hill Baptist Church are discussed in Chapter 10.

- Certain businesses within the Castle Hill industrial area may experience increased trade. Food outlets may have increased flow-on effects from the construction workforce.

b) Norwest Station

A workforce of approximately 20 FTEs is envisaged during the peak construction period. Further jobs such as those associated with servicing the construction workforce (e.g. material suppliers, equipment manufacturers) would also be indirectly created by the project.

- Industries which would most likely benefit from construction are the cafes, restaurants, food outlets and retail outlets catering for the day-to-day needs of the construction workforce (e.g. large retail supermarkets, fruit/vegetable markets).

- During construction works, a small to moderate increase in sales and demand may be expected in these industries as a result of the flow-on effects from construction workers in the area. Businesses located within the Norwest Market Town would primarily benefit from the demands of the construction workforce.

c) Bella Vista Station to Rouse Hill Station

The construction works at the Bella Vista Station are likely to require a workforce of approximately 20 FTEs. Further jobs such as suppliers of materials for the construction workforce would also be indirectly created by the project.

- Accessibility to the McDonalds and BP service station would be altered as a result of construction works. The entrance to these businesses would be relocated.

- The close proximity of construction works to McDonalds and the BP service station may result in an increase in business related sales from the construction workforce.

d) Kellyville Station

Construction work at the Kellyville Station is likely to employ a workforce of approximately 20 FTEs during the peak construction period. Further jobs such as those associated with servicing the construction workforce (e.g. material suppliers, servicing agents) would also be indirectly created by the project.

- The cafes, restaurants and service station at this location, in particular the Hungry Jacks and Caltex service station would most likely experience an increase in business from construction workers.

e) Rouse Hill Station to Tallawong Stabling Yard

The construction works at the Rouse Hill Station would potentially consist of a workforce of approximately 20 FTEs during the peak construction period. Further jobs such as suppliers of materials for the construction workforce would also be indirectly created by the project.

- The erection of construction fencing, height of material stockpiles and frequent movement of large heavy machinery may result in businesses such as cafes and restaurants, located adjacent to the station construction site being less visible from Windsor Road.

- The cafes, restaurants and eateries within the immediate vicinity of the construction works are expected to experience an increase in demand for goods and services from construction workers.

- Health and community services and retailers catering for everyday needs (e.g. chemist, supermarkets) may also experience increased demand for goods from construction workers.

f) Cudgegong Road Station and Tallawong Stabling Facility

During the construction works of Cudgegong Road Station and Tallawong Stabling Facility a combined approximate workforce of 140 FTEs would be employed. Further jobs such as those associated with servicing the construction workforce (e.g. material suppliers, mechanics for construction vehicles) would also be indirectly created by the project.

There are no businesses currently in the station and stabling facility locality; therefore, no negative impacts on local businesses are anticipated during the construction works along Schofields Road.

During the construction period, workers may travel to Rouse Hill Town Centre which is located 1.5 km east of the works. Certain types of businesses (e.g. food and beverage retailers and supermarkets) in the Centre may therefore experience positive flow on effects as a result of worker related expenditure in the vicinity

Mitigation Measures

In addition to the mitigation measures identified and outlined in other chapters of EIS 2 would assist in alleviating the potential negative sources of construction impacts that may affect the day-to-day operation of businesses including:

- **Accessibility** – Appropriate way-finding signage would be provided to ensure drivers' understanding of access to local businesses adjacent to construction works including signage related to parking for stopping motorists (as detailed in Chapter 9 Traffic).

- **Construction worker parking** – Construction worker parking areas would be planned to minimise impact of parking availability for customers and staff of local businesses (as detailed in the Chapter 9 Traffic).

- **Operating amenity** – Chapter 10 (Noise and Vibration) and Chapter 19.1 (Air Quality) identifies effective mitigation measures for controlling temporary amenity impacts during construction.

RECOMMENDATIONS

9.1 The Small Business Commissioner commence a study into the structural adjustment and support required for specific small businesses directly affected by the construction work.

10. LAND USE AND COMMUNITY FACILITIES

General Overview

The relationship between the North West Rail Link and surrounding land uses is primarily being addressed through a parallel precinct planning and land use integration process centred on each railway station precinct. EIS 2 has provided a broad assessment of the potential impact of the operation and construction of the North West Rail Link on existing land uses, known future land uses and community facilities.

The assessment of impacts from construction works on land use and community facilities for the project has been carried out by undertaking the following:

- Providing an overview of the existing character and land use in the immediate vicinity of the construction sites.
- Identifying key community facilities that would be either directly or indirectly impacted by the major civil construction works.
- Identifying the planned future development within the project area that may be impacted by the civil construction works.
- Identifying potential land use and community impacts associated with the civil construction works focusing on the direct impacts of the construction footprint.
- Compilation of mitigation measures (general and specific) that would assist in reducing the land use and community impacts.

The following key tasks have been undertaken to assessment of impacts of the operational phase of the project on land use and community facilities:

- Identification of existing and future land use over a 1,600m radius area to fully capture potential impacts within the surrounding area and to remain consistent with the Department of Planning and Infrastructure precinct planning study.
- Describe the existing environment by identifying the natural and built form characteristics, planning controls, key attractors and community facilities. The existing environment for the operation phase is taken to be post construction.
- Identify planned future development by State Government, Councils and the private sector.
- Identify barriers to movement and connectivity and interchange opportunities.
- Identify the potential implications of the railway activities on existing and future land uses.

- Identify opportunities for Transit Oriented Development.

- Identify potential mitigation measures to avoid and manage the potential impacts.

Existing Environment

a) Cherrybrook Station

The proposed Cherrybrook Station would be located on the corner of Castle Hill Road, Franklin Road and Robert Road within the Hornsby Shire local government area. The Cherrybrook locality is characterised by generally large, low density dwellings predominantly built within the last 30 years, surrounded by established vegetation, green open spaces and natural corridors across the undulating topography. A high voltage (132kV) transmission line crosses the site to the east, set back from Franklin Road by one row of houses. One of the transmission towers is located within the construction footprint, about half way along the south east boundary.

A number of key attractors within the immediate vicinity of the proposed railway station include educational establishments, IBM Australia, various reserves and open spaces, Cumberland State Forest and the Koala Park Sanctuary.

Under Hornsby LEP 1994, the station site is zoned Residential A (Low Density). Under the Draft Hornsby LEP 2011 the site is proposed to be rezoned as R2 (Low Density Residential).

b) Castle Hill Station

The proposed Castle Hill Station would be situated beneath Arthur Whitling Park, between Old Castle Hill Road and Old Northern Road. The location is at the core of the Castle Hill Major Centre within the retail precinct centred around Castle Towers. The area is a major thoroughfare for traffic and public transport services. The bus interchange provides frequent bus services to neighbouring regions and to the city. The interchange also serves as a bus layover facility. A number of community facilities are located in close proximity to the construction site including schools, churches, Senior Citizens Centre, library and Castle Hill Police Station.

Arthur Whitling Park is of particular importance as it provides a significant area of open space within the Town Centre. It also includes a war memorial incorporating a cenotaph and remembrance pool, as well as memorials to prominent local citizens. The war memorial area also includes a pine tree that was donated to Council by Legacy and is believed to have been grown from a seed from the original lone pine at Gallipoli. The pine tree was planted in the park in 1972.

The Castle Hill Station would provide access to the major retail core of Castle Towers and surrounding key attractors from a wide catchment area. As Castle Hill is a Major Centre as defined in the Sydney Metropolitan Strategy, the true catchment is likely to be very large, with people commuting from further away to access the facilities available. This station would be a key destination from a regional perspective.

Under LEP 2012, the site is zoned as RE1 (Public Recreation), R1 (General Residential), B4 (Mixed Use) and R4 (High Density Residential).

c) Showground Station

The proposed Showground Station site would be located on land bounded by Carrington and Showground Roads on land associated with the Castle Hill showground complex and

the Hills Shire Council depot. The majority of the area to the east of the proposed Station site, and surrounding the industrial area, consists of low density residential dwellings.

To the west of the site is the Castle Hill light industrial area accommodating factory units, motor vehicle dealers, bulky goods retailing and warehousing. The area also provides an urban support function including a number of indoor recreation facilities, accommodation facilities and a motor registry.

The site is surrounded by a number of community facilities including Castle Hill Showground, Fred Caterson Reserve, the Council Administration Centre and Operations Centre and The Hills Centre. It also includes a large car park used for a variety of purposes including visitors to The Hills Centre and Council staff parking.

Under LEP 2012, the Showground Station site is zoned as B2 (Local Centre), B6 (Enterprise Corridor), RE1 (Public Recreation), B6 Enterprise Corridor and R1 (General Residential). There is a mix of land use zones present in the surrounding area. To the north the Castle Hill Showground and Fred Caterson Reserve are zoned as RE1 Public Recreation. The Castle Hill Industrial Area to the west is zoned IN2 Light Industrial with a corridor along its main spine of Victoria Avenue zoned B5 Business Development.

d) Norwest Station

The proposed Norwest Station would be located in the specialised centre of Norwest, underground and adjacent to Norwest Boulevard. The employment area is characterised by large format campus style commercial buildings of between three and five storeys located within a modern landscaped setting.

Norwest is strategically positioned within the road network with a high level of accessibility by private vehicle. Direct access is provided to the M7 and M2 Motorways and the major regional roads of Windsor Road and Old Windsor Road perpendicular to the main spine of Norwest Boulevard. The residential precinct of Bella Vista predominantly lines the southern side of the commercial precinct and contains over 2,000 dwellings. While the vast majority of housing in the suburbs surrounding the Norwest Business Park is single detached dwellings, there are some medium density developments already constructed or under construction.

A number of community facilities are located in the immediate vicinity of the proposed railway station including Hillsong Church, convent of St Joseph and facilities such as childcare within the Norwest Market Town Shopping Centre.

Under LEP 2012 the station site is zoned B7 Business Park and is located adjacent to the Norwest Marketown which is zoned B2 Local Centre. Higher density residential zones are located within close proximity to the Norwest Business Park with lower densities extending outwards. Land zoned R4 High Density Residential is located to the north of the business park which is bordered by land zoned R3 Medium Density Residential and R2 Low Density Residential.

e) Bella Vista Station to Memorial Avenue

The proposed Bella Vista Station would be located on the east side of Old Windsor Road just north of Celebration Drive on the former site of the Totally Home Centre. The site is located to the north of the current boundary of the Norwest Specialised Centre with frontage to Old Windsor Road and the existing T-way.

The Bella Vista Station area is characterised by large format commercial buildings, which are generally newer and taller than the older part of Norwest to the east, and newer

residential lands to the east. Residential land to the east of the proposed station is mostly low density residential with small pockets of medium density townhouse development. Lands to the north and north east are currently rural in character and will be developed as low to medium density residential uses as part of the Balmoral Road Release Area.

Community facilities in the immediate vicinity of the site include a number of churches, schools and childcare centres. All are located within the Blacktown City local government area.

Under LEP 2012, the site is zoned as B5 (Business Development), SP2 (Infrastructure) and R1 (General Residential) and B2 (Local Centre). Parts of the Balmoral Road release area have been identified and zoned as land for railway purposes in line with the original concept approval for the NWRL. Modifications to the horizontal alignment may require integration of the NWRL with the land release area.

f) Kellyville Station Windsor Road

The proposed Kellyville Station is located on the southern side of Samantha Riley Drive at the intersection with Old Windsor Road. The site encompasses the T-way car park and bus interchange, open space and a number of residential properties.

The area to the east of Old Windsor Road is currently vacant land forming part of the Balmoral Road Release Area. Low density residential development has taken place recently to the north east of the station and in the vicinity of Sanctuary Drive. Recently developed low density residential areas are located to the west of Old Windsor Road in the suburbs of Stanhope Gardens and Kellyville Ridge. A number of community facilities such as schools, childcare centres are located within the vicinity of the future Kellyville station.

Under LEP 2012, this site traverses a number of zones including B7 (Business Park), SP2 (Infrastructure), R1 (General Residential), R3 (Medium Density Residential) and B6 (Enterprise Corridor). Parts of the Balmoral Road Release Area have been identified and zoned as land for railway purposes in line with the original concept approval for the NWRL. Modifications to the horizontal alignment may require integration of the proposed NWRL with the land release area.

g) Rouse Hill Station, Windsor Road Viaduct, Cudgegong Road

The proposed Rouse Hill Station is located within the Rouse Hill Town Centre on Tempus Street and adjacent to Windsor Road. Rouse Hill Town Centre is located on the eastern outskirts of the North West Growth Centre. The area surrounding Rouse Hill Town Centre is currently being developed largely for residential purposes as part of the North West Growth Centre.

A number of community facilities are located within and adjacent to the Rouse Hill Town Centre including a community centre, library, community college, schools and childcare centres. Castlebrook Lawn Cemetery and Crematorium is located opposite the proposed station construction site.

Major roads ensure vehicular access to the area with Windsor Road providing direct access to Old Windsor Road, the M7 and M2. A major bus interchange is located on the perimeter of the Rouse Hill Town Centre which caters for T-way services as well as a range of other bus services.

Under LEP 2012, Rouse Hill Station is zoned as B4 Mixed Use and is located within the major retail centre of the Region. The surrounding area, east of Windsor Road, is

primarily R3 Medium Density Residential. Large areas of RE1 Public Recreation are present within the area, providing predominantly for sporting facilities serving the local area. A large corridor of SP2 Infrastructure (Stormwater Management) extends parallel to Windsor Road, connecting with the stormwater management system near Kellyville Station.

Potential Future Development

The railway station sites have been proposed to align with the centres for growth which have been identified within the Metropolitan Plan for Sydney 2036. These centres include the major centres of Castle Hill and Rouse Hill and the Norwest Specialised Centre. Opportunities will be created around the remaining station sites to develop new local centres with active uses, local services and provide greater residential capacity.

The assessment recognises that the North West Rail Link will create opportunities for development at stations along the corridor to varying degrees which will assist in achieving dwelling and employment targets for the Region. In order to ensure that future development supports the public transport infrastructure and incorporates the principles of Transit Oriented Development, a precinct planning process is being undertaken by the Department of Planning and Infrastructure in consultation with Transport for NSW and Councils. The outcomes of the precinct planning process will be used to facilitate community and stakeholder discussions about the desired future character of the station precinct. This will directly inform future planning controls and infrastructure provision to support the future growth scenario within the vicinity of the North West Rail Link.

Potential Impacts

The potential impacts of both the construction and operational activities on the land uses and community facilities within the vicinity of each railway station have been assessed and the outcome of this assessment is detailed below.

a) Construction

The potential impact of the construction works presented within EIS 2 for the stations, rail infrastructure and systems are outlined below:

- The impact of the construction phase on community facilities will be minimal as the locations would already be construction sites;
- No additional properties will be acquired or demolished, over and above what was identified within EIS 1, as a result of the construction works proposed within EIS 2;
- The construction works may impact on known future land use planning developments in the study area including the Castle Towers Expansion, Balmoral Road Release Area, and the Rouse Hill Town Centre;
- The construction activities have the potential to physically divide a community via land severance. This could disrupt existing social linkages;
- Disruption or changes to pedestrian access and vehicular movement; and
- Construction traffic may impact on traffic flow along access roads.

The identified impacts of the construction of the North West Rail Link on the land uses and community facilities surrounding the stations are included within the following table.

Site	Direct Impact on Existing Land Use and Community Facilities
Cherrybrook Station	*Implications for Existing Land Use* • There are no known future developments proposed in the immediate vicinity of the proposed station. *Implications for Future Land Use* • Community facilities such as Tangara Infants School, Tangara School for Girls, Inala Rudolf Steiner School, Kindalin Early childhood Learning, Playdays Pre-School and Inala Dulkara Adult Day Care Service may experience reduced amenity during construction. • Potential impact on access to the two schools located on Franklin Road.
Castle Hill Station	*Land Use and Property* • Construction works would require the use of Arthur Whitling Park, part of the Old Northern Road Reserve and demolition of two buildings. The impact of the constructions works proposed within EIS 1 will continue through to EIS 2 works. • Cumulative impacts resulting from the potential overlapping of the North West Rail Link construction works and the expansion of Caste Towers. *Community* • Temporary loss of Arthur Whitling Park during construction • Relocation of war memorial and other monuments, structures and memorials within Arthur Whitling Park. Alternative locations will be investigated. • Potential impact on the amenity of community facilities within close proximity to the construction site including Castle Hill Senior Citizens Centre and St Bernadette's School. • Acquisition of bus stop at Old Northern Road.
Showground Road Station	*Land Use and Property* • Construction works would require the continued possession of the construction area identified in EIS 1. *Community* • The Showground will remain accessible to local residents and for major events. • Likely impact on the amenity of Carrington Pre-school.
Norwest Station	*Land Use and Property* • Works will be confined to the existing construction site. • Businesses on Brookhollow Avenue would be impacted. • The service station may be impacted. *Community*

Site	Direct Impact on Existing Land Use and Community Facilities
	• No direct impact on community facilities. • Surrounding community assets may experience reduced amenity during construction.
Bella vista Station	*Land Use and Property* • Construction works would require the continued possession of the construction area identified in EIS 1. • McDonalds would have a portion of their car park temporarily unavailable during construction. *Community* • No direct impact on community facilities. • Surrounding community assets may experience reduced amenity during construction.
Balmoral Road and Memorial Avenue	*Land Use and Property* • Construction works would require the continued possession of the construction area identified in EIS 1. *Community* • No direct impact on community facilities.
Kellyville Station	*Land Use and Property* • Construction works would require the continued possession of the construction area identified in EIS 1. *Community* • No direct impact on community facilities. • Temporary relocation of the T-way car park during the construction works. Impacts will be minor.
Rouse Hill Station	*Land Use and Property* • Construction works would require the continued possession of the construction area identified in EIS 1. *Community* • No direct impact on community facilities. • Surrounding community assets may experience reduced amenity during construction.

Construction impacts of the North West Rail Link

b) Operation

The impact of the operation of the North West Rail Link on the surrounding land uses would be predominantly positive with both direct and indirect impacts contributing to changes within the surrounding areas. The operational phase of the project has the potential to act as a catalyst for development in the areas surrounding each of the stations. The development of new stations at key growth areas such as Castle Hill, Norwest, Bella Vista, Kellyville and Rouse Hill would create an opportunity for Transit

Oriented Development with the improved public transport network encouraging higher density development around stations.

The broad operation impacts which are likely to be experienced at each of the station sites include the following:

- Future intensification of development within the station catchment to facilitate transit oriented development. This would see mixed uses that reduce the need for residents and workers to make additional trips to meet daily needs;

- Revitalise station precincts through well designed development that adds to the overall quality of existing centres;

- Business centres within the railway corridor would be strengthened via the provision of a direct connection to the Global Economic Arc;

- The operation of the North West Rail Link will have a strong focus on pedestrian, cycle and bus access to encourage sustainable transport modes and reduce the need for private vehicle use.

The identified impacts of the operation of the North West Rail Link on the land uses and community facilities surrounding the stations are included within the following table.

Site	Direct Impact on Existing Land Use and Community Facilities
Cherrybrook Station	*Implications for Existing Land Use* • Castle Hill road acts as a physical barrier between the uses on either side. The physical separation will be improved to enable pedestrian access to the station. *Implications for Future Land Use* • The North West Rail Link will stimulate the development of medium density housing within the area surrounding the station. • The station and the station precinct may become a focus for the local area with accommodation, new activities and local services.
Castle Hill Station	*Implications for Existing Land Use* • Arthur Whitling Park will be transformed into an open civic area interfacing with the retail centre of Castle Towers. Increased security and accessibility will be provided across the park. • Whilst no damage will be incurred to the historical items currently located within the park, all will be relocated. • The completed precinct would incorporate appropriate recognition of the current war memorial. • Direct impact on sensitive residential receivers would be minimal. *Implications for Future Land Use* • The approved plans for the Castle Towers expansion safeguard a direct connection to the future railway station. • The station would support further medium to high density

Site	Direct Impact on Existing Land Use and Community Facilities
	development as well as an increased intensity of commercial and business development. • Revitalisation may occur adjacent to the station along Old Northern Road where there is potential to integrate new development.
Showground Station Site	*Implications for Existing Land Use* • Existing Council uses will be permanently transformed to accommodate the station precinct. • There will be minimal disturbance to the Castle Hill Showground. Major events will be able to continue with minimal long term disturbance. • Fred Caterson Reserve will not be directly impacted. *Implications for Future Land Use* • The surrounding area will be transformed through redevelopment opportunities; • The operation of the Showground station may accelerate the transition toward a mixed residential, business and commercial character.
Norwest Station Site	*Implications for Existing Land Use* • The North West Rail Link will provide increased transport options for workers and residents. *Implications for Future Land Use* • Further redevelopment opportunities will arise in the area surrounding Norwest Station. • Further economic advancement within the centre will be encouraged.
Bella Vista Station Site	*Implications for Existing Land Use* • Pedestrian access to the station will occur via a pedestrian bridge over Old Windsor Road *Implications for Future Land Use* • Future urban development could occur to the north of the station • The station will support future business and residential development within the vicinity of the site. • The precinct around the station will provide opportunities for new jobs and diverse housing options.
Balmoral Road and Memorial Avenue	*Implications for Existing Land Use* • Impact on sensitive residential receivers would be minimal due to existing physical barriers including Old Windsor Road and the T-Way. *Implications for Future Land Use* • Future dev elopement within the Balmoral Road release are will need to respond to the presence of the railway corridor • Land uses adjoining the railway corridor should be restricted

Site	Direct Impact on Existing Land Use and Community Facilities
	to non-sensitive uses such as open space.
Kellyville Station Site	*Implications for Existing Land Use* • The operation of the railway line will complement the existing T-way service. • A pedestrian bridge has been identifies across Old Windsor Road to improve pedestrian movement to the station. *Implications for Future Land Use* • Potential to implement Transit Oriented Development on Greenfield sites surrounding the station.
Rouse Hill Station	*Implications for Existing Land Use* • The operation of the North West Rail Link will allow the Rouse Hill Town Centre to grow and operate more sustainably. • Impacts on the retail area will be positive and long term. *Implications for Future Land Use* • Higher densities planned for the Area 20 Precinct to the north west of the station site • Increased residential densities within the town centre will allow for residential walk up patronage.

Operation impacts of the North West Rail Link

Mitigation Measures

Mitigation measures for the operation and construction phases have been developed to avoid, reduce and manage potential identified impacts. The mitigation measures have been prepared to address potential impacts which may arise during the construction phase are included within the following table.

No.	Mitigation Measure	Applicable Sites*
LC1	Liaison would continue with statutory organisations, DP&I and local Councils to ensure the Project is integrated with local and regional land use planning, and that environmental planning instruments reflect the planning, construction and operation of the Project, and include integrated planning provisions to enhance potential future development.	All
LC2	Consultation would continue with the community throughout the project planning and construction phases to ensure that community members have adequate information about the project, the timing and scope of activities in their local area and impacts on their local facilities and recreational areas. Area specific Place Managers have been allocated to undertake this ongoing consultation.	All
LC3	Further consultation regarding the implications of the Project in relation to the *Epping Town Centre Study* would be undertaken with Hornsby Shire Council, Parramatta City Council and DP&I.	1
LC4	Consultation with Cheltenham Oval user groups would be undertaken as part of identifying appropriate post-construction configuration and facilities for sporting activities.	3
LC5	Consultation with stakeholders of Beecroft Reserve would be undertaken as part of identifying appropriate adjustments to walking trails both during construction (temporary adjustments) and operational phases (permanent adjustments). Enhancements or modifications to the trail network would also be considered as part of this process.	3
LC6	Consultation with schools near the Cherrybrook site would be undertaken to develop specific mitigation measures to reduce impacts on their operation and amenity.	4
LC7	Consultation would be undertaken with the Castle Hill RSL Sub Branch and The Hills Shire Council regarding appropriate management of the war memorial in Arthur Whitling Park. This would include consideration of possible temporary relocation and an appropriate long term solution.	5
LC8	Activities occurring in Showground buildings and pavilions to be acquired as part of the construction footprint would be re-accommodated within the Showground precinct or as otherwise agreed with the Showground Trust.	6
LC9	Consultation with Hillsong Church would be undertaken prior to construction to identify specific mitigation measures to reduce operational and amenity impacts.	7
LC10	Consultation with Emmanuel Baptist Church and Anglican Technical College Western Sydney would be undertaken prior to construction to identify specific mitigation measures to reduce operational and amenity impacts.	8
LC11	Consultation regarding the implications of the Project in relation to the Balmoral Road Release Area would be undertaken with The Hills Shire Council.	9 – 11

No.	Mitigation Measure	Applicable Sites*
LC12	Consultation would be undertaken with relevant stakeholders regarding the implications of the project on the Rouse Hill Town Centre Northern Frame works.	14
LC13	Consultation regarding the implications of the project on the proposed land use plan for Area 20 would be undertaken with DP&I, Blacktown City Council and relevant stakeholders.	15 – 17
LC14	Opportunities to minimise temporary loss of land should be investigated through detailed construction planning and site layout, particularly in areas such as the Cheltenham Services Facility and Showground Station.	All
LC15	Consider staging construction, particularly at busy locations, to complement traffic management measures and assist in minimising disruption to key land uses and vehicle and pedestrian movements.	All

Site 1 - Epping Services Facility, Site 2 – NOT USED, Site 3 - Cheltenham Services Facility, Site 4 - Cherrybrook Station, Site 5 - Castle Hill Station, Site 6 - Showground Station, Site 7 - Norwest Station, Site 8 - Bella Vista Station, Site 9 - Balmoral Road, Site 10 - Memorial Avenue, Site 11 - Kellyville Station, Site 12 - Samantha Riley Drive to Windsor Road, Site 13 - Old Windsor Road to White Hart Drive, Site 14 - Rouse Hill Station, Site 15 - Windsor Road Viaduct, Site 16 - Windsor Road Viaduct to Cudgegong Road, Site 17 - Cudgegong Road Station and Tallawong Stabling Facility and Tunnels

Operational Mitigation Measures – Land Use and Community Facilities

With respect to the operation phase, an Operational Environmental Management Plan would be developed to detail the process to manage the impacts which will arise during the operation of the project. The mitigation measures which will need to be implemented are included within the following table.

No.	Mitigation Measure	Applicable Areas
OpLC1	Consultation would continue between NWRL and DP&I to ensure the DP&I precinct planning process is integrated with NWRL station precinct planning so as to better integrate land use and transport connectivity.	Station precincts
OpLC2	It has been agreed with stakeholders that once operational, the completed precinct would incorporate appropriate recognition of the current war memorial.	Castle Hill Station

Operational Mitigation Measures – Land Use and Community Facilities

The modification of Arthur Whitling Park will be significant and will result in the relocation of a number of historic items and monuments which are currently located within the park. Whilst it is acknowledged that a planning and design process will be undertaken to improve the park and to integrate the open space with the railway station, Transport for NSW will need to continue to consult Council, the Castle Hill RSL Sub Branch and the Hills District Historical Society to ensure that the future design is sympathetic to the heritage significance of the park.

The identified mitigation measures indicate ongoing and comprehensive consultation with the community and key stakeholders and the appointment of area specific place managers, an approach which firmly supported by Council in its response to EIS 1. Transport for NSW will continue to consult with Council and the Department of Infrastructure and Planning with respect to land uses in the vicinity of the construction sites and rail corridor, and in particular the Balmoral Road Release Area. Consideration will also be given to the planned extensions of the Rouse Hill Town Centre and Castle Towers Shopping Centre.

The assessment highlights that the North West Rail Link would create an opportunity to implement Transit Oriented Development with the improved public transport network encouraging higher density development around each of the station sites. It is recognised that this process will be undertaken by the Department of Planning and Infrastructure through the precinct planning process. Council will require Transport for NSW to play an active role in the planning of key development sites within the immediate vicinity of the railway stations. It is likely that the planning of this site will occur prior to the completion of the broader precinct planning process. Accordingly, the involvement of Transport for NSW will be essential to ensure that future development supports the on-going operation of the North West Rail Link.

RECOMMENDATIONS

10.1 It is requested that Transport for NSW work with Council as part of the planning for Key development sites around the future railway stations which may occur prior to the completion of the precinct planning process. On-going consultation is imperative to ensure that any future development at these key sites integrates with the future railway stations and supports the on-going operation of the North West Rail Link.

10.2 Negotiations should continue with Council and the Castle Hill RSL Sub Branch regarding the relocation of the war memorial and other historic monuments within Arthur Whitling Park. Transport for NSW should also consult with the Hills District Historical Society with regard to the railway heritage and war memorial monument within the Arthur Whitling Park.

10.3 It is requested that Transport for NSW continue to consult Council on the potential implications of the project on the Balmoral Road Release Area.

10.4 Transport for NSW should ensure that appropriate consultation is carried out with resident and land owners within the vicinity of the railway corridor and railway station sites that will be affected by the construction and operation of the North West Rail Link.

11. ECOLOGY

Largely the ecological impacts of the project were considered during the assessment of EIS 1. The Stage two stations, rail infrastructure and systems construction works will not result in any additional bushland clearance compared to Stage 1 Major Civil Construction Works. Accordingly the assessment for the purpose of EIS 2 is limited to the impacts of the operation of the system.

In the Council's submission to EIS 1, concerns were raised that the objective of the principles for Biodiversity Certification "Improve and Maintain" have been adopted, the report does not identify where any ecological offset sites might be. As yet there has been no offsets secured.

Further Council recommended the use of the Biobanking methodology to calculate the offset required. While I note that an amended Biobanking methodology was used to assess the condition of the biodiversity, the report does not quantify the number or type of credits that would be required to offset the impact of the project.

Existing Environment

The study area includes the train corridor and a 100m buffer area.

Prior to clearing, the Study area contains habitat for 238 fauna species, including:

- 140 birds;
- 38 reptiles;
- 18 frogs;
- 11 flying mammals (bats);
- 16 non-flying mammals (including ten introduced species);
- 2 snail species (including one introduced species); and
- 13 fish species (including three introduced species).

Potential Impacts

As with any road or rail system collision hazards are being introduced. There is potential to harm motile fauna, particularly bats and birds, which may be impacted by the electrical supply cabling, structures or the trains and could be attracted by insects around lighting.

There is noted the potential for the noise and light spill to impact on foraging and in extreme cases breeding habits of fauna near to the infrastructure however for many species the magnitude of these impacts is unknown.

The operating area is likely to provide a suitable avenue for introduced predators such as rats and cats with may increase predation of native fauna.

RECOMMENDATIONS

11.1 Offset sites should be identified and procured prior to works commencing that involve the removal of ecology. It is requested that specific priority be given to securing offset sites as near to the location of the impact/loss as possible, to assist with the preservation of the specific endemic community of the area and assure that the ecological and amenity benefits of retaining endemic vegetation remain within the Local Government Area.

11.2 Lighting for the skytrain should be designed to minimize light spill

12. VISUAL AMENITY

Assessment Methodology

The assessment of visual impact is based on the identification of the level of visual modification created by the project, and the sensitivity of the viewer. When combined, these characteristics of the view are then considered to assign a level of likely visual impact.

The assessment begins with a description of the existing visual conditions of each construction site and surrounding area. This serves as the baseline for the visual assessment.

Visual modification refers to the change to the landscape that would occur as a result of development from a given viewpoint. This includes what has changed, and how it has changed. Visual modification can result in an improvement or reduction in visual amenity.

Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity. Generally, the greater the distance the less sensitive the viewpoint.

Although there are no recognised standards for determining the significance of visual impact, there is a need to assign significance to this assessment so that there can be a clear and consistent means of evaluating visual impact. The following significance criteria have been developed specifically for the NWRL to allow consistency to occur.

Areas identified as likely to result in a visual impact, as a result of the project, methods for reducing these impacts have been considered and specific mitigation approaches recommended. These mitigation techniques may include the use of vegetation for screening, materials selection, colour and treatment of structures and adjustments to the location of elements.

The assessment of night time impacts has been undertaken in a similar methodology however rather than assessing particular viewpoints the assessment draws upon guidance of the Institution of Lighting Engineers (UK) and their “Guidance for the reduction of obtrusive light” 2005. This guidance note identifies environmental zones, useful for the categorising of night time landscapes settings.

Preparation of Photomontages

As raised in EIS 1 a number of photomontages have been prepared which are intended to act as artists impressions, illustrating the general location, scale, and relationship of key visual elements with the surrounding landscape. These photos are not intended to be an exact representation of the final development, as the site layout and extent of features may change as the project progresses through design development.

The location of these visual simulations was selected to illustrate the range of impacts likely for the NWRL. A priority was given to the potential visual impact of stations, service facilities, viaduct and the stabling facility due to the visual scale of these elements. Viewpoints have been selected to illustrate areas of most significant visual impact, those areas where large numbers of viewers congregate, where visually prominent development and/or vegetation is to be removed and where the site can be clearly seen.

Existing Visual Environment

The NWRL is to be located between Epping in the east and Rouse Hill in the west, extending approximately 23km, including some 15km of tunnel. There are two distinctive landscapes which comprise this corridor, the Hills District in the east and the Cumberland Plain to the west. The character of these landscapes is important in determining the landscape’s ability to visually absorb the proposed infrastructure

because of this the character of the landscape is based primarily on topography and vegetative cover.

The proposal comprises the following typical situations:

- Station Buildings within tunnel section – resulting in some visual contrast to the surrounding residential land uses and less contrast with commercial land uses; and

- Station buildings on viaduct.

a) Castle Hill Station

Generally views within this area are considered to be of local visual sensitivity as the site is located within close proximity to Castle Hill Town Centre, parallels the route of a regional connector road with a series of bus stops, and is adjacent to Castle Towers Shopping Centre. All of these places are community gathering places where there is potential for large number of viewers.

b) Showground Station

Generally views within this area range between neighbourhood, local and regional visual sensitivity as the study area includes differing land uses and activities. Views from the showground are generally regarded as being of regional sensitivity because of the nature and intensity of uses that occur there.

c) Norwest Station

Generally views within this area are considered to be of neighbourhood and local visual sensitivity. Neighbourhood views include those from surrounding commercial uses. Norwest Boulevard and the Hillsong Church are considered to be of local visual sensitivity as they are likely to attract large number of viewers.

d) Bella Vista Station

Most views within this area are considered to be of neighbourhood visual sensitivity as the site is surrounded by predominately commercial and residential areas. Windsor Road and local parkland, however, are considered to be of local visual sensitivity.

e) Bella Vista Rail Corridor, Balmoral Road and Memorial Avenue

Most views in this area are considered to be of neighbourhood visual sensitivity as the site is surrounded by predominately rural and residential areas. Old Windsor Road and adjoining shared pathway, T-way and T-way Station, however, are considered to be of local visual sensitivity.

f) Memorial Avenue to Kellyville Station

Generally views in this area are considered to be of neighbourhood visual sensitivity as the site is surrounded by predominately rural and residential areas. Old Windsor Road and the pathway running along Old Windsor Road, the T-way and T-way Station, however, are considered to be of local visual sensitivity as they are likely to attract ,large number of viewers.

Samantha Riley Drive to Windsor Road and Old Windsor Road to White Hart Drive Views in this area are considered to be of local and neighbourhood visual sensitivity as the study area includes main roads, high density residential and commercial land uses. Old

Windsor Road is the most significant roadway and is heavily trafficked along its length. The pathway running along Old Windsor Road and the T-way are also considered to be of local visual sensitivity. Views from the lawn cemetery and crematorium are also considered to be of local visual sensitivity due to the nature of its use. Views from Mungerie House are considered to be of regional visual sensitivity as it is publicly accessible and well used heritage property.

g) Rouse Hill

Views from surrounding residential areas are generally considered to be of neighbourhood visual sensitivity as the study area includes mainly local roads, rural and residential properties in an area undergoing changes to a more dense urban residential development form. Windsor Road is the most significant roadway and is considered to be of local sensitivity. Views from the Lawn Cemetery and Crematorium are also considered to be of local visual sensitivity due to the nature of the land use. Rouse Hill House and Farm, located at a distance of approximately 2.1 km from the site, is considered to be of regional visual sensitivity and would therefore be considered in this assessment despite its distance from the site.

h) Windsor Road Viaduct to Cudgegong Road

Views from surrounding residential areas are generally considered to be of neighbourhood visual sensitivity as the study area includes mainly local roads, rural residential properties in an area undergoing change to a more dense urban residential development form.

Schofield Road is the main connector road through this area, and once the Second Ponds residential development is complete, this road would be heavily trafficked and is therefore

Recommendations

12.1 EIS2 is still silent on the ultimate design of the viaduct, however, it is expected that the detailed design stage will give particular consideration to making the structure interesting and visually appealing. The ultimate design should incorporate measures to reduce the visual impact and where possible use engineering art to decorate and provide visual interests where landscaping cannot be adequately provided.

12.2 The possible use of the viaduct structure for advertising is an ongoing concern for Council.

13. CLIMATE CHANGE AND GREENHOUSE GAS

General Overview

The Director-General's requirements, conditions of approval and statement of commitments for EIS 2 do not include specific climate change or Greenhouse as related requirements however Greenhouse emissions are an element of the sustainability principles adopted for the project.

A Greenhouse Gas assessment has been conducted, and a number of measures implemented in response to other elements of the proposal eg energy efficiency will have a beneficial influence on the project's overall contribution to Climate Change.

The Risk Assessment provides adaptation responses to all identified risks which will be managed through a combination of design specifications and management actions.

Existing Environment

A climate change risk assessment has been undertaken to identify and avoid impacts on customers, service reliability, safety and project capital and operating costs.

The scenarios which were used in the risk assessment are A1B (moderate emissions) and A1FI (high emissions) as set out in the Special Report on Emissions Scenarios (SRES) of the IPCC (2007). It should be noted that the observed global temperature, GHG emissions and sea level rise recorded since 1990 are currently tracking the high emissions A1FI scenario.

These scenarios are based on Rapid economic growth, a global population that peaks mid 21st century and rapid introduction of new technologies AND either Balance across all energy sources or Intensive reliance on fossil fuel energy resources respectively.

Potential Impacts

The climatic variables identified as potentially generating risks for NWRL are annual average rainfall, extreme rainfall, drought, extreme temperature, extreme wind, storms (cyclones, hail, dust & lightning), groundwater, ground stability and fire danger index and frequency.

The major risks to the project identified in the Climate change risk assessment include:

- Risks relating to temperature;
- Track buckling;
- Impacts on thermal comfort of passengers;
- Increased ventilation and cooling cost;
- Air conditioning units on trains failing;
- Air conditioning of critical equipment failing;
- Interruptions to mains power;
- Failure of signalling and communication equipment and reduced functionality of electrical systems; and
- Heat-related sag in overhead powerlines.

Risks relating to increased rainfall intensity:

- Ground stability issues, risk of landslides and embankment/slope failure;
- Extreme rainfall causing malfunctioning of power supplies and communications; and
- Extreme rainfall causing flooding of rail infrastructure and stations.

Risks associated with reduced annual rainfall:

- Soil movements and cracking of embankments and tunnel walls.

Risks associated with increased storms, hail and wind:

- Storm, hail and wind causing damage to exposed infrastructure (Structural, electrical and communications) and customers; and
- Storm, hail and wind impacts to train services.

Risks relating to increased frequency of bushfire:

- Bushfire damage to aboveground infrastructure, health and safety impacts on customers.

Other Risks

- Increased solar radiation leading to accelerated degradation of external materials.

RECOMMENDATIONS

13.1 Adaptation response be implemented with particular reference to Design specifications for the trains air conditioning systems and adequate emergency and evacuation procedures should be implemented to adequately address the high (unacceptable) likelihood of heat stress related health impacts on customers associated with failure of train air conditioning units.

13.2 As many of the adaptation responses relate to active/energy consuming systems, a commitment to green power for the rail project should be made to assure that Climate Change adaptation actions are not contributing to further intensification of the impacts of climate change.

13.3 Similarly the future operator of the rail should be bound to strict GHG emissions targets consistent with the NSW government Sustainability Policy.

14. SURFACE WATER AND FLOODING

EIS 2 describes the physical environment within the NWRL corridor in relation to surface water. EIS2 has identifies and assesses the potential hydrological impacts related to the operation of the railway as well as construction activities associated with stations, rail infrastructure and systems of the NWRL.

The surface water assessment has been divided according to the three sections of the project which traverse eight major waterway catchments.

The scope of the surface water assessment for the purposes of Stage 2 of the NWRL are as follows:

Operations

- Assessment of flooding impacts on the surrounding development;
- Assessment of drainage and water quality; and
- Assessment of impacts on stream flows.

Construction

- Assessment of flooding impacts to the construction works; and
- Assessment of water quality impacts resulting from station precinct construction and related road improvements.

Methodology

The following tasks have been undertaken in preparing the surface water assessment:

- Collation and review of background information;
- Consultation with government agencies and stakeholders;
- Identification of guiding principles for the assessment of hydrologic impacts during construction, including floodplain management and water quality;
- Flood modeling;
- Water quality impact assessment through the collation and review of available information to define existing conditions and identify potential impacts associated with the proposed works; and
- Identification of mitigation measures to manage flood and water quality impacts.

Existing Environment

The NWRL corridor crosses a number of named and unnamed tributaries of Parramatta River and Hawkesbury River.

Development within the catchments in the south east portion of the project (Epping to Bella Vista Station) is typically well established. This includes the suburbs of Epping, Cherrybrook, Castle Hill and Bella Vista. For catchments within the North West Growth Centre (covering Strangers Creek, Caddies Creek and tributaries, Elizabeth Macarthur Creek, First Ponds Creek and Second Ponds Creek) a considerable degree of development is underway and ongoing. To manage changes in flow behaviour as a result of urbanisation, water management strategies have been incorporated into the planning of these growth areas that include the provision of detention basins to offset potential increases in runoff.

Particular areas within the North West Growth Centre where significant future development has been identified include Balmoral Release area, Area 20 Precinct, Alex Avenue, Riverstone, The Ponds and Beaumont Hills. Many of these areas are largely undeveloped.

Chapter 18 provides an overview of the catchments draining to or through the project corridor. For major waterways traversed by the project flood extent mapping is provided for the 20 year, 100 year ARI flood events and the PMF. For local overland flow paths, peak flows are provided for the 20 year, 100 year ARI and the PMF.

Water Quality

The Hills Shire Council and Blacktown City Council have extensive water quality monitoring and reporting programmes. Water quality monitoring data is or has previously been collected by various government agencies including Sydney Water, the former Department of Land and Water Conservation (DLWC), the Environment Protection Agency, the Sydney Catchment Authority and the Hawkesbury Nepean Catchment Management Trust.

The Hills Shire Council's Health and Environmental Protection Team routinely monitors the water quality of major creek systems in the Council area. This includes monitoring sites upstream and downstream of the Project Area within:

- Cattai Creek;
- Strangers Creek;
- Elizabeth Macarthur Creek;

- Caddies Creek; and
- Second Ponds Creek.

a) Epping Services Facility to Bella Vista Station

The Devlins Creek (including Beecroft Road Tributary) Comparison for the M2 Motorway monitoring results for pre and post construction of the Motorway indicates that construction of the existing motorway has not had any significant impact on the water quality of the downstream receiving systems.

b) Pyes Creek

Monitoring results exceeded the ANZECC guidelines for Ammonium Nitrogen (NH3) and phosphorous concentrations in the majority of samples taken. The levels of turbidity and suspended solids in Pyes Creek were generally recorded at acceptable levels. Sewer leaks were not suspected due to low faecal coliform readings.

c) Cattai Creek

The Hills Shire Council operates three monitoring locations on Cattai Creek, upstream of the Showground Station, downstream of Showground Road and one site a further 1.2km downstream. Additional monitoring locations have previously been operated by the Environment Protection Authority, Sydney Catchment Authority, Sydney Water, Department of Land and Water Conservation and the Hawkesbury Nepean Catchment Management Trust. In general, *E. Coli* and nutrients Total Nitrogen and Total Phosphorous were found to be above the ANZECC guidelines in over half the samples, with dissolved oxygen readings below recommended guidelines.

d) Strangers Creek

The Hills Shire Council operates two monitoring locations on Strangers Creek, downstream of Norwest Station. Results of monitoring indicate nutrient levels below ANZECC guidelines, with dissolved oxygen readings below recommended guidelines.

e) Bella Vista Station to Rouse Hill Station - Elizabeth Macarthur Creek

Two monitoring sites operated by The Hills Shire Council are located on Elizabeth Macarthur Creek, off Celebration Drive upstream of the proposed Bella Vista Station and off Clovelly Crescent, upstream of the confluence with Caddies Creek. The former site has generally shown readings within acceptable limits for secondary contact recreation under the ANZECC guidelines. Slightly more than half the samples showed elevated Total Nitrogen levels. Results at the other monitoring site indicate poorer quality, with elevated levels of Total Nitrogen and Total Phosphorous in nearly all the samples taken, along with elevated *E. Coli* in approximately half the samples. Dissolved Oxygen at this location was below recommended levels within the ANZECC guidelines.

f) Caddies Creek (including Tributaries 3, 4 and 5)

The Hills Shire Council's Health and Environmental Protection Team operate two monitoring sites on Caddies Creek, one located approximately 1km downstream of the proposed Rouse Hill Station and another further 500m downstream. Results from both sites indicate *E. Coli* and nutrients Total Nitrogen and Total Phosphorous are above the ANZECC guidelines in over half the samples, with dissolved oxygen readings below recommended guidelines.

Rouse Hill Station to Tallawong Stabling Facility - Second Ponds Creek

The Hills Shire Council's Health and Environmental Protection Team operate one monitoring site on Second Ponds Creek, located approximately 2.5km downstream of the project corridor and therefore not suitable to provide a direct indication of the existing runoff quality relevant to the NWRL project.

Potential Impacts

Flooding of the creeks and waterways which traverse the project corridor has the potential to inundate the rail infrastructure, precincts and ancillary facilities during the life of the project, cause damage to the rail infrastructure and pose a safety risk to the public and rail workers. Furthermore, any proposed works within the floodplain have the potential to change existing flood behaviour and adversely impact on the surrounding environment. It is therefore necessary to manage the nature and extent of works within the floodplain in order to minimise the flood risk to the NWRL project and surrounding environment.

Potential flood impacts were considered for each component of Stage 2 of the NWRL:

- Stations;
- Development within stations precincts;
- Tallawong Stabling Facility;
- Tunnels;
- The skytrain and Surface Tracks;
- Rail Services Facilities;
- Rail System Infrastructure; and
- Surrounding Environment.

Construction impacts of the major civil works and operational impacts of major civil structures (bridges and viaducts) are addressed in the EIS 1.

Station Precincts

Each station will include a surrounding precinct that consists of a range of existing and future facilities including:

- Commercial/retail space.
- Transport interchanges/drop off/taxi facilities.
- Car and bicycle parking.
- Public domains and station plazas.
- Station access for emergency, delivery and maintenance vehicles.
- Pedestrian access.

As a minimum, railway stations are required to have 100 year ARI flood immunity. However, in accordance with the principles of the NSW Floodplain Development Manual (2005) a higher level of protection is needed where flows in excess of 100 year ARI have the potential to cause significant damage and/or risk to life. This is particularly relevant to underground stations where ingress of floodwaters has the potential to cause significant damage to critical services/infrastructure and where safe evacuation of rail users and staff may be difficult, particularly where there may be limited warning. Underground stations are to be located at Cherrybrook, Castle Hill, Showground, Norwest and Bella Vista. Due to the potential consequences of flooding to these

stations, a PMF flood standard will be required against mainstream and significant overland flooding.

Based on the current concept design each station has been located above the PMF level of mainstream flooding. For above ground stations, it is possible to adopt a lesser (100 year ARI) standard providing a flood risk assessment and flood evacuation plan is developed to identify how flood risks are managed for events greater than the 100 year ARI. Above ground stations are to be located at Kellyville, Rouse Hill and Cudgegong Road.

A summary of flooding potential at each station precinct, including PMF levels adopted for the concept design is provided in chapter 18. Flood levels provided relate to mainstream flooding. At some stations, drainage collection systems will be required to manage the potential for local stormwater runoff to enter the stations. This is particularly relevant to Cherrybrook and Bella Vista Stations. Local issues and potential impacts relevant to each station are identified in Chapter 18 which also outlines mitigation measures to reduce the potential flood impacts.

The planning approach being adopted for the NWRL recognises that development in the precincts around the stations would occur over time, but that measures must be taken now to provide a robust framework within which this development can occur. In this context, the key flooding constraints and opportunities relevant to the broader station precincts have been assessed and key floodplain management requirements are also summarised in Chapter 18.

Construction Impacts

Activities would include station construction and fit-out, station precinct works, services and stabling facility construction and fit-out, tunnel, at-grade and viaduct systems fit-out and testing and commissioning. Of these activities, works within the station precincts, services facilities and stabling facility have the potential for flood related impacts.

a) Below Ground Stations and Facilities - Epping to Bella Vista Station

For the tunnel section of the NWRL between Epping and Bella Vista Station, flood inundation of excavations for below ground stations and services facilities could lead to flooding of the tunnels and result in damage to works, delays in construction program and risk to personal safety. During the construction of the below ground stations and facilities and associated precincts, the potential for ingress of floodwaters into the sites would be appropriately managed, particularly at the entries to the underground sites. At all sites there would be potential for local runoff to enter the stations/ facilities and this would be addressed through local stormwater management of the site. The flood assessment identified that the construction sites at Epping Services Facility, Showground and Bella Vista have the greatest potential risk of flood affectation. The layout of the sites would be further developed taking into consideration the nature and potential risk of flooding, duration of construction, the magnitude of inflows and the potential risks to the project works, facilities and personal safety.

b) Above Ground Stations and Facilities

The above ground stations (Kellyville (Site 11), Rouse Hill (Site 14) and Cudgegong Road (Site 16)) as well as the Tallawong Stabling Facility (Site 17) are generally located outside the 100 year ARI flood extent and therefore flooding is not expected to pose a significant risk during Stage 2 construction.

Temporary filling (such as haul roads, stockpiles, etc) within the floodplain for the construction of the stations, precincts and ancillary facilities proposed as part of Stage 2 would be minimal. Filling within the floodplain would be removed at the completion of construction.

Proposed works during construction, particularly earthworks and temporary access roads, would alter the extent of impervious area and catchment response times. Potential impacts would be offset by the provision of erosion and sediment control measures, such as sediment basins and bunded swales, which would be designed to control the discharge of runoff from the site and minimise the potential for impacts offsite.

The Stage 2 construction works would involve some disturbance and exposure of the underlying soils, which have the potential to lead to increased erosion and sediment transport and ultimately sedimentation in downstream water bodies. The potential for sediment transport and sedimentation issues is influenced by factors such as severity of storm events, the slope and footprint of disturbed area and the management controls that are implemented on site. Potential impacts on water quality could also result from erosion and sedimentation generated during excavation and spoil handling, and from spills.

Works involving excavation would have the greatest potential to result in sediment transport and sedimentation. Such construction works for Stage 2 would include:

- general civil works associated with the construction of the rail precincts, temporary and permanent roads and ancillary station facilities; and
- handling of spoil associated with the above activities.

These works affect all construction sites in one form or another and pose the greatest risk where they occur near waterways (such as Caddies Creek and its tributaries), on steep slopes or on land subject to overland flow or flooding. A management framework and site specific controls would be developed and implemented during the construction phase of the project to reduce the risks of sedimentation in down gradient water bodies due to the proposed constructions works.

Preliminary soil risk maps (Appendix C of Technical Paper 7) have been prepared to identify areas more likely to be prone to erosion due to the construction works. The preliminary risk mapping has been prepared based on soil landscapes, ground conditions (rock or soil), erodibility, slope, extent of clearing required, location of works relative to sensitive receiving environments and the type of construction works being undertaken (piers/piling works, fill earthworks or cut slopes). The soil risk map would be further developed as part of the CEMP.

Procedural and physical management measures would be implemented during construction to retain sediment at the work locations. Measures could include the use of sediment basins or bunded swales. During significant rainfall events however, there is the potential that these sediment control measures would be filled to capacity and surcharge into the downstream environment. In such large events, higher quantities of sediment and pollutants from the site works may be discharged into downstream water bodies, potentially affecting local water quality. However, providing the site measures to control erosion and sedimentation are designed to an appropriate standard, then the spills would only occur following significant volumes of runoff and the quantity of sediment or pollutant would be appropriately diluted.

c) Spoil Handling

Stage 2 construction works would not generate significant quantities of spoil. Where spoil is generated, appropriate management and control measures would be implemented to minimise the potential for impacts on water quality.

d) Potential for Spills

During Stage 2 construction, there would be a risk of release of potentially harmful chemicals and other substances into the environment from spills. This would have the potential to impact on water quality in receiving waters down gradient from the project. Such potentially contaminating substances would include acids and chemicals from washing processes, construction fuels, oils, lubricants, hydraulic fluids and other chemicals.

Release of these substances might occur due to spills, as a result of equipment refuelling, failure and maintenance, via treatment and curing processes for concrete, as a result of inappropriate storage, handling and use of the substances or from the disturbance and inappropriate handling of contaminated soils. These substances have the potential to be transported in surface runoff down gradient from the proposed works locations. Water quality and associated ecological impacts could result if these contaminants reach water bodies. Appropriate measures would be implemented during construction to minimise the
risk of spills occurring. In addition, spill response procedures form part of the environmental management framework.

An OEMP would be developed detailing the processes to manage environmental impacts during the operation of the project. Mitigation measures have been developed to avoid, reduce and manage identified potential operational impacts. These mitigation measures are presented Chapter 18.

RECOMMENDATIONS

14.1 All site staff should be engaged through toolbox talks or similar with appropriate training on soil and water management practices.

14.2 A stormwater management plan which identifies the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks for each construction site should be developed.

14.3 An excavation plan should be developed which ensures procedures that threats to human safety and damage to infrastructure are not exacerbated during the construction period.

15. ASSESSMENT OF NON KEY ISSUES

EIS 2 includes an assessment of what are referred to as ‘non-key’ environmental issues arising from the operation and construction works identified within the EIS, and proposes measures to mitigate these impacts. The non-key issues are matters which are unlikely to be significantly impacted as a result of the proposed operation and construction activities and include the following:

- Air Quality; and
- Waste Management.

Air Quality

An assessment has been undertaken on the existing air quality within the study area and to assess the potential air quality impacts which could occur during the construction and operation of the project.

General Overview

The assessment of the likely impact of the construction and operational phases on the project on air quality is qualitative and has been undertaken at a strategic level. The methodology in assessing the likely impact on the project on air quality is outlined below:

- Identify the sources of air emissions during operation and construction;
- Examine key factors that influence emissions from identified sources;
- Evaluate the likely changes to emission sources due to the operation and construction of the project;
- Relate the likely changes in emission sources to potential air quality impacts at local and regional scales, taking account of existing background levels and relevant air quality objectives; and
- Outline appropriate mitigation measures to ensure air quality objectives are not exceeded.

The air pollutants of concern during the operation and construction include particulate matter with diameter less than or equal to 10 microns (PM10), deposited dust, total suspended particles (TSP), sulphur dioxide (SO2), nitrogen dioxide (NO2) and carbon monoxide (CO).

Existing Environment

The assessment highlights that the ambient air quality within the vicinity of the study area is 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 (for example bushfires, pollen or dust storms).

In order to establish the potential impact of the construction and operation of the railway activities, the assessment has utilised air quality monitoring data produced by the Office of Environment and Heritage to establish the background air quality within the vicinity of the study area. It is considered appropriate that this data be used given the absence of major industrial emission sources within and surrounding the railway corridor. A summary of air quality monitoring data measured by OEH is included within the following table.

Date	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SO_2 maximum 1h average [pphm] Criterion - 20 pphm*											
Lindfield	4.2	4.4	2.1	2.9	2	-	-	-	1.6	-	1.7
Vineyard	1.6	2.4	1.3	1.4	1.6	1.7	1.4	2.9	1.4	1.4	2
Prospect									1.4	1.7	1.8
NO_2 maximum 1h average [pphm] Criterion - 12 pphm*											
Lindfield	5.4	5.4	5.1	4.4	4.6	-	-	-	3.3	5.3	3.8
Vineyard	3.5	4	4.9	3.4	4.1	4.1	4.8	3.7	3.2	4.8	2.9
Prospect	-	-	-	-	-	-	-	-	-	5.8	4.3
CO maximum 8h rolling average [ppm] Criterion - 9 ppm**											
Lindfield	-	-	-	-	-	-	-	-	-	-	-
Vineyard	-	-	-	-	-	-	-	-	-	-	-
Prospect	-	-	-	-	-	-	-	2	1.5	2.3	1.9
OZONE maximum 1h average Criterion - 10 pphm*											
Lindfield	9.3	16.1	13.3	8.1	10.4	-	-	-	7.5	10.9	8.2
Vineyard	10.9	11.1	14	13.6	10.4	11.7	10.4	12.7	8.1	10	9
Prospect									10.7	12.6	10.4
PM_{10} maximum 24h average [µg/m³] Criterion - 50 µg/m³***											
Lindfield	40.1	103.9	93.2	132.4	-	-	-	-	38.8	1596.3	48.2
Vineyard	35.4	82.4	160.9	209.7	43.4	49.1	70	45.1	38	1698.9	39.7
Prospect	-	-	-	-	-	-	-	46.3	41.8	1680.3	40.1

Source: OEH (2011) and DEC (2005)
*pphm – concentration in parts per hundred million
**ppm – concentration in parts per million
*** µg/m³ - micrograms per cubic metre

Air Quality Monitoring Data

The analysis of the existing air quality within the study are has found that the air quality is good with concentrations of most pollutants well below the air quality goals except ozone and PM10. It was also identified that air quality within the study corridor is considered to be mainly influenced by regional air emissions.

The assessment highlights that the air quality is not anticipated to change significantly between the commencement of construction and the commencement of rail operations.

Potential Impacts

a) Construction

The majority of the potential adverse impacts to air quality within the subject area would result from major civil works and construction activities which have been addressed in EIS 1. However the assessment does recognise that the construction works associated with EIS 2 will also have the potential to impact on local air quality.

The impacts would be temporary and confined to the construction period. The main impacts on surrounding air quality during the EIS 2 construction works are discussed below:

- Dust Generation: The majority of the dust generating works would be completed prior to the construction activities assessed within EIS 2 coming into effect. The potential dust generation would be primarily confined to the areas surrounding the

station and service facilities. Sources of dust will be attributed to earthworks, spoil storage (stockpiling) and transport. These impacts would be temporary and will be managed through the implementation of various mitigation measures.

- *Vehicular and Plan Emissions:* Activities which will generate exhaust emissions include construction vehicles, construction equipment and generators. The movement of heavy vehicles associated with the transport of spoil and the delivery of construction equipment will impact on the local air quality. However it is considered that these impacts will be confined to the station and service facility areas and will be appropriately managed through the implementations of various mitigation measures.

b) Operation

The assessment highlights that overall the potential impact of the operation of the railway infrastructure would be beneficial through the reduction in private vehicular trips and vehicular kilometres travelled. The assessment identifies that the likely impact of the operation activities on the surrounding air quality will be minor and would occur through:

- Indirect emissions through the generation of electricity;
- Beneficial changes through a reduction in motor vehicle use; and
- Concentration of motor vehicles and large park and ride facilities.

The key matters which have been addressed with respect to the potential impact of operational activities on air quality are outlined below:

- Train Operation: Air quality will be impacted off-site as a result of the generation of electricity required to run the trains. However the potential impact of these emissions will be offset by the anticipated reduction in the number of length of vehicular trips.
- Tunnel and Station Ventilation System: The tunnel and station ventilation system will ensure that fresh air is circulated through the tunnel. Fresh air will be drawn through the entrance of the tunnel and will be discharged through ventilation shafts. The ventilation outlet will contain small quantities of particulates at low concentration. Given the low concentration the low concentration of particulates, it is unlikely that the ventilation system will impact on air quality.
- Stabling Yard Activities: Emission will be released from diesel machinery at the Tallawong Stabling Facility. However the emissions generated from these activities are considered to be negligible.
- Motor Vehicles: It is likely that there will be a reduction in the overall traffic volume due to the expected shift from private vehicles to rail. This will ultimately result in improved air quality by reducing vehicular emissions.

Overall there will be no adverse air quality impacts arising from the operation of the North West Rail Link. The assessment provides that it is likely that regional air quality will improve as a result in the modal shift from private vehicles to the train services.

Mitigation Measures

Dust and exhaust emissions generated during construction can be controlled through the implementation of various physical and operational mitigation measures.

Mitigation measures have been developed to avoid, reduce and manage identified potential impacts on air quality. These mitigation measures and their application to the project are detailed in EIS 2. The potential dust and air pollutant emitting activities have been adequately considered in the EIS and expected impacts from stockpiles, vehicles,

erosion and transport of spoil should be adequately addressed by these proposed mitigation measures.

Waste Management

In NSW, resource and waste management is prioritised according to the principles of the resource management hierarchy as provided within the *Waste Avoidance and Resource Recovery Act 2001*. Achieving a reduction in waste generation and turning waste into recoverable resources are priorities for NSW. The hierarchy is as follows:

- Avoidance of unnecessary resource consumption;
- Resource recovery; and
- Disposal.

EIS 2 outlines mitigation measures with respect to Waste Management Activities to ensure best practice is carried out to minimise impacts on the environment. Waste management activities associated with the construction works are considered to pose a minor risk to the environment given that standard construction management measures are available to address waste generation, storage, disposal and re-use in order to reduce impacts.

Mitigation measures outlined include:

- Development of an Operational Environmental Management Plan including a section on Operational Waste and Resource Recovery Management. This would detail opportunities for avoiding waste generation and responsible disposal methods for different waste streams;
- Design innovation during the detailed design stage of the NWRL would provide opportunities to reduce the amount of resources required for operation;
- All waste would be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (DECC, 2008);
- All waste materials removed from the sites would only be directed to a waste management facility lawfully permitted to accept the materials;
- Excavated material and spoil would be beneficially reused on the project site or other sites, where feasible and reasonable, in accordance with the spoil use hierarchy;
- Appropriate storage, treatment and disposal procedures would be implemented for any contaminated spoil;
- Cleared site vegetation would be mulched for reuse in rehabilitation and landscaping works. Topsoil generated during site preparation activities would be stockpiled for reuse in landscaping activities;
- Initial and ongoing education would be provided to staff and sub-contractors regarding the importance of appropriately managing waste;
- Recyclable wastes, including paper at site offices, would be stored separately from other wastes. Storage facilities would be secure and recyclables collected on a regular basis;
- Reusable materials would be stored separately, in secure facilities. Worksites would be free of litter and good housekeeping would be maintained. All Vermin proof bins would be utilised onsite;
- Waste oil, other liquid wastes and spillages would be collected and stored in bunded areas;
- Waste truck loads would be covered, and tailgates secured prior to trucks leaving the worksite;

- Centralised reporting and auditing of waste volumes and disposal destinations would be employed;
- Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging;
- Materials such as (noise hoarding, site fencing, and so on) would be reused or shared, between sites and between construction contractors where feasible and reasonable.

RECOMMENDATION

Mitigation measures proposed in EIS 2 are considered satisfactory.

16. CUMULATIVE IMPACTS

General Overview

Cumulative impacts are incremental environmental impacts that are caused by past, present or reasonably foreseeable future activities which when combined may have a cumulative effect. When considered in isolation, the environmental impacts of any single project upon any single receiver or resource may not be significant. Significant effects may arise, however, when individual effects are considered in combination, either within the same project or together with other projects. The cumulative impacts assessment addresses impacts under two categories:

- Interaction between impacts associated with Stage 1 major civil construction works and Stage 2 stations, rail infrastructure and systems (internal cumulative impacts).
- Interaction between the NWRL and other projects (external cumulative impacts).

Internal Cumulative Impacts

Internal cumulative impacts refers to the potential cumulative impacts related to the construction of the stations, rail infrastructure and systems in addition to the major civil construction works, as well as the operation of the NWRL. The assessment of internal cumulative impacts is concerned with the impacts on receptors which result from:

- Construction activities at similar locations and from both stages of the project undertaken concurrently, thereby intensifying potential impacts at any one location.
- Construction activities at similar locations and from both stages of the project undertaken concurrently, thereby prolonging potential impacts at any one location.
- Operational activities following on from construction activities which may prolong impacts at any one location.

The methodology focuses on providing the most up to date project description for stations, rail infrastructure and systems construction works and rail operations to allow an understanding of the potential environmental impacts associated with these activities and how they might interact with the proposed works to give rise to cumulative impacts. As part of the assessment of internal cumulative impacts consideration was afforded to the following:

- Environmental components: aspects of the natural and built environment that was identified as an issue during the preparation of EIS 1 and 2;
- Review of existing environment: Review of existing environment based on the information contained within EIS 1 and 2 and technical papers to understand the characteristics of each environmental component;
- Review project description: Identification of how the activities proposed within EIS 1 and 2 will interact with each other and give rise to cumulative impacts;

- Define geographical extent: Spatially identify the extent and location of cumulative impacts;
- Define timeline extent: Construction activities for both stage 1 and 2 were placed on a timeline to identify the cumulative effects over time;
- Determine internal cumulative impacts: Internal cumulative construction impacts associated with each construction stage within each of the geographic sections were identified in the first instance. Then internal cumulative impacts were identified for the operational stage of the project; and
- Management Measures: Measures established to manage the internal cumulative effects.

External Cumulative Impacts

The assessment of external cumulative impacts is focused on the known key environmental issues associated with the construction (Stage 1 and Stage 2) and operation of the North West Rail Link and their interaction with other projects in the vicinity of the study area. Following the assessment it was identified that a number of projects, when considered in relation to the construction and operation of the North West Rail Link, may result in cumulative impacts. The identification of these projects was based on the following:

- Location: Located in close proximity to the major civil construction works (i.e. located within suburbs intersected by or adjacent to the major civil construction works).
- Project Timeframe: Only projects likely to be under construction concurrent with the major civil construction period were considered.
- Project Size: Projects were identified by virtue of being listed on the DP & I Major Projects Register and through consultation with the NWRL project team.

The following projects when considered with the construction and operation of the North West Rail Link may result in cumulative environmental impacts:

- Construction and operation of drinking water and wastewater infrastructure to service the North West Growth Centre second release precincts (The Hills Shire and Blacktown City).
- Parklea Markets redevelopment (Blacktown City).
- Northern Sydney Freight Corridor Epping to Thornleigh third track (Hornsby Shire).
- Castle Towers expansion and redevelopment (The Hills Shire).
- Showground Road upgrade (The Hills Shire).
- Schofields Road upgrade (Blacktown City).
- Rouse Hill Town Centre northern frame development (The Hills Shire).

The abovementioned projects and the potential cumulative impacts based on geographical area are detailed within the following tables:

Area	Potential Cumulative Impact with NWRL
Old Windsor Road Area between Samantha Riley Drive and Sunnyholt Road	Construction It is noted the construction and operation timeline for the Parklea Markets project is unknown. The cumulative assessment presented below made the conservative assumption that this project will be executed and that there will be construction timeline overlaps. ▪ Noise and vibration impacts to receptors in the area bounded by Old Windsor Road, Sunnyholt Road and Cattai Creek as a result of construction and related traffic1. ▪ Disruption to traffic along Old Windsor Road and Sunnyholt Road as a result of construction related traffic. ▪ Visual impact due to construction hoarding, elevated building structures associated with Parklea Markets redevelopment as well as the NWRL viaduct structure. ▪ Water quality impacts on Caddies Creek/Cattai Creek as a result of potential pollution of stormwater run-off from construction activities. Cattai Creek runs through or alongside the Parklea Markets redevelopment and the Water Services project as well as the NWRL major civil construction works. Operation ▪ The NWRL would increase the sustainable travel plan choices made by the Parklea Markets patrons.
Old Windsor Road/Windsor Road Area between Samantha Riley Drive and White Hart Drive	Construction The indicative construction timeline for the Water relates services for North West Growth Centre project is likely to overlap with the NWRL Stage 1 and Stage 2 constriction period. Cumulative impacts would include: ▪ Noise and vibration impacts to receptors alongside Windsor Road as a result of construction and related traffic1. ▪ Disruption to traffic along Windsor Road (and other local roads) as a result of construction related traffic. ▪ Visual impact due to construction hoarding and the NWRL viaduct structure. ▪ Water quality impacts on Tributaries 3, 4 and 5 as a result of potential pollution of stormwater run-off from construction activities. Tributaries 3, 4 and 5 cross the construction of the Water Services project, which follows Old Windsor Road/Windsor Road, flowing to the east of Old Windsor Road/Windsor Road and crossing the construction sites for the major civil construction works. ▪ Cumulative clearing of vegetation and disruption of terrestrial fauna species. ▪ Increased number of European heritage items and known Aboriginal items impacted. Operation ▪ Complement the provision of public infrastructure services (reticulated water supply and sewerage, public transport, public roads) to the North West Growth Centre.

Area	Potential Cumulative Impact with NWRL
Showground Road and Castle Towers Area	It is noted the construction and operation timeline for the Castle Towers Shopping Centre Upgrade and the Showgrounnd Road Upgrade projects is unknown. The cumulative assessment presented below made the conservative assumption that the projects will be executed and that there will be construction timeline overlaps. Construction ▪ Noise and vibration impacts to receptors along Showgrounnd Road and Old Northern Road particularly where they are in close proximity to the shopping centrel. ▪ Noise and vibration impacts to receptors along Showgrounnd Road and other local roads as a result of construction related traffic. ▪ Disruption to traffic along various roads as a result of construction related traffic. ▪ Visual impact due to construction hoarding and elevated building structures associated with the Castle Towers Shopping Centre Upgrade. ▪ Increased accessibility issues to businesses and patrons entering the Castle Towers Shopping Centre and its car parks. ▪ Cumulative increase in the demand for goods and services may be expected. The businesses which are most likely to experience this demand are the eateries, food outlets and local retailers along Old Northern Road and within Castle Towers Shopping Centre due to the flow-on effects of construction workers. Operation ❖ Increased opportunity for new Castle Towers Shopping Centre business to attract patron activity as a result of the operation of the road upgrade and the NWRL. ❖ The three projects would indirectly support employment and residential growth in the Castle Hill locality.

Area	Potential cumulative impact with NWRL
Rouse Hill area and area west of Windsor Road and north of Schofields Road incorporating Area 20 and parts of Riverstone Precinct	Construction It is likely the Water related services for North West Growth Centre and Schofields Road upgrade construction timelines would overlap with the NWRL construction timeline. Cumulative external impacts during construction would include: ▪ Noise and vibration impacts to receptors throughout the area including those along Windsor Road, Schofields Road, Tallawong Road, Cudgegong Road, Rouse Road, Macquarie Road and Hambledon Road, as a result of construction and related traffic1. ▪ Disruption to traffic along various roads, including Schofields Road as a result of construction related traffic. ▪ Visual impact due to construction hoarding and construction activities as well as the NWRL viaduct structure. ▪ Water quality impacts on Second Ponds Creek and First Ponds Creek as a result of potential pollution of stormwater run-off from construction activities and construction of creek crossings. ▪ Cumulative clearing of vegetation and disruption of terrestrial fauna species within the North West Growth Centre area. ▪ Increased number of European heritage items and known Aboriginal items impacted. Operation ▪ Complement the provision of public infrastructure services (reticulated water supply and sewerage, public transport, public roads) to the North West Growth Centre. ▪ Likely cumulative increase on airborne noise levels from road traffic, train, stabling facility and pump stations noise. ▪ Further support to the transformation of the lands along the Schofields Road and NWRL and improvement of travel conditions, connectivity and easy traffic congestion.

1 Construction Noise and Vibration modelling for NWRL is based on a "realistic worst case" approach - as required in the Interim Construction Noise Guideline. The guideline recommends that the realistic worst case or conservative noise levels from the source should be predicted for assessment locations representing the most noise exposed residences or other sensitive land uses. For most construction activities, it is expected that the construction noise levels will be lower than predicted in the Construction Noise and Vibration Assessment. Since the construction noise predictions in the Construction Noise and Vibration Assessment are already based on a realistic worst case assessment, and at the nearest sensitive receivers to the NWRL construction works, it is unlikely that noise or vibration from another project would generate even higher levels if undertaken at the same time.

Mitigation Measures

a) Construction

Internal and external cumulative impacts for the NWRL Stage 1 and Stage 2 construction works would be managed and mitigated through a project wide Construction Environmental Management Framework. Contractors would be required to implement and adhere to the requirements of this Construction Environmental Management Framework when constructing the NWRL works.

The Construction Environmental Management Framework, which has been included within EIS 2, would provide a linking document between the planning approval documentation and the Construction Environmental Management Plan to be developed by the construction contractors relevant to their scope of works. The purpose of the Plan would be to detail how the project would deliver the environmental requirements and how issues that arise are handled.

The Plan prepared by all contractors would be relevant to the scale and nature of the nominated scope of works and would be prepared consistent with the 'Guideline for the Preparation of Environmental Management Plans' (DIPNR, 2004). The Plan would cover the requirements of the relevant EIS, the project approval conditions, the conditions of all other permits and licences, the Contractor's corporate EMS, the environmental provisions of the contract documentation and the Environmental Management Framework.

b) Operation

The internal and external cumulative impacts for the operation of the North West Rail Link will be managed and mitigated through a project wide Operational Environmental Management Plan. Subject to the preparation and implementation of the OEMP, no additional mitigation measures would be required.

Environmental Risk Analysis

The Environmental Risk Analysis has identified there are no issues that would present a high or greater level of residual risk for NWRL after the incorporation of standard mitigation measures.

The majority of issues would have a moderate residual risk, including:

- Traffic and transport;
- Noise and vibration;
- Local business impacts;
- Land use and community facilities;
- Ecology;
- Visual amenity;
- Greenhouse gas and climate change;
- Surface water and hydrology;
- Waste management; and
- Resource use.

The level of assessment undertaken for these issues has determined the likely extent of impacts and recommended appropriate mitigation required to ensure that the risk would be abated.

Soils and groundwater, European heritage, Indigenous heritage and air quality impacts have a low residual risk. It is expected that these issues can be routinely managed through detailed design and operational procedures, and by the implementation of standard management measures aimed at ensuring that all necessary environmental criteria and guidelines would be achieved.

The Environmental Risk Analysis has identified that construction noise and vibration would present a high or greater level of residual risk for NWRL Stage 2 construction works after the incorporation of standard mitigation measures. This suggests that an

increased focus would be required on this aspect throughout the construction of the project to meet an acceptable risk level.

For example, NWRL Contractors would be required to implement the Construction Noise and Vibration Strategy which includes identification of additional measures during detailed construction planning to minimise the demand noise impacts which would result in a lowering of this residual risk to a more acceptable level.

Other issues that would have a moderate residual risk include:

- Soils and groundwater;
- Construction traffic;
- Local business impacts;
- Land use and community facilities;
- Ecology;
- Visual amenity;
- Greenhouse gas and climate change;
- Surface water and hydrology;
- Waste management;
- Resource use; and
- Cumulative impacts.

The level of assessment undertaken for these issues has determined the likely extent of impacts and recommended appropriate mitigation required to ensure that the risk would be abated.

European heritage, Indigenous heritage and air quality impacts have a low residual risk. It is expected that these issues can be routinely managed through detailed design and construction, and by the implementation of standard management measures aimed at ensuring that all necessary environmental criteria and guidelines would be achieved.

17. MODIFICATIONS TO SHOWGROUND STATION (formerly known as The Hills Centre Station)

On 25 September 2012, a Modification of Minister's Approval was granted pursuant to Section 115ZI of the *Environmental Planning and Assessment Act 1979* for the Staged State Significant Infrastructure Approval for the NWRL project. In addition, on 25 September 2012 an Approval was granted pursuant to Section 115ZB of the *Environmental Planning and Assessment Act 1979* for the State Significant Infrastructure Application relating to the Major Civil Construction Works for NWRL.

Pursuant to Section 115ZI of the EP&A Act, Transport for NSW is now seeking approval from the Minister for Planning and Infrastructure for a further modification of the State Significant Infrastructure approval (SSI-5100) granted on 25 September 2012.

The proposed modification is associated with minor changes to Showground Station (Construction Site 6 as identified in the Environmental Impact Statement for Stage 1: Major Civil Construction Works (EIS 1)) and includes:

- Minor change to the location of Showground Station, to the south east and parallel with Carrington Road, and associated modification of the horizontal alignment of the tunnels;
- Vertical alignment changes to accommodate the changed location of Showground Station;

- Change to Showground Station construction site boundary (Site 6); and
- Change to the Showground Road and Carrington Road construction access/egress arrangements.

The approved Showground Station construction site would contain an area of approximately 65,000m² and be located to the south and west of the existing Castle Hill Showground complex and within The Hills Shire Council depot. The site is bounded by Showground and Carrington Roads. The construction site would require the temporary possession of limited areas associated with the southern portion of the Castle Hill Showground complex and the acquisition of The Hills Shire Council depot.

At Showground Station, open cut excavation works would occur on the site. This station excavation would then be used to undertake a Tunnel Boring Machine (TBM) maintenance program within the confines of the station box prior to advancing the next 5km to Castle Hill Station and then to Cherrybrook Station. Showground Station would become the TBM support site for Showground Station to Cherrybrook Station portion of the drive in order to maximise efficiencies of TBM operation and to provide progressive access for the construction contractor undertaking works that form Stage 2 of the NWRL project. This would require the full range of support services to be provided including high voltage power supply, water supply, ventilation, work train, grout batching plant, drainage and water treatment, workforce facilities, spoil removal, and facilities to introduce pre-cast concrete lining elements.

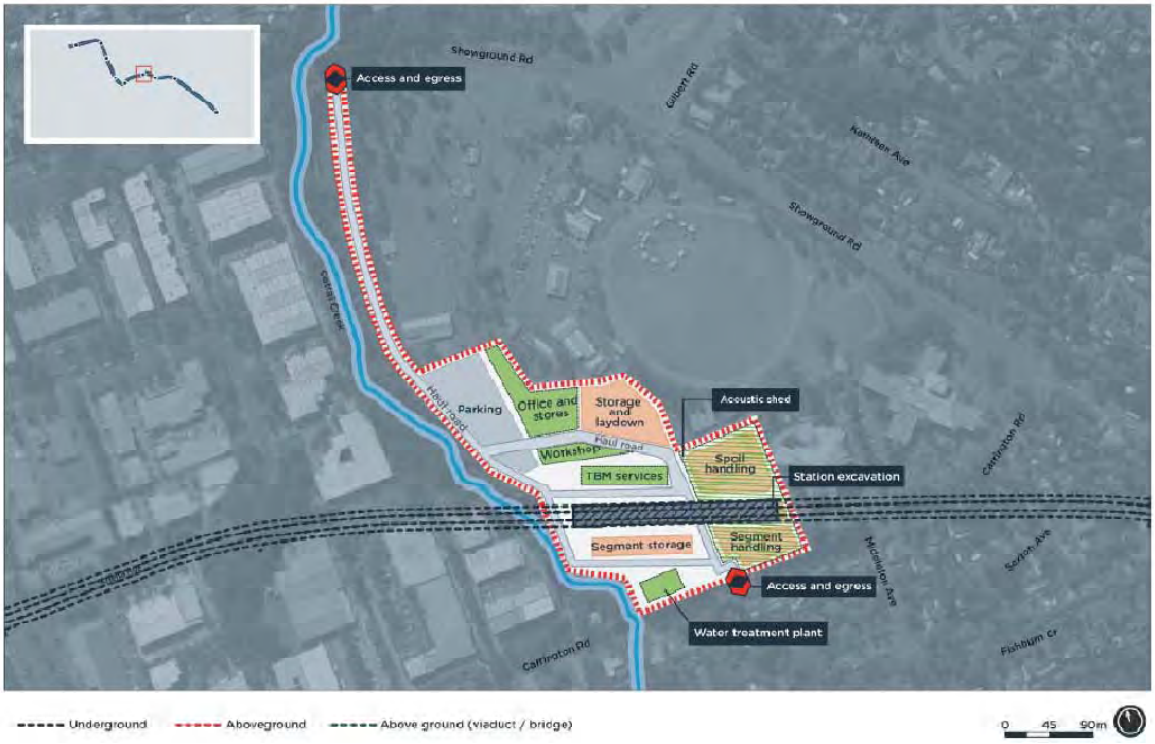
Showground Station would be a significant spoil removal site with a total of approximately 475,000m^3 removed through the site, being some 85,000m^3 from the station excavation and about 390,000m^3 from the tunnelling works.

An acoustic shed would be established on the eastern portion of the site to enclose the TBM operations including pre-cast concrete segment and spoil handling. Acoustic panels would be placed over the remainder of the station box excavation during works outside of standard construction hours. Spoil handling would occur outside of the acoustic shed; however this would generally only occur during standard daytime hours. Loading of spoil onto heavy vehicles outside of standard daytime construction hours would occur within the acoustic shed.

The south western portion of the site would be used for segment storage and a water treatment plant. The area immediately to the north of the station excavation would provide TBM services and a workshop, with the northernmost section comprising general laydown, offices, toilet facilities and car parking for construction workers.

Approved access to and egress from Showground Station would be from Showground and Carrington Roads. The access and egress from Showground Road would largely follow an existing road (to be upgraded) within the Showground complex, located towards the western boundary adjacent to Cattai Creek. A new signalised intersection at Showground Road was also approved.

The location and indicative layout of the Showground Station construction site, including vehicle access / egress, as approved on 25 September 2012, are shown below:



Project Component	Summary of Approved Component	Proposed Modification
Showground Station box	Located to the south and west of the Castle Hill Showground complex and within The Hills Shire Council Depot.	Minor change to the horizontal alignment of Showground Station. Refer to Section 4.1.1. Vertical alignment of the tunnel will be shallower at Showground Station to account for a minor change to the horizontal alignment. Refer to Section 4.1.2.
Showground Station Construction Site	Approximately 65,000m^2 construction footprint. The construction site would require the temporary possession of limited areas associated with the southern portion of the Castle Hill Showground complex and the acquisition of The Hills Shire Council Depot.	Change in the extent and area (85,000m^2) of the construction footprint. Refer to Section 4.1.3.
Construction Access/Egress	Access to and egress from the site is from Showground and Carrington Roads. The access and egress from Showground Road would largely follow an existing road (to be upgraded) within the Showground complex, located towards the western boundary adjacent to Cattai Creek. This would require a new signalised intersection on Showground Road (north of Castle Hill Showground). Access and egress from Carrington Drive would require a new signalised intersection at Doran Drive. Access to the Showground at Doran Drive would be closed to enable excavation of the station.	Change to the Showground Road and Carrington Road construction access/egress locations. Refer to Section 4.1.4.

Changes to Environmental Impact

The changed environmental impacts associated with the proposed modification for the 2012 SSI approval for EIS1 – Major Civil Construction Works are identified in this section. To determine these changed impacts the following was undertaken:

- Consideration of each modification against a list of environmental categories to identify whether there would be a potential change in environmental impact compared to the approved project; and
- Determination of whether the identified potential change in environmental impact is significant and warrants further assessment.

The table below identifies changes in environmental impacts associated with the proposed modification. In areas where there is potential for a significant change in environmental impact further assessment was carried out and is discussed below:

Table 6-1 Change in environmental impacts associated with the proposed modifications to the Staged Infrastructure Approval and EIS 1 Project Approval (✓ = significant change, X = no significant change)

Proposed Modification to Approval	Environmental Category													
	Soils and Groundwater	Traffic and Transport	Noise and Vibration	European Heritage	Indigenous Heritage	Local Business Impacts	Land Use and Community Facilities	Ecology	Visual Amenity	Climate Change and Greenhouse Gas	Surface Water and Hydrology	Air quality	General Waste management	Cumulative Impacts
Minor change to the location of the station and horizontal alignment.	x	✓	✓	x	x	x	x	x	x	x	x	x	x	x
Vertical alignment changes.	✓	x	✓	x	x	x	✓	x	x	x	✓	x	x	x
Change to Showground Station construction site boundary.	x	✓	✓	x	x	x	✓	✓	x	X	✓	x	x	x
Change to site access/egress.	x	✓	✓	x	x	x	✓	x	x	x	x	x	x	x

The modifications would not give rise to significant changes to European Heritage, Indigenous Heritage, Surface water and hydrology Local Business Impacts, Visual Amenity, Climate Change and Greenhouse Gas Emissions, Air Quality, General Waste Management and Cumulative Impacts.

The environmental aspects considered in further detail include:

- Soils and groundwater: Overall, the potential impacts on soils and groundwater during construction are considered to be largely neutral;
- Traffic and transport: Overall, the impacts of the modification during construction on key intersections, buses, pedestrian and cycling access and parking are generally consistent with those previously approved;
- Noise and vibration: Overall, the change in noise and vibration impacts as a result of the modified project would be minor;
- Land use and community facilities: Overall the alteration of the construction would present very few additional adverse land use impacts. Rather, the change would be beneficial due to the significant reduction of impacts to the Castle Hill Showground complex: and
- Ecology, the overall impact of grouting on GDEs would be negligible, as there would be minimal disturbance to the alluvial aquifer and to the water table. Sensitive drilling techniques, such as angled drilling, would be used to access the top of the sandstone, thereby avoiding direct impacts to the STIF present in the riparian zone that may obtain a portion of its water needs from the zone of saturation.

Some additional construction impacts in ecology would occur as a result of the proposed modification of the 2012 SSI approval, including:

- A minor increase in impact (0.07 ha), on Sydney Turpentine Ironbark Forest EEC (TSC Act);
- Minor increase (0.21 ha) in impacts on Planted/Exotic vegetation; and
- Additional potential impacts on GDEs, aquatic and riparian ecology and water quality of Cattai Creek if appropriate controls in are not in place.

The proposed modification, however, would largely reduce ecological impacts during construction:

- Overall reduction in vegetation clearance of 0.5 ha;
- No removal of Shale Sandstone Transitional Forest, representing a 0.78ha reduction in impacts to a Commonwealth and State listed CEEC;
- EEC offsetting commitments would now go beyond requirements compared to the approved project; and
- Decreased impact on the number of hollows within the construction footprint from 33 to one hollow.

Mitigation measures proposed to manage the impacts of the modification on traffic and transport, noise and vibration and ecology are provided below:

No.	Mitigation Measure	Applicable to*
Construction		
T34	Provision of public access for vehicles, pedestrians and cyclists to and from the Showground precinct via the western side (adjacent to Cattai Creek) of the construction site and/or the eastern side of the site. The location and form of the access facilities would be defined as part of the Construction Traffic Management Plan for the site.	Showground Station
NV19	Prior to construction, investigate reasonable and feasible measures to minimise gaps in the noise walls and resulting exceedances at some receivers (including the childcare centre and some residences) during construction. Measures to be investigated include overlapping of noise wall sections at site access points, or orienting the access points away from (for example) the childcare centre.	Showground Station
E23	Conduct pre-disturbance river health assessment (e.g. macroinvertebrate surveys) to provide comparison after rehabilitation. This should include a site within the impacted area and an upstream survey site as a control point for general catchment disturbances.	Showground Station
E24	Prior to grouting works, undertake pressure testing to determine correct grouting application (viscosity and applied pressure) to avoid surface penetration.	Showground Station
E25	Should grouting works be required, environmental management measures would include: - Monitor creek water for pH changes before, during, and after grouting. - Avoid the use of grout containing chemical acrylics or polyurethane compounds. - Where feasible, drilling rigs would be set up on existing hardstand surfaces (outside Cattai Creek riparian channel), to avoid impacts on riparian vegetation and creek bank stability. - In order to manage the potential for grout leaking through the bedrock and alluvium into Cattai Creek, the following would be incorporated into the environmental management framework for the site works (where required): • Real time monitoring of water quality during grouting; • Provision of adequate sand bags to isolate grout within the channel; • Diversion of flow above the site; • Adequate provision on site of a suitable equipment to remove grout from the creek and a neutral pH solution to dilute any leakage; and • Rehabilitation of the disturbed section of creek following treatment.	Showground Station

RECOMMENDATION

It is considered that the proposed mitigation measures for the modification to Showground Station are acceptable.

CONCLUSION

The NWRL project is one, if the largest infrastructure projects ever undertaken by any NSW State Government. Its successful completion will provide a critically important public transport option for existing and future residents of The Hills Shire and the North West Growth Centre. The Project has been and will continue to be supported by both Council and general community.

Overall it is considered that the proposed mitigation measures proposed in EIS 2 are satisfactory. However Council officers have identified in the report a number of concerns

and comments which should be submitted to the Department of Planning and Infrastructure.

As recommended in EIS 1 Council should maintain its position on the entire project being built underground. However should State Government not accept Council's view, the officers comments included in the report incorporate recommendations to help address the impact of the above ground structures.

IMPACTS

Financial

Construction of the NWRL project will have a wide range of both direct and indirect financial impacts on Council. Direct financial impacts include income received for the acquisition of Council property and expenditure involved in the relocation of Council's Operation Centre. These financial impacts will be provided in more detail as future reports are submitted to Council on these matters.

Indirect financial impacts will primarily involve the large amount of time that will be spent by officers from across the organisation liaising with the NWRL project team on a wide variety of matters throughout the duration of the project. These indirect costs will be accommodated within Council's existing staff establishment and budget allocations.

Hills 2026

The NWRL is a significant State infrastructure project that addresses many of the factors identified by our community's strategic vision that contributes to our quality of life.

RECOMMENDATION

This report and the following recommendations form the basis of The Hills Shire Council's response to EIS 2 and the modification to the Showground Station.

Project Description

1.1 Details of fire fighting, passenger evacuation and rescue arrangements along the entire route of the NWRL be referred to the relevant emergency services (Fire & Rescue NSW, Rural Fire Service, Police Service, Ambulance Service, State Emergency Service) for their consideration and endorsement prior to the commencement of operations.

1.2 Heavy vehicle access be provided at ground level along the route of the elevated Skytrain for maintenance and emergency vehicle access.

1.3 A detailed Maintenance Management Plan for all above ground facilities be prepared in consultation with the relevant Councils, to ensure that all structural and landscaped assets are maintained by the NWRL operators to a high standard. Particular attention is to be given to graffiti removal, litter removal, soft and hard landscaping maintenance.

1.4 Detailed designs of bus interchanges be undertaken in consultation with the relevant bus operators with such designs to include appropriate amenity facilities for bus drivers.

Sustainability

2.1 Expressed under the commitment to leadership in the Sustainability Policy is a commitment to "Explore new benchmarks for the transport infrastructure sector by requiring high standards from our designers, contractors and suppliers".

This commitment is the key principle to assure the success of the project in the context of sustainability. Specifications for further work and design parameters must demonstrate innovation and leadership in the pursuit of the best practical sustainability outcome to assure the overall impacts of the project are acceptable in the community and that the benefits of the project are optimised.

2.2 A number of the initiatives and targets are not yet quantified. Clear targets should be adopted to establish clear performance standards for project deliverables and future contractors' specifications. For example, offsets for electricity needs of 100% of the operation and 20% of the construction phase of the project should be a commitment rather that undertaking to merely explore options.

Consultation

3.1 It is recommended that Transport for NSW involve Council through on-going consultation and involvement as part of the further planning for the North West Rail Link and the railway station precincts.

Soil and Groundwater

4.1 A post construction monitoring program for ground movement and groundwater levels to be established for land slip area.

4.2 A process Manual be implemented and kept on-sites at all times for any contaminant spill or accident that may occur.

4.3 A management plan be implemented for the reuse of captured groundwater.

Noise and Vibration

6.1 It is recommended that a cautious approach be taken in deciding where vibration attenuation is not needed. Where there is any doubt about the impact of vibration, apply attenuation measures.

6.2 The adopted residential trigger or planning goals for night time noise should be 50dB(A) rather than the proposed 55dB(A) in consideration of the area in which the train line is proposed. Further the draft Rail Infrastructure Noise Guideline recommends 50 dB at night for light rail. It provides 55 dB at night for heavy rail which is defined as operating passenger and / or freight trains. No freight trains are proposed. The Industrial noise policy also recommends general planning goals of 45 or 50dB(A) as the maximum for an urban area at night.

6.3 Continuous welded rail be provided.

6.4 A schedule of periodic noise monitoring of the operation of the rail line (at least every two years) as noise attenuation methods will largely be reliant upon noise dampeners and noise absorption materials which can perish and wear over time resulting gradual increases in noise levels.

6.5 A schedule of periodic noise monitoring of the operation of the rail line (at least every two years) as noise attenuation methods will largely be reliant upon noise dampeners and noise absorption materials which can perish and wear over time resulting gradual increases in noise levels.

European Heritage

7.1 Views to Mungerie House from Windsor Road must also be considered in the design and placement of the viaduct and its piers.

7.2 During the detailed design of the viaduct and consideration of view corridors, Transport NSW should consult the Mungerie House Conservation Management Plan (2007) prepared for Lend Lease by Tanner Architects and endorsed by Council as it contains important information regarding view corridors and the setting of Mungerie House.

Local Business Impact

9.1 The Small Business Commissioner commence a study into the structural adjustment and support required for specific small businesses directly affected by the construction work.

Land Use and Community Facilities

10.1 It is requested that Transport for NSW work with Council as part of the planning for Key development sites around the future railway stations which may occur prior to the completion of the precinct planning process. On-going consultation is imperative to ensure that any future development at these key sites integrates with the future railway stations and supports the on-going operation of the North West Rail Link.

10.2 Negotiations should continue with Council and the Castle Hill RSL Sub Branch regarding the relocation of the war memorial and other historic monuments within Arthur Whitling Park. Transport for NSW should also consult with the Hills District Historical Society with regard to the railway heritage and war memorial monument within the Arthur Whitling Park.

10.3 It is requested that Transport for NSW continue to consult Council on the potential implications of the project on the Balmoral Road Release Area.

10.4 Transport for NSW should ensure that appropriate consultation is carried out with resident and land owners within the vicinity of the railway corridor and railway station sites that will be affected by the construction and operation of the North West Rail Link.

Ecology

11.1 Offset sites should be identified and procured prior to works commencing that involve the removal of ecology. It is requested that specific priority be given to securing offset sites as near to the location of the impact/loss as possible, to assist with the preservation of the specific endemic community of the area and assure that the ecological and amenity benefits of retaining endemic vegetation remain within the Local Government Area.

11.2 Lighting for the skytrain should be designed to minimize light spill.

Visual Amenity

12.1 EIS2 is still silent on the ultimate design of the viaduct, however, it is expected that the detailed design stage will give particular consideration to making the structure interesting and visually appealing. The ultimate design should incorporate measures to reduce the visual impact and where possible use engineering art to decorate and provide visual interests where landscaping cannot be adequately provided.

12.2 The possible use of the viaduct structure for advertising is an ongoing concern for Council.

Climate change and Greenhouse Gas

13.1 Adaptation response be implemented with particular reference to Design specifications for the trains Air conditioning systems and adequate emergency and evacuation procedures should be implemented to adequately address the High (unacceptable) likelihood of heat stress related health impacts on customers associated with failure of train air conditioning units.

13.2 As many of the adaptation responses relate to active/energy consuming systems, a commitment to green power for the rail project should be made to assure that Climate Change adaptation actions are not contributing to further intensification of the impacts of climate change.

13.3 Similarly the future operator of the rail should be bound to strict GHG emissions targets consistent with the NSW government Sustainability Policy.

Surface Water and Flooding

14.1 All site staff should be engaged through toolbox talks or similar with appropriate training on soil and water management practices.

14.2 A stormwater management plan which identifies the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks for each construction site should be developed.

14.3 An excavation plan should be developed which ensures procedures that threats to human safety and damage to infrastructure are not exacerbated during the construction period.

ATTACHMENTS

1. History (9 pages)

ATTACHMENT 1

HISTORY

Nov. 1998 Action for Transport 2010 published which identified a proposed railway from Epping to Castle Hill (by 2010) and Rouse Hill (post 2010).

03.03.2001 Council considered a report on the Balmoral Road Release Area and resolved (in part) that:

5. *In view of the importance of the Rouse Hill Regional Centre and the Balmoral Road Release Area, a formal request be made to the Minister for Transport to publicly release the consultant's report relating to the proposed heavy rail link from Castle Hill to Mungerie Park Regional Centre.*

07.08.2001 Council considered a status report on the Balmoral Road Release Area and resolved (in part) that:

2. *The Department of Transport be advised that the preferred alignment for the rail corridor is located adjoining Old Windsor Road north of the Norwest Business Park and the corridor be either "cut and cover" or underground.*

3. *The Department of Transport be requested to finalise and publicly release the alignment of the rail corridor from Castle Hill to Mungerie Park and specifically through the Balmoral Road Release Area.*

24.10.2001 Council received a letter from the Department of Transport stating that the Overview Report for the North West Rail Link, which will include the preferred alignment of the rail line, "*…is expected to be released towards the end of 2001*".

10.03.2002 The Minister for Transport released the Overview Report for the North West Rail Link. The report was on exhibition until 3 May 2002 and submissions closed on the same day.

13.03.2002 Copies of the Overview Report obtained and circulated to Councillors.

16.4. 2002 Briefing to Councillors by Department of Transport.

23.4. 2002 Report to Council including a formal submission to State Government.

2003 to 2005 Economic Feasibility and projected patronage studies completed by State Government.

20.07.2006 Status Report to Council on North West Rail Link.

30.11.2006 North West Rail Link Environmental Assessment referred to Council.

18.01.2007 Preliminary Precinct Planning Workshops for each station held at Council with Transport Infrastructure Development Corporation (TIDC) representatives.

30.01.2007 Council considered a report at its Extraordinary meeting on 30 January 2007 on the exhibited Environmental Assessment and resolved to forward a submission in support of the project subject to all of the alignment being underground and the project being undertaken in a single stage.

31.01.2007 Council submission to the Department of Planning.

01.06.2007 Letter received from TIDC advising of exhibition of the Preferred Project Report. Report addresses issues raised in submissions to the

Environmental Assessment and describes modifications to the project. It still does not address Council's objection to the elevated viaduct between the proposed Balmoral Station and Rouse Hill Station or the objection to the delivery of the project in two stages.

06.06.2007 Exhibition of preferred Project Report.

17.07.2007 Council considered a report on the preferred Project Report at its Ordinary meeting on 17 July 2007 and resolved:

1. *Council objects to the two staged delivery proposal and prefers to have the rail link between the Main Northern Line and Rouse Hill constructed as a single project with the Burns Road Station being the commencement point for construction. Council requests that the Final Statement of Commitments for the project be amended to reflect Council's preference.*
2. *Council endorses and supports the proposed lead tunnel extensions to facilitate connections to Parramatta via Carlingford. Such rail access via Carlingford supports Council's initiatives to increase population densities around the existing Carlingford rail station and encouraging transport orientated urban renewal of Carlingford.*
3. *The resources that Council will require for involvement during the construction and planning phase of the project will be significant. It is considered appropriate that the State Government provide financial assistance to Council to ensure a smooth delivery and gain maximum benefit from the investment in the North West Rail Link. Accordingly, Commitment No.6 should be amended to insert at the end of the paragraph "Grant funding opportunities will be explored with local council's to ensure local land use planning provisions reflect an integrated planning outcome within the vicinity of stations".*
4. *Council maintain its opposition to the proposed viaduct on social, economic and visual grounds and TIDC be requested to formulate alternate options to address Council's concerns.*
5. *Council requests that the railway be extended beyond Rouse Hill to establish a connection to the existing Richmond Line as part of the current concept plan providing an alternate route for rail movements and increased level of service to the population of the North West.*

25.07.2007 Council submission to the Department of Planning in accordance with resolution.

18.03.2008 NSW Government reaffirms its commitment to build a new rail line to the North West of Sydney but in the form of a Metro linking Rouse Hill to Epping and then following an alignment through Top Ryde, Gladesville, Drummoyne, Rozelle and Pyrmont.

31.03.2008 In response to the submissions on the Preferred Project Report, a Supplementary Submissions Report prepared by TIDC was submitted to Department of Planning.

08.04.2008 Mayoral Minute 10/2008 considered by Council at its Ordinary meeting on 10 April 2008. Council resolved:

1. *Council re-affirm its previous requests to the State Government for it to commit to a secure and permanent future for the Castle Hill Showground in view of its value to the Baulkham Hills Shire*

community as a recreational and cultural asset.

2. *Council objects to construction of the North West Metro Link from the Hills Centre and prefers instead to have the link constructed in a single project from Burns Road where land has been appropriately zoned for this purpose and is close to major transport links.*

3. *The North West Metro Link should incorporate connection from Carlingford to Epping to support the planned increased housing densities in this location.*

4 *Council maintain its opposition on any of the Metro Link being located above the ground surface on viaducts on social, economic and visual grounds.*

21.04.2008 Correspondence forwarded to TIDC advising of Council's resolution.

06.05.2008 Western portion of the Metro Link from Rouse Hill to Epping approved by Minister for Planning under Part 3A of the EP & A Act.

13.5.2008 Mayoral Minute 14/2008 considered by Council at its Ordinary meeting on 13 May 2008. The Mayoral Minute provided details on the outcome of a meeting with the then Deputy Premier and Minister for Transport to discuss the proposed North West Metro Rail Link and Council's previous submission. Council resolved that the Mayoral Minute be received.

31.10.2008 NSW Government announces North West Metro Link project deferred indefinitely.

March 2011 Incoming NSW Government announces its intention to fast track the North West Rail project.

June 2011 Castle Hill Community Information Centre opened.

July 2011 Project Overview Report released.

July 2011 Community and business consultation about Project Overview Report commences.

14.12.2011 Application submitted to Department of Planning and Infrastructure (DP & I) to modify the previous staged infrastructure approval. Proposed modifications to include:

- Change the North West Rail Link definition as a result of the proposed modifications.
- Relocate Kellyville Station from the vicinity of Burns Road, Kellyville to the vicinity of Samantha Riley Drive, Kellyville.
- Provide additional stations at Bella Vista and Cudgegong Road.
- Minor changes to the location of The Hills Centre Station.
- Change the Area 20 route alignment with a route alignment parallel to Schofields Road and through the Area 20 Precinct as shown in the Area 20 Draft Precinct Planning Package (Department of Planning and Infrastructure, May 2011).
- Vertical alignment changes between Bella Vista and Rouse Hill.

Application identifies that two State Significant Infrastructure Applications will also be submitted for Stage 1 (major civil construction works) and Stage 2 (construction and operation of stations, rail infrastructure and systems). Each application is to include its own Environmental Impact Statement (EIS).

03.02.2012 DP & I Director General's assessment requirements under Sections 115ZI and 115Y of the EP & A Act released.

02.04.2012 Advice received from Transport for NSW (TfNSW) that EIS Stage 1 will be on public exhibition from 4 April until 21 May 2012.

30.04.2012 Update briefing to Councillors from North West Rail Link Project Team.

22.05.2012 Report to Council – Council considered a report on the North West Rail Link – Environmental Impact Statement No. 1 at its meeting on and resolved:

General

1.1 Overall, Council supports the delivery of the NWRL project.

1.2 The NWRL Project Delivery team should include a meaningful community reference and liaison group that will help to build collaboration to help manage the inevitable impacts of construction a project of this scale amongst an established community.

1.3 The retention of the tunnel stubs to support a future Parramatta to Epping linkage at Epping is supported.

1.4 It remains Council's preference for the entire NWRL to be constructed entirely below ground.

1.5 It is essential that any construction and operation of a Skytrain ensure sufficient acoustic treatment is provided so as to not cause offensive noise pollution to surrounding areas. Further, the design of the elevated viaduct that supports the Skytrain must incorporate design elements including artistic features, to make the construction more visually attractive to contribute positively to the setting.

1.6 The route of the NWRL should be as exhibited in the 2006 growth centres structure plan so as to serve future population north of Windsor road at Box Hill.

Soils and Groundwater

2.1 Council's LEP maps indicating the extent of the geotechnical assessment area be included in Council's submission and that the geotechnical experts investigate the potential risk to land in that area as a result of the construction and operation of the NWRL.

2.2 The mitigation measure of conducting before and after dilapidation surveys of buildings in the vicinity of stations, works and construction sites is supported.

Construction Traffic

3.1 A dilapidation report is to be prepared prior to work commencing to ascertain the current condition of the affected local roads and a form of Contributions Plan must be established to collect contributions which will assist with the cost of maintenance, repair and reconstruction as a result of damage caused by trucks.

3.2 Restricted truck access on Council's local roads will be enforced in accordance with weight restrictions within the Shire. The weight restricted routes that are near the station construction precincts include Gilbert Road, Highs Road, Taylor

St, Aiken Road, Oakes Road, Jenkins Road, Glenhaven Road, Commercial Road, Withers Road, Hezlett Road, Annangrove Road and Kenthurst Road.

3.3 Council also has several sub-arterial roads near the station construction sites that do not have weight restrictions. These roads include Samantha Riley Drive, Green Road, Sanctuary Drive, Carrington Road and Victoria Avenue. These unrestricted sub-arterial roads should not be used for truck movements to and from the station construction areas - Any conditions of consent issued for the construction of the NWRL by the NSW Government should restrict truck access on these roads.

3.4 Street lighting issues are likely to arise at each construction site because of the extensive excavations. Interrupted power supply and light pole relocations will occur at various stages and the construction management plans will need to detail how these issues are continuously monitored and resolved. This issue will be critical at Castle Hill and Norwest Stations in particular because of pedestrian movements, and site modifications will be required for street lighting at each area to ensure continued operation.

3.5 Traffic volumes along Glenhope Road and Glenridge Avenue will be over their environmental capacity of 250 movements in peak hour, and LATM treatment will be needed along the full length of the connection to Coonara Avenue. Public consultation and funding of any LATM Scheme along Glenhope Road and Glenridge Avenue will be the responsibility of NWRL. The LATM scheme will need to include Parking restrictions in Glenhope Road to control contractors vehicles during construction and these restrictions will remain to control commuter parking.

3.6 The West Pennant Hills Bus Link may be needed as an alternative to Castle Hill Road as buses are likely to use Glenhope Road as a major connection between the residential areas and Cherrybrook station. The proposed Bus Link will need to be re-evaluated as part of a general review of bus services integrating with the Station precinct.

3.7 Relocation of the Castle Hill bus interchange area is critical because pedestrian access will be restricted through and across the site. Buses, and pedestrian traffic using those buses, will all revert to Old Castle Hill Road resulting in severe congestion. NWRL will need to show how bus and pedestrian traffic will operate in the temporary location in conjunction with the re-introduction of two way traffic flow along the full length of that road.

3.8 A new bus layover area is needed to reduce demand for bus parking – options include unused Castle Towers overflow parking areas, or Council land in Brisbane Road. The State Government must identify where that layover area is, and clearly show how it will operate to reduce traffic issues in Old Castle Hill Road.

3.9 The proposed major truck access for The Hills Centre Station goes direct to Showground Road through the dog show area adjacent to the Cattai Creek bridge. It is unlikely that this proposed access arrangement will be approved on safety grounds because of the steep gradients of Showground Road. A better location is through the Showground upper precinct at the existing signals for Gilbert Road. A fourth leg of this intersection would provide for construction access as well as supporting functions at the Showground during construction of the station.

3.10 No truck movements will be permitted onto Carrington Road. Secondary access for contractors is from Carrington Road at Doran Drive. No improvements are proposed but some form of intersection control such as a roundabout or traffic signals will be needed.

3.11 Peak travel time access through the Business Park must not be affected by the Norwest Station construction. As a result, four traffic lanes must be available in Norwest Boulevarde every work day from 7am to 9am, and 4.30pm to 6.30pm. Brookhollow Avenue must not become a defacto bypass for Norwest Boulevarde.

3.12 Most truck movements will head to the west along Norwest Boulevarde (Old Windsor Road) This will place a further burden on the roundabout at Lexington Avenue which performs at level of service "F" every morning and afternoon. Either a signalized intersection to replace the roundabout is needed ($8M) or the roundabout itself must be signalized ($0.3M).

3.13 No trucks will be permitted to exit/enter the Business Park except via the eastern end of Norwest Boulevarde at Windsor Road, or via Celebration Drive at the western end of the Business Park at Old Windsor Road. None of the local roads leading off Norwest Boulevarde will be used for truck traffic.

3.14 The Roundabout at the intersection of Lexington Avenue and Celebration Drive will need to be replaced with traffic signals. Celebration Drive will also need to be upgraded to a four lane carriageway between Lexington Avenue and Old Windsor Road and the dual right turn lanes in Old Windsor Road at Celebration Drive will need to be extended.

3.15 No truck movements are to be permitted from the construction site along Lexington Avenue or through the residential area to the east.

<u>Construction Noise and Vibration</u>

4.1 While the criteria used to determine acceptable noise impacts is supported, that criteria predicts that there will be significant noise impacts and more investigation around the major construction sites is required.

4.2 Any amendment to construction methodologies and associated mitigation measures should be required to improve or maintain those impacts anticipated by this EIS.

4.3 Further background measurements should be undertaken to assure the accuracy of the background noise levels and resultant modelling of the impacts on receivers where the background noise is lower than that modelled.

4.4 While it is proposed to "primarily" conduct site establishment works during the daytime, the duration of these works and occasional evening and night time works during this period will inevitably lead to some level of community dissatisfaction and complaints. Further consideration should be given to mitigation measures at individual receiver's premises to reduce these impacts.

4.5 Further consideration and commitment to reducing truck movements to and from constructions sites along Carrington Road and Norwest during the night time

hours should be included in the Construction Noise and Vibration Strategy for the project.

4.6 In relation to the prediction that on-site truck movements causing awakening reactions (or sleep disturbance) at nearby residences. At each of the underground station sites, including the Bella Vista TBM support site, during night time periods, further consideration of mitigation measures either at the construction site and/or at sensitive or residential receivers to reduce these impacts should be included.

4.7 Where blasting is required (presumably as a last resort), in addition to the proposed assessment of the realistic worst-case noise and vibration levels being undertaken and compared with noise and vibration criteria, a comprehensive community information program should be undertaken to advise potential receivers of; the need for the activity, the days and times proposed and the expected noise impacts associated with the activity.

4.8 Acoustic treatment should be offered for the dwellings of those residents most affected by the on-going construction noise. Such treatment measures may include additional acoustic insulation of walls and ceilings, installation of double glazing, installation of air conditioning units etc. These measures should be considered particularly around the Hills Centre, Castle Hill & Bella Vista stations. Particular residential receivers of concern include, Carrington Road, Showground Road, residents to the east of Bella Vista Station & Precast Yards including Celebration Drive, Sharrock Avenue.

4.9 A commitment to upgrade the acoustic treatment of the acoustic enclosure at the Bella Vista station and pre-cast yard acoustic sheds is required. The modelled impacts on residential receivers for the duration of this project are unreasonably high based on standard acoustic shed construction.

4.10 An on-going commitment to complaint management and community liaison is required to manage and resolve future issues.

4.11 The construction methodology and proposed mitigation measures for the construction of the viaduct require review. The modelled impact of the construction of the viaduct are unacceptable as the prediction indicates significant exceedance of the NMLs for the entirety of the construction works on the residences described as:

- *"Residences East of Old Windsor Road from the North section of Arnold Avenue to the North border of the Celebration Drive shopping centre";*
- *"Residences East of Old Windsor Road and South of Samantha Riley Drive";*
- *"Residences East of Old Windsor Road, between the group of residences North East of Windsor Road/Old Windsor Road junction and Samantha Riley Drive" and*
- *"Residences East of Windsor Road, between Bellcast Road and Sanctuary Drive".*

<u>European Heritage</u>

5.1 Views to Mungerie House from Windsor Road must also be considered in the design and placement of the viaduct and its piers.

5.2 During the detailed design of the viaduct and consideration of view corridors, Transport NSW should consult the Mungerie House Conservation Management

Plan (2007) prepared for Lend Lease by Tanner Architects and endorsed by Council as it contains important information regarding view corridors and the setting of Mungerie House.

Indigenous Heritage

6.1 No further recommendation other than those contained in EIS 1.

Local Business Impacts

7.1 The Small Business Commissioner commence a study into the structural adjustment and support required for specific small businesses directly affected by the construction work.

7.2 The EIS does not recognise that the national headquarters of IBM Australia is also located in Coonara Avenue. It employs more than 2,000 people, most of whom would drive to work. Therefore increased truck movements and any resulting traffic delays around the construction site could have some impact on those employees travelling to and from work.

7.3 A community liaison group to cater and involve business operators in Castle Hill Town Centre should be established to help respond to issues relating to traffic, access and parking during construction.

Land Use and Community Facilities

8.1 Negotiations should also continue with Council and the RSL Sub-Branch with regard to the temporary relocation of the war memorial during construction of the Castle Hill station. Expert technical advice should also be obtained on the feasibility of transplanting the 'lone pine' located adjacent to the war memorial to an alternate site to the satisfaction of Council and the RSL sub-branch. Consideration should also be given to the collection of seeds or cuttings from the 'lone pine' to enable propagation should transplanting of the tree not be considered feasible or is unsuccessful.

8.2 Transport NSW should consult with the Hills District Historical Society with regard to the railway heritage and monument within the Arthur Whitling Park and future inclusion of railway heritage into the future station and open space.

8.3 Transport NSW must also ensure consultation is carried out with residents and owners, including Kindalin Child Care Centre on The Hills Shire side of Old Castle Hill Road at West Pennant Hills (opposite Cherrybrook station).

Ecology

9.1 Offset sites should be identified and procured prior to works commencing that involve the removal of ecology.

9.2 It is requested that specific priority be given to securing offset sites as near to the location of the impact/loss as possible, to assist with the preservation of the specific endemic community of the area and assure that the ecological and amenity benefits of retaining endemic vegetation remain within the Local Government Area.

9.3 The management of off-set sites could be secured through the registration of land as Biobank Sites with the Biobank Trust funding the in perpetuity maintenance of the vegetation. This could be achieved without the need to purchase the land, rather the purchase and surrender of credits under the Biobanking scheme.

9.4 Three distinct patches of Cumberland Plain vegetation within the Balmoral Road Release area seem particularly appropriate which are 21.6ha, 13.7ha & 6.1ha respectively located on Balmoral Road and Fairway Drive. Additional smaller patches are also mapped within the immediate area. Consideration should be given to securing these sites to offset the loss of vegetation.

Visual Amenity

10.1 The reflectivity of acoustic sheds and site buildings is an additional measure that should be considered.

10.2 If possible, 6m hoarding proposed on Castle Hill Road (Cherrybrook Station) should be reduced in height if it will not reduce the amenity of residents / child care centre on the opposite side of Castle Hill Road.

10.3 Due to the visibility of the viaduct it is expected that the detailed design stage will give particular consideration to making the structure interesting and visually appealing is required. The ultimate design is to incorporate measures to reduce its visual impact and where possible use engineering art to decorate, provide visual interests where landscaping cannot be adequately provided.

10.4. The possible use of the viaduct structure for advertising is an ongoing concern for Council and should be addressed in EIS2.

Climate Change and Greenhouse Gas Emissions

11.1 The 20% electricity offset target should be increased.

11.2 Further offset options associated with revegetation projects and biodiversity offset requirements should also be included.

28.05.2012 Council's submission to the Department of Planning and Infrastructure

July 2012 EIS 1 Submissions/Preferred Infrastructure Report and Project application for NWRL- STAGE 2 Stations, Rail Infrastructure and Systems was lodged with the Department of Planning and Infrastructure.

09.2012 Draft NSW Long Term Transport Master Plan confirms NWRL as priority transport project and Tier 1 Rapid Transit within the three tiered system described by Sydney's Rail Future.

10.2012 Infrastructure NSW endorses the three tier railway strategy developed by TfNSW as the basis for rail infrastructure investment, including the NWRL.

30.10.2012 Advice received from Transport for NSW that EIS2 will be on public exhibition from 31.10.2012 until 3.12.2012.