Hornsby Quarry
Road Construction Spoil Management project
Submissions and Preferred Infrastructure Report

October 2015
Executive summary

Roads and Maritime Services (Roads and Maritime) is proposing to beneficially reuse up to 1.5 million cubic metres of excavated rock and soil (spoil) from the construction of NorthConnex to partially fill the Hornsby Quarry. The Hornsby Quarry Road Construction Spoil Management project (the project) would fill the quarry void with spoil to a level that would allow Hornsby Shire Council to start rehabilitating the site to a public recreational area benefitting the local community.

The key features of the project include:

- Hauling the spoil from the NorthConnex tunnelling sites to Hornsby Quarry using the existing road network.
- Widening and sealing of the quarry access road (Bridge Road and track) to facilitate all weather access.
- Creating a stockpile area at Old Mans Valley, where the spoil would be unloaded from trucks and handled with dozers.
- Constructing and operating a conveyor to take the spoil from the Old Mans Valley stockpile site to the rim of the quarry void.
- Site demobilisation and rehabilitation of the compound site, stockpile areas and the conveyor corridor to a pre-project condition, in consultation with Hornsby Shire Council.

All of the proposed work would be carried out between the hours of 7 am and 6 pm Monday to Friday or 8 am and 1 pm on Saturday.

Subject to planning approval, the project is expected to start late 2015 and take around 33 months to complete.

Project benefits

The Hornsby Quarry Road Construction Spoil Management project is designed to greatly assist Hornsby Shire Council, who has been actively seeking opportunities to fill the quarry void and rehabilitate the site for public recreation. The project would be an important first step in enabling the future rehabilitation of the site by Hornsby Shire Council for long term and sustainable benefits to the local and regional community.

Environmental impact statement

The Hornsby Quarry Road Construction Spoil Management project environmental impact statement was placed on public exhibition for 30 days from 5 August 2015 to 4 September 2015. During this time a range of consultation activities were undertaken to raise awareness of the public exhibition, to provide information about the EIS and to advise community and stakeholders on how to make a formal submission.

A total of 47 submissions on the project were received by the Department of Planning and Environment (DP&E) during the exhibition period. Six submissions were from government agencies, one was from local government, ten submissions were from interest groups/organisations and 30 submissions were received from the community. Each submission was read carefully and issues extracted for detailed consideration. A summary of the submissions received during the public exhibition period is included in Chapter 4 and responses to the issues raised in the submissions received are detailed in Chapter 5 and Chapter 6.

The subjects most commonly raised related to:

- Network performance.
- Traffic safety.
- Hydrogeology and soils.
- Mountain bike trails.
- Biodiversity.
- Noise and vibration.
- Planning and statutory requirements.
Issues associated with traffic and transport were most frequently raised in submissions, indicating that despite the effort given to assess and address this issue in the environmental impact statement the community remained concerned. Accordingly, significant additional effort has been made during the preparation of the Submissions and Preferred Infrastructure Report to address this issue.

Submissions and preferred infrastructure report

To prepare this submissions and preferred infrastructure report, Roads and Maritime has reviewed all submissions and prepared clarifications and responses to the issues raised. A range of amendments to the project have also been identified to reduce environmental impacts and address stakeholder and community concerns.

This information is set out in this submissions and preferred infrastructure report in the following format.

- Introduction (Chapter 1)
- Details of the community involvement activities carried out for the project during the public exhibition period (Chapter 2).
- A number of clarifications to information presented in the EIS (Chapter 3).
- A summary of the submissions received during the public exhibition period (Chapter 4).
- Responses to the issues raised in submissions received from government agencies and local councils (Chapter 5).
- Responses to the issues raised in submissions received from the local community (Chapter 6).
- Changes made to the project as presented in the environmental impact statement to further minimise its environmental impact and/or in response to issues raised in submissions (Chapter 7).
- A revised summary of mitigation measures, to those presented in the EIS, which have been updated to reflect responses to issues raised in submissions and changes made to the project (Chapter 8).
- Conclusions and next steps (Chapter 9).

Changes to the project since exhibition of the EIS

In the EIS, the proposed outbound haulage route during the peak period was identified as being out through Bridge Road and north along Jersey Street North, the Pacific Highway, Yirra Road, Belmont Parade and Ku-ring-gai Chase Road to connect with the M1 Pacific Motorway (refer to section 4.3.1 and Figure 4-3 of the EIS).

Based on additional assessment of heavy vehicle route options and in response to concerns raised in submissions, the outbound peak period haulage route has been reviewed. The aim of the review was to identify opportunities to further reduce potential impacts on the local community from heavy vehicle haulage traffic, including in relation to safety and network performance.

As a result of this review, a change has been made to the outbound haulage route during peak periods. This change involves heavy vehicles using a combination of the northern and the southern outbound haulage routes during the peak periods, with the preferred route selected based on traffic congestion and incident management responses.

A description and an assessment of this change to the project is provided in Chapter 7 of this report.

Clarifications in response to submissions

Potential traffic impacts from closing Roper Lane

Submissions queried the potential traffic impacts resulting from the closure of Roper Lane at the intersection of Roper Lane and Bridge Road.
Clarification was also sought on access to Peats Ferry Road via alternate un-signalised intersections (via Watsons Avenue or Summers Avenue) and accessing Galston Road from alternate un-signalised intersections in order to access Peats Ferry Road.

Following closure of Roper Lane, access to the Pacific Highway/Peats Ferry Road will continue to be provided via Summers Avenue and Watson Avenue, which provides for all movements. Signalised access will also be available via Galston Road.

In addition, preliminary discussions between Hornsby Shire Council and Roads and Maritime have started regarding installation of traffic signals at the Watson Avenue/Peats Ferry Road intersection with the intention of identifying a safe, feasible solution for potential implementation at the intersection in the future. Where such a design solution is identified and agreed, it is intended that intersection works would be carried as soon as possible to maximise road network benefits during the early stages of the project.

Section 3.1 of this report provides clarifications on the potential traffic impacts from closing Roper Lane

Investigations into the use of the Windybanks Interchange

In the EIS, the proposed outbound haulage route during the peak period was identified as being out through Bridge Road and north along Jersey Street North, the Pacific Highway, Yirra Road, Belmont Parade and Ku-ring-gai Chase Road to connect with the M1 Pacific Motorway (refer to section 4.3.1 and Figure 4-3 of the EIS).

In response to submissions and as a result of ongoing assessment of the northern outbound haulage route following the exhibition of the EIS, investigations are underway into the use of either the northern outbound haulage route described in the EIS for the project (via Yirra Road / Belmont Parade / Ku-ring-gai Chase Road) or alternatively the use of the Windybanks Interchange in Berowra.

Section 3.2 of this report provides clarification on the investigations underway into potential use of the Windybanks Interchange for outbound heavy vehicles during the peak periods and further details about the Windybanks Interchange route are provided in Section 7.3.

Access to mountain bike trails at Old Mans Valley

Submissions raised concerns regarding the closure and restriction of access to some mountain bike trails as a result of the project. Some submissions suggested areas where access could be improved or maintained through project footprint refinements.

Ongoing consultation and design development has identified opportunities to retain mountain bike trail connectivity without compromising contractor and public safety. Further detail has been provided in Section 3.2.

Connection to mains electricity

Early investigations are currently underway to identify whether provision of a connection from the existing mains electricity network to the site is feasible. If identified as feasible, assessment and approval of the electricity connection from the quarry site to the existing mains electricity network would be considered separately to the project, with separate assessment and approval.

Further detail including an assessment of the potential impacts of providing mains power for plant and equipment is included in Section 3.4 of this report.

Contouring of spoil material within the quarry void

An assessment of the feasibility of contouring spoil as it is placed into the quarry void has commenced. The aim of this contouring would be to facilitate as much visual access to the east face of the quarry void (the area including the diatreme) as feasible and reasonable. Initial assessment of contouring opportunities indicates that spoil could be contoured to around RL 54 metres on the eastern side of the void, which would leave exposed an additional 10 metres of the void’s eastern face when compared to the finished level proposed in the EIS for the project.

Section 3.5 of this report provides more information and includes a commitment to ongoing assessment and consultation to determine the feasibility of contouring spoil material.
Next steps

The Department of Planning and Environment will, on behalf of the Minister for Planning, review the environmental impact statement and this submissions and preferred infrastructure report. Once the Department of Planning and Environment has completed its assessment, a draft assessment report will be prepared for the Secretary of the Department of Planning and Environment, which may include recommended conditions of approval.

The assessment report will then be provided to the Minister for Planning, who may then approve the project (with any conditions considered appropriate) or refuse to give approval.

The Minister for Planning’s determination and the Secretary’s report will be published on the Department of Planning and Environment’s website immediately following determination with a copy of the submissions and preferred infrastructure report.
Contents

Executive summary ................................................................. i

Contents ................................................................................. v

Glossary of terms and abbreviations .................................... vii

1 Introduction and background ................................................ 1

  1.1 Hornsby Quarry ............................................................ 1

  1.2 The project ..................................................................... 2

  1.3 Statutory Context ......................................................... 2

  1.4 Purpose of this document ............................................. 3

2 Community involvement ..................................................... 11

  2.1 Consultation Overview .................................................. 11

  2.2 Consultation Activities .................................................. 11

  2.3 Ongoing consultation during construction ..................... 14

3 Clarifications ........................................................................ 15

  3.1 Potential traffic impacts from closing Roper Lane ............ 15

  3.2 Investigations into the use of Windybanks Interchange .... 16

  3.3 Access to mountain bike trails at Old Mans Valley ......... 16

  3.4 Connection to mains electricity .................................... 19

  3.5 Contouring of the spoil material within the quarry void .... 19

4 Submissions received .......................................................... 21

  4.1 Respondents ............................................................... 21

  4.2 Overview of the issues raised ....................................... 21

5 Responses to key stakeholder submissions ......................... 25

  5.1 Government agencies ................................................... 25

  5.2 Local councils ............................................................ 35

  5.3 Peak groups and advisory organisations ....................... 44

  5.4 Environmental Groups ................................................ 45

  5.5 Community Groups .................................................... 48

  5.6 Educational institutions .............................................. 56

6 Responses to community submissions ............................... 63

  6.1 Strategic justification and project need ......................... 63

  6.2 Project development and alternatives ......................... 64

  6.3 Project description ....................................................... 66

  6.4 Traffic and transport .................................................... 67

  6.5 Noise and vibration ..................................................... 73

  6.6 Hydrology and soils .................................................... 74

  6.7 Surface water and flooding ......................................... 76
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.8 Air quality</td>
<td>77</td>
</tr>
<tr>
<td>6.9 Land use and property</td>
<td>77</td>
</tr>
<tr>
<td>6.10 Health</td>
<td>78</td>
</tr>
<tr>
<td>6.11 Biodiversity</td>
<td>78</td>
</tr>
<tr>
<td>6.12 Social and economic</td>
<td>80</td>
</tr>
<tr>
<td>6.13 Resources and waste</td>
<td>81</td>
</tr>
<tr>
<td>7 Preferred Infrastructure Report</td>
<td>83</td>
</tr>
<tr>
<td>7.1 Overview</td>
<td>83</td>
</tr>
<tr>
<td>7.2 Proposed outbound heavy vehicle route</td>
<td>83</td>
</tr>
<tr>
<td>7.3 Investigations into the use of Windybanks Interchange</td>
<td>94</td>
</tr>
<tr>
<td>7.4 Conclusion</td>
<td>94</td>
</tr>
<tr>
<td>8 Revised summary of mitigation measures</td>
<td>95</td>
</tr>
<tr>
<td>9 Conclusions and next steps</td>
<td>111</td>
</tr>
<tr>
<td>10 References</td>
<td>113</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>μS/cm</td>
<td>Microsiemens per centimetre</td>
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<td>A</td>
<td>The tangible (objects) and intangible (dreaming stories, songlines, places) cultural practices and traditions associated with past and present day Aboriginal communities.</td>
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<td>Aboriginal cultural heritage</td>
<td>Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW.</td>
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<td>Aboriginal place</td>
<td>Any place declared to be an Aboriginal place under s.94 of the National Parks and Wildlife Act 1974.</td>
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<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics.</td>
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<tr>
<td>Acid sulfate soils</td>
<td>Naturally acid clays, mud and other sediments usually found in swamps and estuaries. They may become extremely acidic when drained and exposed to oxygen and may produce acidic leachate run-off that can pollute waters and liberate toxins.</td>
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<tr>
<td>ACM</td>
<td>Asbestos containing material.</td>
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<tr>
<td>Aggregate</td>
<td>A uniform sized material from sand, gravel, rock or metallurgical slag by screening, blasting or crushing. Used in concrete production and for bitumen sealing.</td>
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<td>AHD</td>
<td>Australian Height Datum. The standard reference level used to express the relative height of various features. A height given in metres AHD is essentially the height above sea level. Mean sea level is set as zero elevation.</td>
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<tr>
<td>AHIMS</td>
<td>Aboriginal heritage information management system. A register of NSW Aboriginal heritage information maintained by OEH.</td>
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<td>Alluvial</td>
<td>Relating to, consisting of, or formed by sediment deposited by flowing water.</td>
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<td>Ancillary</td>
<td>A subordinate part or element.</td>
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<td>ANZECC</td>
<td>Australian and New Zealand Environment and Conservation Council.</td>
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<td>APZ</td>
<td>Asset protection zone.</td>
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<td>Aquatic ecology</td>
<td>Flora and fauna that live in or on water for all or a substantial part of the life span (generally restricted to fresh / inland waters).</td>
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<td>Aquifer</td>
<td>Geologic formation, group of formations, or part of a formation capable of transmitting and yielding quantities of water.</td>
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<tr>
<td>Archaeological site</td>
<td>A site with any material evidence of past Aboriginal or non-Australian activity in which evidence of past activity is preserved.</td>
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<tr>
<td>Archaeology</td>
<td>The scientific study of human history, particularly the relics and cultural remains of the distant past.</td>
</tr>
<tr>
<td>ARI</td>
<td>Average recurrence interval. Used to describe the frequency or probability of floods occurring (e.g. a 100 year ARI flood is a flood that occurs or is exceeded on average once every 100 years (100:1)).</td>
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<tr>
<td>Arterial roads</td>
<td>The main or trunk roads of the State road network.</td>
</tr>
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<td>ASRIS</td>
<td>Australian soils resource information system.</td>
</tr>
<tr>
<td>ASS</td>
<td>Acid sulfate soils.</td>
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<tr>
<td>At grade</td>
<td>A road at ground level, not on an embankment or in a cutting. Opposite to grade separated.</td>
</tr>
<tr>
<td>Backfill</td>
<td>Fill replaced in an excavation.</td>
</tr>
<tr>
<td>Background noise level</td>
<td>The ambient sound-pressure noise level in the absence of the sound under investigation exceeded for 90 per cent of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.</td>
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<td>Batter</td>
<td>The constructed slope of road embankments and cuttings usually expressed as a ratio of x horizontal to 1 (one) vertical. A fill batter is where the road is above the existing surface on a filled embankment and refers to the sloping sides of the embankment. A cut batter is where the road is below the existing surface.</td>
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<tr>
<td>Bedrock</td>
<td>Rock of a substantial thickness and extent underlying a relatively soft and variable surface.</td>
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<tr>
<td>Blasting</td>
<td>The use of explosives for excavating rock, demolition and other purposes.</td>
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<tr>
<td>BOM</td>
<td>Bureau of Meteorology.</td>
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<tr>
<td>Bore</td>
<td>A cylindrical drill hole sunk into the ground from which water is pumped for use or monitoring.</td>
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<tr>
<td>Borehole</td>
<td>A hole produced in the ground by drilling for the investigation and assessment of soil and rock profiles.</td>
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<tr>
<td>BTEX</td>
<td>Benzene, toluene, ethylbenzene and xylene.</td>
</tr>
<tr>
<td>Bund</td>
<td>A small embankment designed to retain water.</td>
</tr>
<tr>
<td>C</td>
<td>Cadastral showing the extent and ownership of land (generally on a map).</td>
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<tr>
<td>CALPUFF</td>
<td>Air quality monitoring models used to estimate pollutant concentrations, which include CALPUFF, CALMET and CALPOST.</td>
</tr>
<tr>
<td>Carbon dioxide equivalent (CO₂-e)</td>
<td>The mass of a greenhouse gas that is emitted is multiplied by its global warming potential to convert greenhouse gas emissions to an equivalent quantity of CO₂ emissions, referred to as carbon dioxide equivalent. For simplicity of reporting, the mass of each greenhouse gas emitted is commonly translated into a carbon dioxide equivalent (CO₂-e) amount so that the total impact from all sources can be summed to one figure.</td>
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<tr>
<td>Catchment</td>
<td>The area from which a surface watercourse or a groundwater system derives its water.</td>
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<tr>
<td>CEEC</td>
<td>Critically endangered ecological community.</td>
</tr>
<tr>
<td>CEMP</td>
<td>Construction Environmental Management Plan. A site specific plan developed for the construction phase of a project to ensure that all contractors and sub-contractors comply with the environmental conditions of approval for the project and that environmental risks are properly managed.</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane.</td>
</tr>
<tr>
<td>CLM Act</td>
<td>Contaminated Land Management Act 1997 (NSW)</td>
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<tr>
<td>CMA</td>
<td>Catchment Management Authority</td>
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<tr>
<td>CNVMP</td>
<td>Construction Noise and Vibration Management Plan.</td>
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<tr>
<td>CO</td>
<td>Carbon monoxide.</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon dioxide.</td>
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<tr>
<td>Compaction</td>
<td>An increase in density of a soil material by mechanical means such as rolling the surface layers or for deep compaction, driving sand piles, vibration or impact methods.</td>
</tr>
<tr>
<td>Compound site</td>
<td>Facilities used to support the operation of a construction site including (but not limited to) site offices, workshops, delivery areas, storage areas, staff vehicle parking, materials, plant and equipment.</td>
</tr>
<tr>
<td>Concentration (air quality)</td>
<td>Vehicles emit pollutants to the air, which are transported and diluted resulting in a volume of pollutant per volume of ambient air. Ambient air quality goals are expressed in terms of concentrations, which are measured in parts per million or micrograms per cubic metre.</td>
</tr>
<tr>
<td>Confluence</td>
<td>A point at which streams combine.</td>
</tr>
<tr>
<td>Construction footprint</td>
<td>The area required to construct the project, including underground components, above ground components and temporary ancillary construction facilities.</td>
</tr>
<tr>
<td>Critical habitat</td>
<td>The habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.</td>
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<td>Definition</td>
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<td>Cumulative impacts</td>
<td>Impacts that, when considered together, have different and/or more substantial impacts than a single impact considered alone.</td>
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<tr>
<td>Cut</td>
<td>The material excavated from a cutting.</td>
</tr>
<tr>
<td>Cutting</td>
<td>Formation resulting from the construction of the road below existing ground level – the material is cut out or excavated.</td>
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<td><strong>D</strong></td>
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<tr>
<td>dBA</td>
<td>Decibels using the A-weighted scale measured according to the frequency of the human ear.</td>
</tr>
<tr>
<td>DCLM</td>
<td>NSW Department of Conservation and Land Management (now part of DPI).</td>
</tr>
<tr>
<td>DEC</td>
<td>NSW Department of Environment and Conservation (now OEH and EPA).</td>
</tr>
<tr>
<td>DECC</td>
<td>NSW Department of Environment and Climate Change (formerly DEC and now OEH and EPA).</td>
</tr>
<tr>
<td>DECCW</td>
<td>NSW Department of Environment, Climate Change and Water (formerly DEC, DECC and now OEH and the EPA).</td>
</tr>
<tr>
<td>Decibel</td>
<td>A scale unit used in the comparison of powers and levels of sound energy. Used for measuring noise.</td>
</tr>
<tr>
<td>Dewatering</td>
<td>The removal of water from solid material or soil by wet classification, centrifugation, filtration or similar solid-liquid separation processes.</td>
</tr>
<tr>
<td>Diatreme</td>
<td>A volcanic pipe, filled with rock composed of angular fragments of older rocks melded together, formed by a subterranean gaseous explosion.</td>
</tr>
<tr>
<td>DIPNR</td>
<td>The NSW Department of Planning and Natural Resources (now part of DPE and DPI Water).</td>
</tr>
<tr>
<td>Discharge</td>
<td>The volumetric rate of water flow.</td>
</tr>
<tr>
<td>DLWC</td>
<td>NSW Department of Land and Water Conservation (now part of DPI).</td>
</tr>
<tr>
<td>DMP</td>
<td>Dust Management Plan.</td>
</tr>
<tr>
<td>DoE</td>
<td>Australian Government Department of the Environment.</td>
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<tr>
<td>DoP</td>
<td>NSW Department of Planning (now DPE).</td>
</tr>
<tr>
<td>DP&amp;I</td>
<td>NSW Department of Planning and Infrastructure (formerly DIPNR and DoP, now DPE)</td>
</tr>
<tr>
<td>DPE</td>
<td>NSW Department of Planning and Environment</td>
</tr>
<tr>
<td>DPI</td>
<td>NSW Department of Primary Industries, which includes Fisheries NSW, Agriculture NSW and DPI Water.</td>
</tr>
<tr>
<td>DPI Water</td>
<td>NSW Department of Primary Industries – Office of Water</td>
</tr>
<tr>
<td>DP</td>
<td>Deposited Plan. A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.</td>
</tr>
<tr>
<td>Drainage</td>
<td>Natural or artificial means for the interception and removal of surface or subsurface water.</td>
</tr>
<tr>
<td>DSEWPaC</td>
<td>Australian Government Department of Sustainability, Environment, Water, Population and Communities (now the Department of the Environment).</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td></td>
</tr>
<tr>
<td>Earthworks</td>
<td>All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.</td>
</tr>
<tr>
<td>Ecosystem</td>
<td>A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic community and between the biotic components of the system.</td>
</tr>
<tr>
<td>Edge effects</td>
<td>A change in species composition, physical conditions or other ecological factors at the boundary between two ecosystems or the ecological changes that occur at the boundaries of ecosystems (including changes in species composition, gradients of moisture, sunlight, soil and air temperature, wind speed and other factors).</td>
</tr>
<tr>
<td>EEC</td>
<td>Endangered ecological community. An ecological community identified by relevant legislation that is likely to become extinct or is in immediate danger of extinction.</td>
</tr>
<tr>
<td>EEO Act</td>
<td><em>Energy Efficiency Opportunities Act 2006 (Commonwealth)</em></td>
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<td>Term</td>
<td>Definition</td>
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<tr>
<td>Embankment</td>
<td>An earthen structure where the road (or other infrastructure) subgrade level is above the natural surface.</td>
</tr>
<tr>
<td>Emission factor (EF)</td>
<td>Emission factors convert an indicator of activity into estimated greenhouse gas emissions.</td>
</tr>
<tr>
<td>Emission source</td>
<td>Source from which greenhouse gases are released.</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental management plan. A plan used to manage environmental impacts during each phase of project development. It is a synthesis of all proposed mitigation, management and monitoring actions, set to a timeline with defined responsibilities and follow up actions.</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental management system. A quality system that enables an organisation to identify, monitor and control its environmental aspects. An EMS is part of an overall management system, which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.</td>
</tr>
<tr>
<td>ENM</td>
<td>Excavated natural material.</td>
</tr>
<tr>
<td>EP&amp;A Regulation</td>
<td>Environmental Planning and Assessment Regulation 2000 (NSW).</td>
</tr>
<tr>
<td>EPA</td>
<td>NSW Environment Protection Authority.</td>
</tr>
<tr>
<td>Ephemeral drainage line</td>
<td>A creek that only exists for a short duration of time following rainfall.</td>
</tr>
<tr>
<td>EPL</td>
<td>Environment protection licence.</td>
</tr>
<tr>
<td>Escarpment</td>
<td>A long, cliff-like ridge of rock commonly formed by faulting or fracturing of the earth’s crust.</td>
</tr>
<tr>
<td>ESCP</td>
<td>Erosion and sediment control plan.</td>
</tr>
<tr>
<td>ESD</td>
<td>Ecologically sustainable development. As defined by the Protection of the Environment Administration Act 1991, requires the effective integration of economic and environmental considerations in decision making processes including: The precautionary principle. Inter-generational equity. Conservation of biological diversity and ecological integrity. Improved valuation, pricing and incentive mechanisms (includes polluter pays, full life cycle costs, cost effective pursuit of environmental goals).</td>
</tr>
<tr>
<td>FFMP</td>
<td>Flora and Fauna Management Plan</td>
</tr>
<tr>
<td>Fill</td>
<td>The material placed in an embankment.</td>
</tr>
<tr>
<td>FM Act</td>
<td>Fisheries Management Act 1994 (NSW).</td>
</tr>
<tr>
<td>Footprint</td>
<td>The extent of impact that a development makes on the land.</td>
</tr>
<tr>
<td>Fragmentation</td>
<td>The breaking up of continuous sections of ecosystems or landscape features.</td>
</tr>
<tr>
<td>Frequency (sound)</td>
<td>Similar to the pitch of a musical note in sound pressure fluctuations of cycles per second (Hertz). Most sounds comprise a composite of frequencies of varying sound-pressure levels in the range of 20 Hertz to 20,000 Hertz.</td>
</tr>
<tr>
<td>GDE</td>
<td>Groundwater Dependent Ecosystems.</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic information system.</td>
</tr>
<tr>
<td>Grade</td>
<td>1. The rate of longitudinal rise (or fall) with respect to the horizontal expressed as a percentage or ratio.</td>
</tr>
<tr>
<td>Grade separation</td>
<td>The separations of road, rail or other traffic so that crossing movements at intersections are at different levels. Opposite to at grade.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Greenhouse gas (GHG)</td>
<td>Greenhouse gases are those gases which reduce the loss of heat from the earth's atmosphere by absorbing infrared radiation. Six greenhouse gases are regulated by the Kyoto Protocol: Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆). The emissions of greenhouse gases are reported in carbon dioxide equivalents (see above).</td>
</tr>
<tr>
<td>Ground vibration</td>
<td>The combined speed of ground oscillation at a point from a source of vibration such as a blast or vehicle.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Water that is held in the rocks and soil beneath the earth's surface.</td>
</tr>
<tr>
<td>Grubbing</td>
<td>The removal of roots or stumps from below ground level.</td>
</tr>
<tr>
<td>GTLAC</td>
<td>Guringai Tribal Link Aboriginal Corporation.</td>
</tr>
<tr>
<td>H</td>
<td>Hectare/s.</td>
</tr>
<tr>
<td>Habitat</td>
<td>The place where a species, population or ecological community lives (whether permanently, periodically or occasionally). Habitats are measurable and can be described by their flora and physical components.</td>
</tr>
<tr>
<td>Haul road</td>
<td>A designated road, often temporary, used for moving materials (often used when new infrastructure is being constructed).</td>
</tr>
<tr>
<td>Heavy vehicle</td>
<td>A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System.</td>
</tr>
<tr>
<td>HMP</td>
<td>Heritage Management Plan.</td>
</tr>
<tr>
<td>HMSP</td>
<td>Haulage Management Sub Plan.</td>
</tr>
<tr>
<td>Hydrocarbon</td>
<td>Any organic compound — gaseous, liquid or solid — consisting only of carbon and hydrogen.</td>
</tr>
<tr>
<td>Hydrogeology</td>
<td>The science of the distribution and movement of groundwater.</td>
</tr>
<tr>
<td>Hydrology</td>
<td>The study of rainfall and surface water runoff processes.</td>
</tr>
<tr>
<td>Hydromulching</td>
<td>A procedure to establish grass over a large area. A mixture of grass seed, chopped straw and fertiliser is sprayed over the area to be grassed.</td>
</tr>
<tr>
<td>I</td>
<td></td>
</tr>
<tr>
<td>IBC</td>
<td>Intermediate bulk containers.</td>
</tr>
<tr>
<td>IER</td>
<td>Index of economic resources.</td>
</tr>
<tr>
<td>INP</td>
<td>NSW Industrial Noise Policy (EPA, 2000).</td>
</tr>
<tr>
<td>Interchange</td>
<td>A grade separation of two or more roads with one or more interconnecting carriageways.</td>
</tr>
<tr>
<td>Intersection at-grade</td>
<td>An intersection where carriageways cross at a common level.</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change.</td>
</tr>
<tr>
<td>IRSAD</td>
<td>Index of relative socioeconomic advantage and disadvantage.</td>
</tr>
<tr>
<td>ISEPP</td>
<td>State Environmental Planning Policy (Infrastructure) 2007</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent transport system.</td>
</tr>
<tr>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Lₐ10</td>
<td>The noise level which is exceeded for 10 per cent of the sample period. During the sample period, the noise level is below Lₐ10 level for 90 per cent of the time. The Lₐ10 is a common noise descriptor for environmental noise and road traffic noise.</td>
</tr>
<tr>
<td>Lₐ90</td>
<td>The noise level which is exceeded for 90 per cent of the sample period. During the sample period, the noise level is below Lₐ90 level for 10 per cent of the time. This measure is commonly referred to as background noise level.</td>
</tr>
<tr>
<td>Lₐeq</td>
<td>The equivalent continuous sound level. This is the energy average of the varying noise over the sample period and is equivalent to the level of constant noise which contains the same energy as the varying noise environment. This measure is a common measure of environmental noise and road traffic noise.</td>
</tr>
<tr>
<td>LALC</td>
<td>Local Aboriginal Land Council.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Landscape character.</td>
<td>The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features.</td>
</tr>
<tr>
<td>LEP</td>
<td>Local environmental plan.</td>
</tr>
<tr>
<td>LGA</td>
<td>Local government area.</td>
</tr>
<tr>
<td>Light vehicle</td>
<td>A vehicle is classified as a Class 2 vehicle or smaller, in accordance with the Austroads Vehicle Classification System.</td>
</tr>
<tr>
<td>Local road</td>
<td>A road or street used primarily for access to abutting properties.</td>
</tr>
<tr>
<td>LoS</td>
<td>Level of service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.</td>
</tr>
<tr>
<td>Lot</td>
<td>A parcel of land defined by measurement as a lot in a deposited plan (DP) or as a Crown portion or allotment.</td>
</tr>
<tr>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Macro invertebrates</td>
<td>Macroinvertebrates are fauna with no backbone that can be seen with the naked eye (i.e. without the aid of a microscope or magnifying glass). Aquatic macroinvertebrates are those that spend all or part of their life cycles in water.</td>
</tr>
<tr>
<td>Macrophytes</td>
<td>Macrophytes are aquatic plants that can be seen with the naked eye. They can grow below, within or on top of the water.</td>
</tr>
<tr>
<td>Median</td>
<td>1. The central reservation which separates carriageways from traffic travelling in the opposite direction. 2. The 'middle number' in a sorted list of numbers.</td>
</tr>
<tr>
<td>MLALC</td>
<td>Metropolitan Local Aboriginal Land Council.</td>
</tr>
<tr>
<td>Mode</td>
<td>A type or method of transport movement – including for the road corridor: cars, buses, bikes and pedestrians.</td>
</tr>
<tr>
<td>Motorway</td>
<td>Fast, high volume controlled access roads. May be tolled or untolled.</td>
</tr>
<tr>
<td>Mt</td>
<td>Million tonnes.</td>
</tr>
<tr>
<td>MVKT</td>
<td>Million vehicle kilometres travelled.</td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>N₂O</td>
<td>Nitrous oxide.</td>
</tr>
<tr>
<td>NCA</td>
<td>Noise Catchment Area</td>
</tr>
<tr>
<td>NGA</td>
<td>National Greenhouse Accounts</td>
</tr>
<tr>
<td>NML</td>
<td>Noise management level.</td>
</tr>
<tr>
<td>NO</td>
<td>Nitrogen monoxide.</td>
</tr>
<tr>
<td>NO₂</td>
<td>Nitrogen dioxide.</td>
</tr>
<tr>
<td>Northern interchange</td>
<td>The connections of the NorthConnex project with the M1 Pacific Motorway (formerly known as the F3 Freeway) and Pennant Hills Road.</td>
</tr>
<tr>
<td>Notifiable weed</td>
<td>A noxious weed that is classified as a Class 1, 2 or 5 under the Noxious Weed Act 1993.</td>
</tr>
<tr>
<td>NOW</td>
<td>NSW Office of Water (now DPI Water)</td>
</tr>
<tr>
<td>NOx</td>
<td>Oxides of nitrogen.</td>
</tr>
<tr>
<td>Noxious weeds</td>
<td>A weed declared to be a noxious under section 7 of the Noxious Weed Act 1993.</td>
</tr>
<tr>
<td>NPW Act</td>
<td>National Parks and Wildlife Act 1974 (NSW)</td>
</tr>
<tr>
<td>NPWS</td>
<td>NSW National Parks and Wildlife Service (now OEH).</td>
</tr>
<tr>
<td>NWRL</td>
<td>North West Rail Link.</td>
</tr>
<tr>
<td>O</td>
<td></td>
</tr>
<tr>
<td>O₃</td>
<td>Ozone</td>
</tr>
<tr>
<td>OCP</td>
<td>Organochlorine pesticides.</td>
</tr>
<tr>
<td>OEH</td>
<td>NSW Office of Environment and Heritage.</td>
</tr>
<tr>
<td>OH&amp;S</td>
<td>Occupational health and safety.</td>
</tr>
<tr>
<td>P</td>
<td></td>
</tr>
<tr>
<td>PACHCI</td>
<td>Procedure for Aboriginal Cultural Heritage Consultation and Investigation (Roads and Maritime, 2011).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PAD</td>
<td>Potential archaeological deposit. Any location considered to have a moderate to high potential for subsurface archaeological material.</td>
</tr>
<tr>
<td>PAH</td>
<td>Polynuclear aromatic hydrocarbons.</td>
</tr>
<tr>
<td>PASS</td>
<td>Potentially occurring acid sulfate soils.</td>
</tr>
<tr>
<td>PCB</td>
<td>Polychlorinated biphenyls.</td>
</tr>
<tr>
<td>Peak oil</td>
<td>The predicted time when oil extraction reaches its maximum.</td>
</tr>
<tr>
<td>pH</td>
<td>A measure of acidity or alkalinity of a solution, numerically equal to seven for neutral solution, increasing with increasing alkalinity and decreasing with increasing acidity. Originally stood for the words potential of hydrogen.</td>
</tr>
<tr>
<td>PIARC</td>
<td>Permanent International Association of Road Congress.</td>
</tr>
<tr>
<td>Piezometer</td>
<td>Device used to measure the pressure of groundwater, or static pressure of a liquid.</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate matter.</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>Particulate matter less than 2.5 micrometres in diameter.</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>Particulate matter less than 10 microns in diameter.</td>
</tr>
<tr>
<td>Pollutant</td>
<td>Any measured concentration of solid or liquid matter that is not naturally present in the environment.</td>
</tr>
<tr>
<td>Portal</td>
<td>Where a tunnel emerges to the surface, being the entrance or exit of the main alignment tunnels, off-ramps or on-ramps.</td>
</tr>
<tr>
<td>Proponent</td>
<td>The person or organisation that proposes carrying out the project or activity.</td>
</tr>
<tr>
<td>(The) project</td>
<td>The Road Construction Spoil Management project</td>
</tr>
<tr>
<td>Q</td>
<td>Quadrat A plot used to mark a physical area to isolate a sample and determine the percentage of vegetation and/or animals occurring within the marked area.</td>
</tr>
<tr>
<td>Quarry</td>
<td>An open pit from which stone, sand, gravel or fill is taken.</td>
</tr>
<tr>
<td>R</td>
<td>RAPs Registered Aboriginal parties.</td>
</tr>
<tr>
<td>RBL</td>
<td>Rating background level. The median value of the assessment background levels value for the period over all of the days measured. There is therefore an RBL value for each period — daytime, evening and night-time.</td>
</tr>
<tr>
<td>Receiver</td>
<td>An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receiver is a home, work place, school or other place where people spend some time.</td>
</tr>
<tr>
<td>(The) Regulation</td>
<td>Environmental Planning and Assessment Regulation 2000</td>
</tr>
<tr>
<td>Remnant native vegetation</td>
<td>Small patches of native vegetation that remain after land use changes to the surrounding area.</td>
</tr>
<tr>
<td>Revegetation</td>
<td>To revegetate an area by direct seeding with native species using manual or mechanical means such as hydromulching, strawmulching and tractor seeding.</td>
</tr>
<tr>
<td>Riparian</td>
<td>Relating to the banks of a natural waterway.</td>
</tr>
<tr>
<td>RNP</td>
<td>NSW Road Noise Policy (DECCW, 2011).</td>
</tr>
<tr>
<td>Roads and Maritime</td>
<td>Roads and Maritime Services.</td>
</tr>
<tr>
<td>RTA</td>
<td>Roads and Traffic Authority of NSW (now Roads and Maritime).</td>
</tr>
<tr>
<td>S</td>
<td>Section 170 register A register established in accordance with section 170 of the Heritage Act 1977 to record all heritage items in the ownership or under control of the RMS (or other state government agency).</td>
</tr>
<tr>
<td>SEIFA</td>
<td>Socioeconomic index for advantage.</td>
</tr>
<tr>
<td>Sensitive receiver</td>
<td>A sensitive receiver, such as a residence, work place, school or other place where people spend some time. An elevated sensitive receiver is a point above ground level.</td>
</tr>
<tr>
<td>SEPP</td>
<td>State environmental planning policy.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Severance of land</td>
<td>The creation of a physical barrier between a property and an existing road access to that property, or between two sections of the same property.</td>
</tr>
<tr>
<td>SIP</td>
<td>State Infrastructure Plan</td>
</tr>
<tr>
<td>SIS</td>
<td>NSW Government State Infrastructure Strategy</td>
</tr>
<tr>
<td>Site establishment works</td>
<td>Preliminary works carried out prior to the commencement of construction, including installation of environmental controls, demolition of existing structures, vegetation clearing and establishment of temporary construction facilities.</td>
</tr>
<tr>
<td>Shoulder</td>
<td>The portion of the carriageway beyond the traffic lanes adjacent to and flush with the surface of the pavement.</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulphur dioxide.</td>
</tr>
<tr>
<td>Southern interchange</td>
<td>The connections of the NorthConnex project with the Hills M2 Motorway and Pennant Hills Road.</td>
</tr>
<tr>
<td>Spoil</td>
<td>Surplus excavated material.</td>
</tr>
<tr>
<td>SREP</td>
<td>State regional environmental plan</td>
</tr>
<tr>
<td>Stockpile</td>
<td>Temporarily stored materials such as soil, sand, gravel and spoil / waste.</td>
</tr>
<tr>
<td>Surface water</td>
<td>Water flowing or held in streams, rivers and other wetlands in the landscape.</td>
</tr>
<tr>
<td>Transport Management Centre</td>
<td>Monitors and manages the NSW State road networks.</td>
</tr>
<tr>
<td>Tributary</td>
<td>A river or stream flowing into a larger river or lake.</td>
</tr>
<tr>
<td>TSP</td>
<td>Total suspended particulates.</td>
</tr>
<tr>
<td>TSS</td>
<td>Total suspended solids.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>A measure of light penetration through a water column containing particles of matter in suspension.</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>The ‘Kyoto Protocol to the United Nation Framework Convention on Climate Change’, which was signed in 1997 and Australia ratified the protocol in December 2007.</td>
</tr>
<tr>
<td>VENM</td>
<td>Virgin excavated natural material.</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compounds.</td>
</tr>
<tr>
<td>Water table</td>
<td>The surface of saturation in an unconfined aquifer at which the pressure of the water is equal to that of the atmosphere.</td>
</tr>
<tr>
<td>Wildlife corridor</td>
<td>Linked sections of natural vegetation retained to assist in fauna movement and maintenance of local biodiversity.</td>
</tr>
<tr>
<td>Zoning</td>
<td>Zoning regulates land use within an environmental planning instrument (usually by different colour codes on a map accompanying a local environmental plan). Land use tables set out the various purposes for which land may or may not be used or developed in each zone.</td>
</tr>
</tbody>
</table>
1 Introduction and background

On 13 January 2015 Roads and Maritime Services (Roads and Maritime) received approval to construct and operate the NorthConnex project under Part 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act). NorthConnex is a multi-lane tolled motorway tunnel linking the M1 Pacific Motorway at Wahroonga to the Hills M2 Motorway at the Pennant Hills Road interchange at Carlingford in northern Sydney.

The Environmental Impact Statement (EIS) exhibited for the NorthConnex project identified that approximately 2.6 million cubic metres of spoil will be generated during the construction of the project. The EIS identified potential spoil management location options, with the final option(s) to be determined at the construction stage. The spoil management location options identified in the EIS included:

- The Australian Defence Industries (ADI) site, St Marys, with capacity of between two and 2.5 million cubic metres.
- Gosford Quarry with a capacity of around 2.5 million cubic metres.
- Hornsby Quarry with a capacity of around 3.3 million cubic metres.
- The CSR Quarry with a capacity of around 1.16 million cubic metres.
- The Defence precinct Schofields (HMAS Nirimba) with a capacity of around 500,000 cubic metres.
- The Great Southern Rock Quarry Sandy Point with a capacity of around 5 million cubic metres.

Following design development, the Hornsby Quarry site has been identified as one of the preferred options for the management of spoil generated during NorthConnex road construction from late 2015. It is proposed that up to 1.5 million cubic metres of spoil comprising VENM (virgin excavated natural material) and/or ENM (excavated natural material) would be directed to the Hornsby Quarry site for handling, management and beneficial reuse.

The Hornsby Quarry site is located within Old Mans Valley, off Quarry Road on the western side of the Hornsby town centre. It is the closest spoil emplacement option to the NorthConnex tunnelling and excavation sites (refer to Figure 1.1). The site was operated as a breccia hard rock quarry by private businesses from the early 1900s and ceased in the late 1990s. In 2002 the site was acquired by Hornsby Shire Council from CSR Limited.

1.1 Hornsby Quarry

In its current state, the Hornsby Quarry site presents an ongoing safety risk and requires ongoing maintenance costs to ensure stability of the quarry void. Public access to the quarry void and its immediate surrounds is prohibited for this reason.

Hornsby Shire Council has identified the importance of the rehabilitation of the Hornsby Quarry site, including the need to stabilise the quarry void to enable the entire site to be opened to the public in the future. Filling the quarry void would be an essential first step towards rehabilitation of the site and realisation of a future land use consistent with the current zoning of the land for public recreation (RE1) under the Hornsby Local Environmental Plan 2013 (Hornsby LEP). Hornsby Shire Council has been actively exploring options for stabilising and filling the quarry void to rehabilitate the site to make it safe for public recreation, and since 2007 has commissioned a number of studies into future land use options at the site.

Beneficial reuse of spoil generated during the construction of NorthConnex offers an opportunity to fill the quarry void to a level that would allow Hornsby Shire Council to start the process for the realisation of the final land use for the quarry site.

The handling, management and beneficial reuse of spoil at the Hornsby Quarry site represents a unique opportunity to achieve two objectives:
• Environmentally responsible management of spoil generated during construction of a major road and road infrastructure facility, being the NorthConnex project.

• Contributing to the planned future rehabilitation and redevelopment of the quarry by Hornsby Shire Council for recreational purposes and public benefit.

The Hornsby Quarry site is not currently the subject of a development approval that would permit handling, management and beneficial reuse of spoil at that site. Therefore, a fresh assessment and approval process is being pursued in accordance with the EP&A Act.

Approval is now being sought to permit the handling, management and beneficial reuse of spoil generated during the construction of a road and associated road infrastructure facility (the NorthConnex project) at the Hornsby Quarry site.

The local context for the project is shown in Figure 1.2.

1.2 The project

The Hornsby Quarry site would receive up to 1.5 million cubic metres of ENM and/or VENM from tunnelling and excavation activities at the approved NorthConnex construction sites. Only ENM and/or VENM would be received and reused at the Hornsby Quarry site.

Key features of the project are shown in Figure 1.3 and would include:

• Pavement construction including widening and sealing of the quarry access road (Bridge Road and track) to facilitate all weather access.

• Clearing and grubbing, and establishment of erosion and sediment controls.

• Establishment of a compound site at Old Mans Valley stockpile area, security fencing and signage around the project area.

• Dewatering of the quarry void (to be undertaken by Hornsby Shire Council in accordance with its existing groundwater licence) to a suitable level that allows working within the void.

• Construction of a conveyor from the stockpile site to the rim of the quarry void.

• Spoil haulage by truck from the NorthConnex construction sites to the Hornsby Quarry site over a period of approximately 28 months.

• Stockpiling of spoil within the Hornsby Quarry site using dozers and wheel loaders.

• Transport of the spoil via the conveyor from the stockpiles to the rim of the quarry void, where the spoil would fall directly into the void.

• Spreading and grading of the spoil on the quarry floor.

• Site demobilisation and rehabilitation of the compound site, stockpile areas and the conveyor corridor to a condition resembling pre-project condition, as agreed to with Hornsby Shire Council.

The project is anticipated to commence in late 2015 and is expected to take around 33 months to complete.

Detailed descriptions of each project phase can be found in Section 4.1 of the EIS.

1.3 Statutory Context

Roads and Maritime is seeking approval for the project under Part 5.1 of the EP&A Act.

Handling, management and beneficial reuse of spoil at the Hornsby Quarry site, and the infrastructure required to facilitate these activities, are permissible without development consent as ‘development for the purpose of a road or road infrastructure facility carried out by or on behalf of a public authority’ under clause 94 of State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP).
Spoil handling, management and beneficial reuse on the Hornsby Quarry site constitutes development for the purpose of a road or a road infrastructure facility because:

- The Hornsby Quarry site would exclusively receive spoil generated by the development of a road and associated road infrastructure facilities (the NorthConnex Project), as defined under the Infrastructure SEPP. Spoil would not be received for management from any other source as part of the proposal.

- The generation of spoil and the need for an appropriate spoil management location is a fundamental and unavoidable consequence of the construction of a road and associated road infrastructure facilities.

The project would be carried out on behalf of Roads and Maritime, a public authority.

Roads and Maritime, as the proponent of the project and a determining authority within the meaning of Part 5 of the EP&A Act, has formed the opinion that management of spoil at the Hornsby Quarry site is likely to significantly affect the environment. The project therefore meets the requirement for preparation of an EIS under Part 5 of the EP&A Act. Under clause 14, and clause 1 Schedule 3 of State Environmental Planning Policy (State and Regional Development) 2011 the project is therefore declared to be State Significant Infrastructure (SSI) under Part 5.1 of the EP&A Act.

The Minister for Planning is the approval authority for SSI, and would assess and determine the application for spoil management at the Hornsby Quarry site.

In accordance with the requirements of the EP&A Act an EIS was prepared to assess the potential impacts of the project to meet the Secretary’s environmental assessment requirements (SEARS) issued for the project on 2 July 2015. The EIS was submitted to the Department of Planning and Environment (DP&E) in August 2015.

The EIS was placed on public exhibition by DP&E between 5 August 2015 and 4 September 2015 at nine public locations (refer Section 2.2.1).

1.4 Purpose of this document

During the exhibition of the EIS, 47 submissions were made. The Secretary of the DP&E provided copies of the submissions to Roads and Maritime. In accordance with section 115Z of the EP&A Act, the Secretary required Roads and Maritime to respond to the issues raised in these submissions in a submissions report. The Secretary also advised that if there are any proposed changes to the project to minimise its environmental impact or to address issues raised in submissions, a preferred infrastructure report would be required.

This report presents the following information:

- Details of the community involvement activities carried out for the project during the public exhibition period (Chapter 2).
- A summary of the submissions received during the public exhibition period (Chapter 3).
- Responses to the issues raised in submissions received from government agencies and local councils (Chapter 4).
- Responses to the issues raised in submissions received from the local community (Chapter 5).
- A number of clarifications to information presented in the EIS (Chapter 6).
- Changes made to the project as presented in the environmental impact statement to further minimise its environmental impact and / or in response to issues raised in submissions (Chapter 7).
- A revised summary of mitigation measures, to those presented in the EIS, which have been updated to reflect responses to issues raised in submissions and changes made to the project (Chapter 8).
Figure 1.2 Local and site context
Figure 1.3 Indicative Site layout

- Existing unsealed access road to be used for access to the quarry void.
- Sealed project access road.
- Sealed and widened access road.
- Existing access roads to be sealed and used for the project.
- Existing access roads proposed for use by light vehicles and deliveries.
- Stockpiling area (indicative).
- 5m high noise mound (indicative).
- Conveyor.
- Fence around project zone.
- Existing quarry void fence.
- Waterway.
- Conveyor feeder.
- Truck bridge.
- Gate.
- Existing gate.
2 Community involvement

2.1 Consultation Overview
The EIS was exhibited for 30 days from 5 August 2015 to 4 September 2015. During this time a range of consultation activities were undertaken to raise awareness of the public exhibition, to provide information about the EIS and to advise community and stakeholders on how to make a formal submission. A total of 47 submissions on the project were received by DP&E during the exhibition period. A summary of the submissions received during the public exhibition period is included in Chapter 4 (Submissions received) and responses to the issues raised in the submissions received are detailed in Chapter 5 (Key stakeholders) and Chapter 6 (Community submissions).

2.2 Consultation Activities
Roads and Maritime supported the public exhibition of the EIS with a number of activities. These activities are listed below and described in more detail in this section.

- Static display of the EIS
- Toll free community information line 1800 093 090
- Project email enquiries@hornsbyquarry.com.au
- Project website updates rms.gov.au/Hornsby quarry
- Advertisements in local publications
- Community drop-in sessions
- Project overview document
- Phone calls to key stakeholders
- Doorknocks to immediately affected residents
- Meetings and briefings with key stakeholders
- Project fact sheets
- Community update
- Emails to the project mailing list
- Project database to record correspondence relevant to the project.

2.2.1 Static display of the environmental impact statement
The EIS and supporting material were available to view and download on:


Static displays which included an overview poster and hard copies of the EIS were also provided at nine display locations as follows:

- DP&E Information Centre, 23-33 Bridge Street, Sydney
- Roads and Maritime (Head Office), Level 9, 101 Miller Street, North Sydney
- Hornsby Shire Council, 296 Peats Ferry Road, Hornsby
- Hornsby Central Library: 28-44 George Street, Hornsby
- Nature Conservation Council: Level 2, 5 Wilson Street, Newtown
- NorthConnex Community Information Centre: 354-356 Pennant Hills Road, Pennant Hills
- Office of Matt Kean, State Member for Hornsby: Suite 5, The Madison, 25 - 29 Hunter Street, Hornsby
2.2.2 Advertisements in local and regional publications

Advertisements were placed in local and regional press to announce the EIS public exhibition period. These advertisements appeared from 5 to 20 August 2015. The publications included:

- The Daily Telegraph (5 August, 2015)
- Sydney Morning Herald (5 August, 2015)
- North Shore Times (5 and 12 August, 2015)
- Northern District Times (5 and 12 August, 2015)
- The Hornsby Advocate (6 and 13 August, 2015)
- Australian Chinese Daily (12 August, 2105)
- Sing Tao Daily (12 August, 2105)
- Bush Telegraph (13 and 20 August, 2015)

2.2.3 Community drop-in sessions

Three community drop-in sessions were held during the EIS public exhibition period. These sessions were attended by around 62 people. The community were informed of the drop-in sessions through project advertising, a community update and via an email notification distributed to registered stakeholders. The session times and locations were as follows:

- Wednesday 12 August 2015, 6 pm to 9 pm, Hornsby RSL, 4 High Street, Hornsby
- Wednesday 19 August 2015, 6 pm to 9 pm, Hornsby RSL, 4 High Street, Hornsby
- Saturday 22 August 2015, 1 pm to 4 pm, Hornsby War Memorial Hall, 2 High Street, Hornsby

The drop-in sessions were attended by representatives from the project team, the Lend Lease Bouygues Joint Venture, the NorthConnex Project Company and Hornsby Shire Council.

2.2.4 Letters, emails and phone calls

Correspondence relating to the EIS public exhibition was distributed during the exhibition period to community members, registered stakeholders and interest groups. The correspondence provided project updates, notifications of the public exhibition period, information on upcoming consultation activities, details on how to provide feedback through the submissions process and how to contact the project team for further information. Correspondence included:

- Email notifications to 256 registered stakeholders
- Letters to 550 residents on Dural Street, Quarry Road, Bridge Road, Peats Ferry Road, Summers Avenue, Fern Tree Close, Roper Lane, and Manor Road
- Phone calls and emails to key stakeholders including:
  - Six places of worship
  - 24 educational institutions
  - 11 health providers and organisations
  - Four cycling and mountain biking organisations
  - 10 local businesses
  - Three emergency service providers
2.2.5  Doorknocks to immediately affected residents

Doorknocks to 30 apartments with frontage onto Bridge Road were carried out on Thursday 6 August. These doorknocks raised awareness with local residents about the project and notification of the public exhibition period.

2.2.6  1800 number and project email

The project has a dedicated community information line (free call) and email which were available during the public exhibition phase.

- Project free call number 1800 093 090
- Project email address enquiries@hornsbyquarry.com.au

A summary of phone and email contacts received during the EIS public exhibition is provided in Table 2.1.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 1800 phone calls received</td>
<td>19</td>
</tr>
<tr>
<td>Phone calls made</td>
<td>80</td>
</tr>
<tr>
<td>Project emails received</td>
<td>8</td>
</tr>
<tr>
<td>Emails sent by the project team</td>
<td>19</td>
</tr>
</tbody>
</table>

2.2.7  Project overview document

A project overview document was made available to coincide with the public exhibition of the EIS. The document presents an overview of the project, some of the key findings from the EIS and information on the proposed changes at the quarry site during construction.

The project overview document was made available on the project website, at the community drop-in sessions and on request.

2.2.8  Project fact sheets and brochures

Four project factsheets were made available during the EIS public exhibition. These factsheets were available for download on the project website and distributed at the community drop-in sessions. These included:

- How to make a submission
- Air quality
- Noise and vibration
- Traffic and transport.

2.2.9  Community updates

Around 13,400 community updates were distributed via letter box drop to the community within the project area in August 2015. The community update provided information on the project, notified of the EIS public exhibition and advertised the upcoming community drop-in sessions.

2.2.10 Website updates

The Hornsby Quarry Road Construction Spoil Management project website was updated during the public exhibition period. The website provided links to the EIS and project documents, advertised the EIS display locations and community drop-in sessions and provided the contact details of the project team for further information.

2.2.11 Meetings and briefings with stakeholders

A number of meetings and briefings were held during the public exhibition period with stakeholders. These provided stakeholders with the opportunity to obtain an overview of the EIS from the project team and discuss any areas of interest. Table 2.2 lists the stakeholder meetings and briefings held during the public exhibition period.
### Table 2.2 Stakeholder organisations consulted during the public exhibition period

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Meeting/ briefing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hornsby Shire Council</td>
<td>23 July 2015</td>
</tr>
<tr>
<td>Sydney North Off Road Cyclists (SNORC)</td>
<td>3 August 2015</td>
</tr>
<tr>
<td>Hornsby Campus Northern Sydney Institute TAFE NSW</td>
<td>3 August 2015</td>
</tr>
</tbody>
</table>

#### 2.3 Ongoing consultation during construction

Consultation on the project would continue throughout the remainder of the planning process and during construction. Consultation activities would include informing the community and affected motorists of any upcoming changes to the road network associated with the project. The 1800 number and email address would continue to operate and the website would be updated as the project progresses. If approved, the project would be constructed by Lend Lease Bouygues Joint Venture (LLBJV) and delivered in accordance with any conditions of approval. Future consultation would be carried out by LLBJV in partnership with Roads and Maritime and the NorthConnex Project Company.
3 Clarifications

This chapter provides clarifications of information presented in the EIS for the project in response to issues raised during the exhibition period. The clarifications presented in this chapter relate to:

Traffic and transport

- Potential traffic impacts from closing Roper Lane.
- Investigations into use of the Windybanks Interchange, Berowra for northbound haulage vehicles during the peak periods.

Land use and property

- Access to mountain bike trails at Old Mans Valley.

Project description

- Potential supply of mains power to the project site.

Direct impacts to heritage items

- Contouring of the spoil material within the quarry void.

In addition to the clarifications outlined in this chapter, Chapter 7 of this report details changes that have been made to the project to reduce its environmental impacts. These changes relate to:

- Revised outbound peak hour haulage route so that outbound haulage is via a combination of the northern route and the southern route, both of which are identified in the EIS.
- Investigations into the use of the Windybanks Interchange instead of the northern outbound haulage route described in the EIS.

3.1 Potential traffic impacts from closing Roper Lane

The potential traffic impacts from closing Roper Lane at the intersection of Roper Lane and Bridge Road have been raised as an issue in submissions, particularly from residents of Roper Lane (and connected streets such as Fern Tree Close, Summers Avenue and Silvia Street). As a consequence of closing Roper Lane, these residents would need to use alternative roads to access Pacific Highway/Peats Ferry Road rather than the signalised Bridge Road/Peats Ferry Road intersection.

Following closure of Roper Lane, access to the Pacific Highway/Peats Ferry Road would continue to be provided via Summers Avenue and Watson Avenue, which provides for all movements. Signalised access would also be available via Galston Road.

Hornsby Shire Council has previously identified that the installation of traffic signals at the Watson Avenue/Peats Ferry Road intersection would assist in addressing the existing issues around traffic congestion and safe access to the Pacific Highway/Peats Ferry Road for the users of Roper Lane and the connected streets in this area. Preliminary discussions have started between Council and Roads and Maritime to identify a design solution for this intersection which would ensure the safety of road users and that would not result in a detrimental impact to the existing road network. Consultation would continue with the aim of identifying a safe, feasible design solution for potential implementation at the intersection in the future. Where such a design solution is identified and agreed, it is intended that intersection works would be carried as soon as possible to maximise road network benefits during the early stages of the project.

The design and construction of the signalised intersection at Watson Avenue and Peats Ferry Road would be the responsibility of the Hornsby Shire Council and would be undertaken under a separate approval. However, Roads and Maritime recognised that installation of signals at the intersection of Watson Avenue and Peats Ferry Road would also assist in ameliorating local traffic impacts associated with the closure of Roper Lane. Roads and Maritime would continue to work closely with Hornsby Shire Council and other relevant stakeholders to assist in delivering these works within a timeframe suitable to meet the needs of the community currently and during the temporary closure of Roper Lane as part of this project.
3.2 Investigations into the use of Windybanks Interchange

In response to submissions and as a result of ongoing assessment of the northern outbound haulage route following the exhibition of the EIS, investigations are underway into the use of either the northern outbound haulage route described in the EIS for the project (via Yirra Road / Belmont Parade / Ku-ring-gai Chase Road) or alternatively the use of the Windybanks Interchange in Berowra.

The Windybanks Interchange (southbound on-ramp onto the Pacific Motorway) is approximately 6.5 kilometres north of the Ku-ring-gai Chase Road Pacific Motorway southbound on-ramp described in the EIS. Haulage vehicles would travel north on the Pacific Highway (an arterial road) and access the interchange directly via a signalised right hand turn lane at an existing intersection. The Windybanks Interchange is identified by Roads and Maritime as suitable for use by Restricted Access Vehicles.

Chapter 7 of this report assesses the potential impacts on the community and the environment of haulage vehicles using both the northern and southern outbound haulage routes during the peak periods. This assessment has used the northern outbound haulage route described in the EIS. Investigations into the use of the Windybanks Interchange will include consideration and assessment of environmental changes where the Windybanks Interchange is used instead of the northern outbound haulage route described in the EIS and further information is provided in Section 7.3.

Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the Traffic Management Plan (TMP) and Haulage Management Sub Plan (HMSP) approval stage.

3.2.1 References to the northern outbound haulage route

Unless otherwise stated, references to the ‘northern outbound haulage route’ in this Submissions and Preferred Infrastructure Report refer to either the Ku-ring-gai Chase Road interchange as described in the EIS or the Windybanks Interchange.

3.3 Access to mountain bike trails at Old Mans Valley

Section 4.3.3 of the EIS presents the anticipated restrictions to public access to the quarry site during the project to ensure public safety, including a description of the requirement to restrict access to some of the mountain bike trails in Old Mans Valley. Figure 4-5 in the EIS identifies proposed changes to recreational access during the project. The figure also highlights areas under investigation for continued access by users where feasible and reasonable.

Submissions raised concerns regarding the closure and restriction of access to some mountain bike trails as a result of the project. Some submissions suggested areas where access could be improved or maintained through project footprint refinements.

To clarify this issue and to further address the submissions raised, the following additional detail is provided:

- Temporary crossing access for the bike trail would be provided across Bridge Road (quarry access track), likely in the form of a culvert under the road near where the Tech Track currently joins the existing quarry access track. The design specifications for this crossing would be confirmed during the detailed design phase, but the crossing is likely to be in the form of a culvert under Bridge Road.
- Temporary crossing of the conveyor would be provided. The location and configuration of this crossing would be confirmed during detailed design.
- In the south western section of the site, investigations have confirmed that the fence around the project area can be moved to be inside of the outermost mountain bike trail to allow continued access to the mountain bike trail in this section for the duration of the works.
- In the north eastern part of the site, minor refinements of the fence line would allow access to the Lava Flow trail to remain open for the duration of the works, with only temporary restrictions on access during the construction of the Bridge Road crossing.
Access between the trails east and west of Quarry Road would be maintained via the south eastern mountain bike trail loop, which would provide for connection to the trails west and north west of the Quarry Road access gate. However, the requirements to ensure public safety and to minimise interaction between project vehicles would mean that the crossing of Quarry Road, where Quarry Road bisects the existing trail (shown as an investigation area in Figure 4-5 of the EIS) would need to be managed for the duration of the project to allow for the maintenance of a secure and safe construction site.

Figure 3.1 indicates the location and scope of these clarifications to the access to mountain bike trails at Old Mans Valley.
Figure 3.1 Proposed changes to recreational access during the project
3.4 Connection to mains electricity

Section 4.6 of the EIS lists the plant and equipment anticipated to be used during the project. This section identifies that power during each phase of the project would be supplied by temporary onsite diesel fuelled generators. The project has been assessed on this basis having regard to the potential environmental impacts, including those relating to noise, emissions and air quality impacts.

Early investigations are currently underway to identify whether provision of a connection from the existing mains electricity network to the site is feasible. If such a connection is feasible it would result in:

- A reduction in the number of delivery vehicles carrying diesel accessing the site.
- A reduction in diesel exhaust emissions generated by the onsite generators.
- A reduction in noise emissions.

If identified as feasible, assessment and approval of the electricity connection from the quarry site to the existing mains electricity network would be considered separately to the project, with separate assessment and approval.

If identified as feasible, the following changes would be made to the scope of the project and are included in the scope of the approval currently being sought:

- Diesel fuelled generators would no longer be required, and subject to the timing and transition to mains power supply, would be removed from the site.
- Electricity connection infrastructure would be constructed on the site as part of the project. This infrastructure is likely to include a small electricity connection kiosk, to which the separate electricity supply would be connected.

3.5 Contouring of the spoil material within the quarry void

The EIS identifies that the project would result in the partial filling of the quarry void from RL 10 metres AHD to a level of around RL 64 metres AHD. At this level, the top most sections of the basinal layering of the Hornsby Diatreme visible on the eastern wall of the quarry void would remain visible (from approximately RL 64 metres to RL 100 metres). The partial filling of the quarry would not physically damage the diatreme, but would cover sections of the geology.

In response to issues raised in submissions, an assessment of the feasibility of contouring spoil as it is placed into the quarry void has commenced. The aim of this contouring would be to facilitate as much visual access to the east face of the quarry void (the area including the diatreme) as feasible and reasonable. Initial assessment of contouring opportunities indicates that spoil could be contoured to around RL 54 metres on the eastern side of the void, which would leave exposed an additional 10 metres of the void’s eastern face when compared to the finished level proposed in the EIS for the project.

Contouring of the spoil material within the quarry void is being considered in consultation with Hornsby Shire Council, and any contouring of fill material would need to have regard to the future use of the site. Where contouring is deemed viable, this would be included as an additional mitigation measure and would be documented in the CEMP and/or sub-plans for the project.
4 Submissions received

4.1 Respondents

The Department of Planning and Environment accepted submissions in response to the EIS during the public exhibition period (a period of 30 days from 5 August 2015 to 4 September 2015). Submissions were accepted by:

- Mail – Director, Infrastructure Projects, Department of Planning and Environment, Application number SSI 15_7066, Major Projects Assessment, GPO Box 39, Sydney, NSW, 2001.

A total of 47 submissions were received in response to the EIS as summarised in Table 4.1.

Table 4.1 Summary of submissions received

<table>
<thead>
<tr>
<th>Submission group type</th>
<th>Number of separate submitters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>30</td>
</tr>
<tr>
<td>State government agencies</td>
<td>6</td>
</tr>
<tr>
<td>Local councils</td>
<td>1</td>
</tr>
<tr>
<td>Interest groups/organisations</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>

Note that submitter details were withheld at the request of some submitters. In the absence of being able to identify each submitter, these submission statistics may overestimate the number of different submitters.

4.2 Overview of the issues raised

Each submission has been individually examined in detail to understand issues raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, these have been combined and only one response provided. Care has been taken in this process to preserve the specific details of each issue raised.

Submission authors have not been identified in this report (excluding agencies, councils and other key stakeholders). Submission authors have been assigned a unique identification number which is referred to in this report as a ‘stakeholder identification number’. Emails and letters have been sent to each submission author (where contact details have been provided) about the availability of this report. Eight submission authors chose not to disclose their contact information, therefore these individuals have not received an email or letter.

4.2.1 Government agencies

Six government agencies made submissions, raising a range of issues relevant to their respective areas of interest and responsibility. A high level summary of each agency’s issues is provided below with detailed responses provided in Chapter 5.

Environment Protection Authority

The Environment Protection Authority raised issues relating to:

- The assessment of air quality impacts and proposed mitigation measures including:
  - Recommendation for additional proactive controls.
  - Recommendation for inclusion of a reactive management strategy.
  - Inclusion of a detailed emissions inventory for all particle sources at the site.
  - Inclusion of the assessment of environmental impacts associated with vehicles including off-road diesel equipment and plant.
  - Recommendation that unnecessary idling of engines be further reduced.
- The assessment of noise and vibration impacts including:
  - Recommendations that appropriate noise mitigation measures be incorporated into a drivers code of conduct and the inclusion of noise management clauses in drivers contracts.
− Assurance that all reasonable and feasible noise mitigation measures for managing noise levels above the nominated Noise Management Levels would be implemented.
− Request that construction vehicles would not be allowed to arrive at the project site or in surrounding areas outside of approved construction hours.

• The development of erosion and sediment control measures in accordance with Managing Urban Stormwater Soils and Construction, 4th Edition published by Landcom (the ‘Blue Book’).

NSW Health

NSW Health raised issues relating to noise and vibration including:

• Further noise mitigation measures and improved operating practices to address noise impacts, particularly at the Hornsby TAFE.
• Ongoing monitoring at noise affected properties that identifies and addresses adverse noise impacts and allows the effectiveness of additional mitigation measures to be evaluated.
• The noise management plan should include protocols relating to modification or cessation of operations causing adverse noise impacts.

NSW Health also raised issues relating to air quality and health including:

• Recommendation that the monitoring program include measurement of total suspended particles (TSP) and particulate matter (PM) at the site boundary and that this be incorporated into the Dust Management Plan for the project.
• Recommendation that an annual risk figure for particulate matter exposure, without an adjustment factor for mortality risk (>30 years), be calculated and interpreted in the assessment.

Office of Environment and Heritage

The Office of Environment and Heritage (OEH) did not raise any issues with respect to Aboriginal heritage, biodiversity and flood risk management.

Office of Environment and Heritage – Heritage Council

The Heritage Council stated conditional support for the management and mitigation measures outlined in the EIS and recommended that one additional management measure relating to discovery of substantial intact archaeological deposits / relics be included.

Department of Primary Industries – NSW Office of Water

The NSW Office of Water raised issues relating to:

• Spoil management including requests for clarification on sources of fill for the project.
• Clarification on whether the council intends to fill the void after this project is completed.
• Groundwater, including:
  − Recommendations for further hydrogeological classification.
  − Recommendations for further assessment to better understand groundwater levels and flow direction including additional groundwater monitoring and groundwater analysis related to rainfall recharge and a geological cross-section.
  − Inclusion of groundwater recharge and appropriate three dimensional consideration of the differing geology and hydrogeological characteristics in the analytical model.
  − Recommendations for further discussion on dewatering management after project completion.
• Clarification of discharge water quality and whether discharge is likely to affect the downstream aquatic environment of Old Mans Creek.
• Recommendation that details of any existing impacts to Old Mans Creek from dewatering to date are outlined.
Fire and Rescue NSW

Fire and Rescue NSW outlined its concerns regarding potential conflicts with spoil haulage adjacent to the Hornsby Fire Station on Bridge Road and recommended mitigation measures.

4.2.2 Local councils

Hornsby Shire Council made a submission which raised a range of issues, including:

- Noise impacts from heavy vehicle movements on residential streets. Council recommended that further noise assessment be undertaken and additional mitigation measures proposed to address noise impacts.

- Water quality and management of discharge water including:
  - Recommendations for additional guidelines to be considered and a Water Management Plan to be developed and provided to Council for approval.
  - Recommendations that additional mitigation measures be detailed to prevent turbid water discharge to Old Mans Creek.
  - Request that the Soil and Water Management Plan be provide to Council for review prior to commencement of construction activities.

- Traffic and spoil haulage related issues including:
  - Traffic management on local streets and traffic safety.
  - Recommendations for a number of intersection and local road modifications.
  - Concerns regarding reduced road safety resulting from the use of local roads for spoil haulage.
  - Request that a detail traffic management plan be developed in consultation with Council.
  - Request for clarification of swept path assessments.

- Biodiversity issues, including:
  - Concerns regarding insufficient biodiversity data for Old Mans Creek and recommendations for baseline aquatic biodiversity data to be obtained as part of the Water Management Plan.
  - Recommendation for preparation of a Soil Seed Bank, Topsoil Translocation and Seed Collection Plan.
  - Recommendation that the Flora and Fauna Management Plan include avoidance and mitigation measures from the EIS.

- Recommendation that walking / bike trails be relocated during construction and reinstated following works.

- Recommendations for managing heritage impacts to the exposed diatreme in the quarry void.

- Recommendation that a community complaints system be operational for the construction period.

Detailed responses to the issues raised by Hornsby Shire Council are provided in Chapter 4.

4.2.3 Other key stakeholders

Other key stakeholders included:

- Peak groups and advisory organisations including the Geological Society of Australia.
- Environmental groups including the Association for Berowra Creek and STEP Inc.
- Community groups including the Galston Area Residents Association, Sydney MTB Riders the Pennant Hills District Civil Trust Inc. and Community Voice.
- Two submissions from educational institutions; Hornsby TAFE and Barker College.

Detailed responses to the issues raised by these key stakeholders are provided in Chapter 4.
4.2.4 Community

Community submissions have raised a range of issues depending on the respondent’s location in relation to the project, and the particular interests of the respondent. The main issues raised in community submissions include:

- Network performance.
- Traffic safety.
- Justification for the Northern haulage route.
- Closure of Roper Lane.
- Road improvements.
- Traffic and noise impacts on Bridge Road.
- Impacts on the mountain bike trails within the quarry site.
- Justification for using Bridge Road over Quarry Road to access the site.

Responses to community submissions are provided in Chapter 6.
5 Responses to key stakeholder submissions

5.1 Government agencies

5.1.1 Environment Protection Authority

5.1.1.1 Air quality

Issue description
The assessment should be revised to include:

- Additional proactive controls (where available) to help ensure that:
  - The project would not cause exceedance of relevant particle impact assessment criteria.
  - To reduce the project predicted incremental impacts.
- Reactive management strategies to ensure that the project impacts are acceptable under adverse conditions, including adverse weather and elevated background concentrations.
- A detailed emissions inventory for all particle sources at the site. Where particle emissions are assumed to be controlled or managed, the emissions inventory should be linked to a detailed air quality management plan that includes, as a minimum:
  - Key performance indicator(s)
  - Monitoring methods
  - Location, frequency and duration of monitoring
  - Record keeping
  - Compliance reporting.

Response
Best industry practice mitigation measures have been incorporated into the project to proactively manage potential impacts. These are included in Section 7.1.6 of the EIS and Section 7.1 of the Technical working paper: air quality (Appendix E of the EIS) and include (but are not limited to):

- Sealing of all site haul roads.
- The use of control measures such as water carts, sprinklers, sprays, internal side road speed limits and dust screens to control dust emissions.
- Minimisation of exposed areas to prevent or minimise windblown dust.
- Maintaining the drop height of excavators and front-end loaders to 1.5 metres or less.
- Ensuring that all loaded haulage trucks are covered at all times on public roads and onsite, where there is a risk of release of dust or other materials.

The EIS commits to developing and implementing a reactive management air quality strategy on site, which would be incorporated into the design of the air quality management plan with additional mitigation measures outlined as a contingency against potential exceedances. The strategy would be developed to manage the generation and off-site transportation of dust. The reactive management strategy would involve implementation of site operational procedures targeting the visual observation of dust leaving the site. Dust observations would be undertaken on an ongoing basis by trained site staff with all staff encouraged to make proactive dust observations whenever on-site. Should visible dust be observed to be crossing the site boundary, contingency measures would be implemented to reduce the potential for off-site impacts. Additional mitigation measures that could be implemented as contingency measures are further identified below and would be adopted depending on the detailed design of the project.
The contingency measures for the reactive management strategy would be designed to target activities that are expected to result in the highest dust generation, and are expected to include measures such as:

- Increase to active mitigation measures such as additional watering and covering stockpiles (where practical).
- Modifications to dust generating activities e.g. focusing activities to within the quarry when dust generation issues occur in the stockpiling areas in Old Mans Valley (where practicable).
- Reduction in materials handling intensity.

These measures would be outlined within the air quality management plan for the project.

A detailed emissions inventory was prepared as part of the air quality impact assessment for the filling activity (refer to Appendix E of the technical working paper: air quality). Key assumptions of the emissions inventory which are considered to be controlling factors for dust generation would form the basis of key performance indicators (KPIs) for the air quality management plan. The air quality management plan would detail these KPIs and monitoring measures for each. An example of an air quality KPI based on the emissions inventory assessed for the project is provided in Table 5.1 (noting that the final monitoring measures implemented for the KPI would be confirmed in the air quality management plan).

Table 5.1 An indicative air quality KPI

<table>
<thead>
<tr>
<th>Key performance indicator (KPI):</th>
<th>35 trucks per hour delivering spoil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of monitoring compliance with KPI:</td>
<td>Driver delivery dockets compiled daily</td>
</tr>
<tr>
<td>Location, frequency and duration of monitoring:</td>
<td>Dockets compiled and compared with limit weekly for the duration of the filling project.</td>
</tr>
<tr>
<td>Record keeping:</td>
<td>All original delivery dockets to be kept for future auditing if required.</td>
</tr>
<tr>
<td>Response mechanism:</td>
<td>If truck numbers exceed 35 trucks per day, the reason for the non-conformance investigated and where relevant procedures updated to prevent further breaches.</td>
</tr>
<tr>
<td>Complaint management:</td>
<td>A public complaints line would be available. If a complaint is received in relation to truck volumes an investigation would be undertaken to ascertain truck volumes against KPIs.</td>
</tr>
</tbody>
</table>

**Issue description**

The environmental impacts associated with off road diesel equipment can be a major source of fine particles. The EPA recommends the environmental impacts associated with heavy vehicles including off-road diesel equipment and plant used in the construction of the project be assessed. This should include but not be limited to:

- Compliance with relevant and current emission standards as prescribed in Australian Design Rules (ADR) for heavy duty engines and vehicles.
- Strategies for minimising air emissions from off road diesel equipment including but not limited to grades, bulldozers, loaders, etc.
- Confirmation that all off-road diesel equipment would meet best available diesel emissions standards or be fitted with appropriate diesel exhaust treatment devices where possible.

**Response**

Off-road diesel emissions from sources such as excavators, front end loaders and haul trucks have been included in the dispersion modelling as discussed in Appendix E of the Technical working paper: air quality (Appendix E of the EIS). Emissions were calculated from emission factors provided in NPI Emission Estimation Technique Manual for Combustion Engines, Version 3.0 (DEWHA, 2008).
It is expected that the emissions modelled are higher than the relevant ADR (due to the age of data used to compile the NPI emission factors) and as a result the predicted ground level concentrations of pollutants from off-road diesel emissions are likely to be lower than those predicted in the Technical working paper: air quality.

Despite this expectation, an analysis of the ADR values would be undertaken during the development of the Air Quality Management Plan and the lower of the ADR or the modelled emissions rates would be used as emissions standards for the project equipment. Using this methodology, the emissions would be the same or lower than what has been modelled and presented in the EIS.

Strategies for minimising emissions from off-road vehicles would be outlined in the Air Quality Management Plan for the project. In addition, the contractor is committed to using off-road diesel equipment that is well maintained and offers best available emissions standards from the national plant hire companies currently in use by the contractor on the NorthConnex Project.

**Issue description**

Mitigation and management measure AQ16 states: *Haul trucks and plant equipment would be switched off when not used for periods of greater than 15 minutes. Vehicle engines would be turned off while parking on site.*

Unnecessary idling of engines should be further reduced. Diesel plant engines should be turned off when not in active use and truck engines should be turned off during period of inactivity and while waiting to load or unload material for three minutes or more.

**Response**

The commitment to switching off haul trucks and plant equipment when not used for periods of greater than 15 minutes is consistent with the approval for the NorthConnex project. This would ensure consistency of operations with trucking contractors between the NorthConnex and Hornsby Quarry Road Construction Spoil Management projects including the maintenance of a similar set of on-site requirements. Unnecessary use and idling of plant and truck engines would be minimised wherever possible.

5.1.1.2 Noise and vibration

**Issue description**

The Technical working paper: air quality lists mitigation measures to be implemented to reduce and manage truck noise impacts. The EPA supports these proposed mitigation measures.

It is recommended that appropriate measures be incorporated where possible into a driver Code of Conduct and that consideration be given to the possibility of including clauses in drivers’ contracts that require them to abide by the reasonable direction of Roads and Maritime in relation to minimising noise impacts (such as not using exhaust braking or engine compression braking on Bridge Road).

**Response**

Engine (compression) braking would not be utilised by any haulage trucks associated with the project. Induction and training would be provided to relevant staff and sub-contractors, including haulage vehicle drivers, outlining their responsibilities with regard to noise and vibration. As part of the training and induction, haulage vehicle drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours and required practices relating to minimising noise impacts (e.g. no compression braking, no extended periods of engine idling, etc.). Appropriate documentation, such as a Code of Conduct or similar, for haulage vehicle drivers outlining these responsibilities would be prepared.

**Issue description**

For activities other than truck haulage, predicted noise levels are above the nominated Noise Management Levels, so all feasible and reasonable noise mitigation measures should be implemented for activities other than truck haulage. The EPA prefers that mitigation measures should be confirmed in a Construction Noise and Vibration Management Plan (CNVMP) as a minimum.

The EPA supports the project provided that all reasonable and feasible noise mitigation measures are implemented where noise levels would exceed relevant triggers in the Interim Construction Noise Guidelines and the Road Noise Policy.
Response

Noise impacts associated with the project have been assessed in Section 6.2 and Appendix D of the EIS. Environmental management measures relating to noise and vibration are provided in Section 6.24 of the EIS and would be included in the CNVMP.

Additional feasible and reasonable noise management and mitigation measures consistent with the Interim Construction Noise Guideline (DECC 2009) would be considered during detailed design to minimise impacts at affected receivers. Detailed consideration of feasible and reasonable noise management and mitigation measures would include consideration of the nature and timing of impacts and the sensitivity of individual receivers to noise impacts. Additional noise management and mitigation measures identified to be feasible and reasonable would be included in the CNVMP.

In addition, environmental management measure NV19 demonstrates Roads and Maritime’s commitment to implementing a noise monitoring program to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities. The results of the monitoring would be reviewed to determine if additional mitigation measures are required. All measurements would be undertaken in accordance with applicable standards and guidelines for noise monitoring. The noise monitoring program would be detailed in the CNVMP.

Issue description

Community concerns may arise from noise impacts associated with the early arrival and idling of construction vehicles at the site and in surrounding areas. The EPA recommends that construction vehicles not arrive at the site or in surrounding areas outside approved construction hours.

Response

A new management measure (TT09) has been developed and adopted to reflect the commitment (on page 48 of the EIS) that haulage trucks would be managed to arrive at the Hornsby Quarry site no earlier than the commencement of spoil emplacement activities (being 7 am on weekdays and 8 am on Saturdays). The new management measure also reflects that trucks would not, under normal operating conditions, be permitted to queue outside of the Hornsby Quarry site outside of these hours.

5.1.1.3 Water quality

Issue description

The EPA recommends that erosion and sediment control measures be developed and managed in accordance with Managing Urban Stormwater Soils and Construction, 4th Edition published by Landcom (the ‘Blue Book’).

Response

Section 6.4.4 of the EIS sets out the environmental management measures relating to surface water and includes environmental management measure SW3, which states: Erosion and sediment controls, including sedimentation basins, would be designed, installed and managed in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004).

5.1.2 NSW Health

5.1.2.1 Noise and vibration

Issue description

NSW Health made a number of recommendations relating to noise mitigation, including:

- Further noise mitigation measures and improved operating practices are required to address noise impacts, particularly at the Hornsby TAFE.
- Ongoing monitoring at noise affected properties that identifies and addresses adverse noise impacts and allows the effectiveness of additional mitigation measures to be evaluated.
- The noise management plan should include protocols relating to modification or cessation of operations causing adverse noise impacts.
NSW Health also suggested that the noise and vibration assessment use the maximum predicted noise levels (L_Amax) at affected properties instead of noise levels presented as a 15 minute equivalent (L_Aeq(15 minute)), as presented in the assessment.

**Response**

A noise and vibration impact assessment was carried out for the project and is provided in Section 6.2 and Appendix D of the EIS. The noise and vibration impact assessment has been prepared in accordance with the Interim Construction Noise Guideline (ICNG) (DECC, 2009).

The Interim Construction Noise Guideline specifies noise management levels against which the impacts of construction activities are to be assessed. These noise management levels are expressed using the L_Aeq(15 minute) metric, which represents the equivalent continuous noise level of all noise energy received at a particular point over a 15 minute period. The noise impact assessment for the project has applied the L_Aeq(15 minute) metric to conform to the requirements of the Interim Construction Noise Guideline. For each noise catchment area assessed in the EIS, the maximum L_Aeq(15 minute) noise level (being the highest L_Aeq(15 minute) value identified in each catchment area) has also been provided.

The noise impact assessment for the project demonstrates that at the Hornsby TAFE, the project would result in:

- Noise within the most affected buildings of the TAFE of 54 dB(A) during the initial site establishment phase, which is 9 dB(A) above the applicable noise management level.
- Noise within the most affected buildings of the TAFE of around 46-47 dB(A) during the remainder of the project (conveyor construction and haulage, and spoil haulage and emplacement), which is 1-2 dB(A) above the applicable noise management level.

Noise impacts of around 46-47 dB(A) during most of the project works are not anticipated to adversely affect the normal operations of the Hornsby TAFE, although peak noise impacts of up to 54 dB(A) during site establishment may be slightly disruptive in some circumstances. Hornsby TAFE would be consulted during planning for site establishment works, to identify opportunities that may exist to schedule noise intensive works and apply feasible and reasonable noise mitigation and management measures to minimise noise impacts during the relatively short site establishment phase of the project.

The assessment of road traffic noise generated by heavy vehicles on Bridge Road identifies that road traffic noise levels may increase by up to 10 dB(A) during the lowest background traffic hour of the day. During the peak traffic hour, traffic noise levels are anticipated to increase by around 7 dB(A). The increases in traffic noise would be relative to existing road traffic noise, which has been monitored at noise monitoring location NL02 as being 53 dB(A) (L_Aeq(1 hour)) during the day time. These traffic noise levels are external noise predictions (at the building façade) and it is likely that some noise attenuation would be achieved by the building, resulting in lower internal traffic noise effects. At these predicted noise levels, traffic noise would be audible but is unlikely to disrupt communications within classrooms of the Hornsby TAFE.

Roads and Maritime has commenced consultation with the Hornsby TAFE in relation to potential measures that could be applied to further minimise impacts on the campus, particularly as a result of heavy vehicle traffic associated with the project. This consultation has included initial inspection of key affected areas within the TAFE site to identify opportunities for noise and dust mitigation and attenuation measures. Roads and Maritime is committed to ongoing consultation with the Hornsby TAFE to identify and implement feasible and reasonable measures to minimise project impacts on campus activities. Consultation between the parties would continue to establish feasible and reasonable outcomes, prior to the commencement of works on the quarry site.

In addition, environmental management measure NV19 demonstrates Roads and Maritime’s commitment to implementing a noise monitoring program to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities at the commencement of activities and periodically during the project. The results of the monitoring would be reviewed to determine if additional mitigation measures are required at the time. All measurements would be undertaken in accordance appropriate standards and guidelines for noise monitoring. The noise monitoring program would be detailed in the Construction Noise and Vibration Management Plan.
5.1.2.2 Air quality monitoring

**Issue description**

NSW Health suggests expansion of the monitoring program to include measurement of total suspended particles (TSP) and particulate matter (PM) at the site boundary should be incorporated into the dust management plan for the project.

**Response**

Section 7.1 and Appendix E of the EIS present the air quality impact assessment of the project, including dust generation from spoil handling activities on the quarry site. The assessment demonstrates that maximum predicted dust impacts from the project would be:

- An annual average total suspended particulate (TSP) concentration of 18.4 µg/m³ which is around 20 per cent of the applicable criterion (90 µg/m³).
- A 24 hour average PM₁₀ concentration of 22.1 µg/m³ which is around 44 per cent of the applicable criterion (50 µg/m³).
- An annual average PM₁₀ concentration of 2.4 µg/m³ which is around eight per cent of the applicable criterion (30 µg/m³).
- A 24 hour average PM₂.₅ concentration of 9.9 µg/m³ which is around 40 per cent of the relevant advisory reporting standard (25 µg/m³).
- An annual average PM₂.₅ concentration of 1.4 µg/m³ which is around 18 per cent of the applicable criterion (8 µg/m³).

At these predicted maximum particulate matter concentrations (project only contributions) and noting that predicted exceedances of applicable air quality criteria and advisory reporting standards are the result of elevated background dust concentrations, an expanded dust monitoring program including site boundary monitoring is not warranted.

A Dust Management Plan would be developed and implemented for the project, which would include a reactive management strategy based on visual observation of dust levels on the site, details of site activities and significant dust sources, and weather predictions. The full scope of the proposed Dust Management Plan is provided as management and mitigation measure AQ1 (refer to Chapter 8 of the EIS).

5.1.2.3 Health risks

**Issue description**

NSW Health recommends an annual risk figure for particulate matter exposure, without an adjustment factor for mortality risk (>30 years), be calculated and interpreted in the assessment.

**Response**

The assessment of risks for chronic health effects associated with exposure to PM₂.₅ included an exposure duration adjustment factor to account for the short duration of the project when compared with an average human lifetime. Assuming an average lifetime of 82 years, the adjustment factor relevant to a 33 month exposure (2.75 years) out of 52 years (>30 years of age) was 0.053.

If this factor is removed, the calculated annual chronic risk of mortality (>30 years) would increase. The revised annual risks calculated for this endpoint are presented in Table 5.2.
### Table 5.2 Incremental annual risks – chronic exposure to PM$_{2.5}$ (with and without adjustment factor)

<table>
<thead>
<tr>
<th>Health endpoint</th>
<th>Effect duration</th>
<th>Age group</th>
<th>PM fraction assessed</th>
<th>Risks for scenario 2 – best practice mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum impacts (TAFE)</td>
</tr>
<tr>
<td>Mortality – all causes</td>
<td>Long-term</td>
<td>≥30 years</td>
<td>PM$_{2.5}$</td>
<td>5x10^-6</td>
</tr>
</tbody>
</table>

The project would operate for less than three years and therefore the change in air quality and human health risks are not long-term impacts. For this reason, the use of the exposure duration adjustment factor is considered valid. While the calculated annual risk is higher than presented in the EIS where the exposure duration adjustment factor is removed, the calculated risks do not exceed 1 x 10^-4 and therefore remain tolerable.

Where risks are determined to be tolerable, it is expected that mitigation measures would be implemented to minimise exposures associated with the project. For this project, air quality impacts and subsequent health risks are proposed to be minimised through the implementation of best industry practice dust management and mitigation measures (refer to Section 7.1.6 of the EIS). Implementation of these measures would result in lower levels of exposure and risk at all receptors in the surrounding community.

### 5.1.3 Office of Environment and Heritage

The Office of Environment and Heritage did not raise any issues with respect to Aboriginal heritage, biodiversity and flood risk management.

### 5.1.4 Office of Environment and Heritage – Heritage Council

**Issue description**

The Heritage Council supports the recommended management and mitigation measures detailed in the Technical working paper: non-Aboriginal heritage. It recommends that the following condition of approval be applied to the project if approval is granted:

*The Applicant must ensure that if substantial intact archaeological deposits and/or State significant relics are discovered, work must cease in the affected area(s) and the Heritage Council of NSW must be notified. Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.*

**Response**

A management measure (NAH4) relating to the discovery of archaeological deposits and/or relics during works was included in the EIS. This measure has been further updated in response to the Heritage Council’s submission (changes are shown in bold and underline below):

*In the event of an unexpected cultural heritage find, the Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime, 2015) would be followed. This would include notification to the NSW Heritage Branch and, depending on the nature of the discovery, may require further assessment. The process for managing and assessing unexpected cultural heritage finds would also be documented in the project HMP.*
5.1.5 Department of Primary Industries – NSW Office of Water

5.1.5.1 Spoil management

Issue description
The NSW Office of Water requests clarification of sources of fill and the ultimate future of filling of the Hornsby Quarry, because the EIS for the Northern Beaches Hospital Road Connectivity and Network Enhancement Stage 2 Project (SSI-6622) also identifies the Hornsby Quarry as a potential destination for spoil.

Response
The Hornsby Quarry Road Construction Spoil Management project, if approved, would only accept spoil from tunnelling and associated excavation sites forming part of the approved NorthConnex project.

5.1.5.2 Rehabilitation and final landform

Issue description
The NSW Office of Water requests clarification as to whether Council intends to continue to fill the void after the Hornsby Quarry Road Construction Spoil Management project is completed or if RL 64 metres would be the final fill level.

Response
The Hornsby Quarry Road Construction Spoil Management project would fill the quarry void to around RL 64 metres. There is no intention as part of the Hornsby Quarry Road Construction Spoil Management project to fill the void beyond this level.

5.1.5.3 Groundwater

Issue description
The EIS identifies two types of potential groundwater impacts, both relating to changes in quality and quantity of groundwater:

- During spoil emplacement activities.
- Post emplacement.

Further hydrogeological characterisation is recommended, particularly as there may be additional impacts on groundwater levels and flows in response to the filling beyond those that have been identified in the EIS (both positive and negative). The likely rise in the groundwater table has been inferred but not properly quantified. This may have impacts in developing new flow exit points (springs or seeps) in the quarry surrounds, and also the quarry walls. The latter may have stability implications, and the former has potential implications for re-establishment of spring-fed surface flows which may also allow for the re-emergence of groundwater dependent ecosystems (GDEs).

Response
The EIS presents a detailed assessment of the potential key impacts of the project on groundwater, and has satisfied the Secretary’s environmental assessment requirements (SEARs) that were issued for project. The information presented in the EIS includes sufficient detail for an informed view to be developed on the potential groundwater impacts of the project, including the development of appropriate mitigation and management measures to address potential adverse effects.

The EIS demonstrates that there would be an initial period of increased groundwater drawdown around the site, as a result of dewatering the quarry void. This drawdown would be temporary in nature, and is within the scope of potential impacts authorised under the current groundwater licence held by Hornsby Shire Council for quarry void water management. The EIS also demonstrates that filling the quarry void would have a longer term beneficial impact on groundwater levels and would result in an improvement in groundwater levels towards pre-quarrying conditions. This improvement in groundwater levels has been sufficiently estimated and assessed to develop an informed view on the likely environmental outcomes of the project.
The movement of groundwater through existing fractures within the volcanic breccia or Hawkesbury Sandstone is unlikely to cause instability in the quarry wall due to the competent nature of the rock.

In addition the infilling of the quarry with spoil would reduce stresses in the quarry wall which would assist in maintaining the stability of the quarry walls. Hornsby Shire Council currently monitors stability within the Hornsby Quarry and surrounding land, and this monitoring would continue during implementation of the project. Additional measures to maintain the integrity and stability of the quarry void would be identified and implemented, if ongoing monitoring identifies that the project is having an adverse effect on stability.

It is recognised that restoring the environment to pre-quarry conditions could reactivate springs or seeps, and contribute to the re-establishment of groundwater dependent ecosystems. The re-establishment of groundwater dependent ecosystems would depend on several factors in addition to changes in groundwater level, and it is not possible to conclusively determine whether groundwater dependent ecosystems would in fact reappear. Notwithstanding, if groundwater dependent ecosystems are re-established, this would be an additional positive impact generated by the project.

**Issue description**

The hydrogeological setting of the quarry and its immediate context could be better characterised, to assist the future management of the site and associated groundwater impacts. Key improvements primarily relate to the understanding of groundwater levels and flow directions. Groundwater level data has relied on a limited hydrograph from one bore (BHHQ1) to March 2010. There are no recent data including levels in the quarry. Groundwater (in-rock) does not appear to have been assessed for baseline hydrogeochemistry.

In the first instance this should be aided by the installation of a minimum of three additional monitoring bores to measure groundwater levels on a continuous basis. Groundwater analysis related to rainfall recharge and a geological cross-section which presents the groundwater situation at present or in the future, would greatly assist understanding the temporal change in groundwater conditions.

**Response**

The EIS presents a detailed assessment of the potential key impacts of the project on groundwater, and has satisfied the Secretary’s environmental assessment requirements (SEARs) that were issued for project. Relevant impacts that may be generated by the project have been assessed, including filling the quarry void to around RL 64 metres and stabilising the site prior to returning management responsibility to Hornsby Shire Council. Future management of the site, beyond handing it back to Council in a stable form, is beyond the scope of the project.

As reported in the EIS and the Technical working paper: groundwater (Appendix M of the EIS), Council currently maintains water levels within the quarry void at no greater than RL 40 metres.

The project is not anticipated to affect hydrogeochemistry (in-rock), and on this basis, no hydrogeochemical monitoring has been carried out or relied on for the assessment presented in the EIS. Details of groundwater quality monitoring data relevant to the assessment of the project is provided in Section 6.4 of the EIS.

The monitoring of groundwater levels beneath and around the site is currently conducted in accordance with condition 8 of the groundwater dewatering licence held by Hornsby Shire Council (10BL602842). Additional monitoring of groundwater levels is unlikely to change the outcomes of the groundwater impact assessment presented in the EIS, which include:

- An initial temporary period of increased groundwater drawdown around the site, as a result of dewatering the quarry void consistent with the existing groundwater dewatering licence.
- A longer term beneficial impact on groundwater levels with an improvement in groundwater levels towards pre-quarrying conditions.

**Issue description**

Groundwater inflow has been determined from a simple analytical model. There appears to be no consideration of recharge in this model – and thus its effect on the groundwater table. There is also no consideration of variable hydraulic conductivity in the surrounding bedrock. The approach is a very rough first approximation but should be improved for better technical control of operational and completion aspects of this project. In particular, appropriate three dimensional consideration of the differing geology and hydrogeological characteristics would assist inflow calculations.
Response

The groundwater inflow calculations described in the EIS were approximate to estimate the flow of groundwater to be extracted from the quarry during the infilling program and to confirm the dewatering licence allocation under the existing permit was adequate. It is acknowledged that the hydraulic conductivity of the quarry at various depths is variable depending on the differences in the geology intersected. The value for bulk hydraulic conductivity applied to the quarry walls was high, which would have overestimated the groundwater inflow, thus the calculation was considered conservative. Dewatering volumes would be monitored during the infilling program, and would be used to validate the groundwater inflow calculations.

Issue description

Further discussion of ongoing dewatering management after project completion is requested since ongoing dewatering would be required.

Response

Groundwater dewatering is currently regulated by a licence held by Hornsby Shire Council. Future dewatering after completion of the project would continue to be managed in accordance with that licence. Any proposed changes to the approach to groundwater dewatering or management would be subject to formal amendment of the licence, if required.

Future management of the site, following completion of filling activities and stabilisation of the site, and after its return to Hornsby Shire Council, is beyond the scope of this project.

5.1.5.4 Downstream environment and Old Mans Creek

Issue description

Further clarification of the quality of water from dewatering and whether discharge of the water is likely to affect the downstream aquatic environment is required. Appendix G of the EIS indicates potential impacts to downstream environments were not assessed because the discharge of water from the quarry void during dewatering would be undertaken in accordance with the existing dewatering licence. The project differs to the existing conditions in that spoil emplacement into the void has the potential to affect the water quality that is discharged (for example turbidity of the water in the void would need to be managed prior to discharge).

Response

Surface water impacts of the project have been assessed in Section 6.4 of the EIS.

The water quality of the quarry void has been monitored over time by Hornsby Shire Council. Monthly measurements of discharge water quality from the quarry void have been collected by Hornsby Shire Council upstream from Old Mans Creek (at the flow monitoring tank at the quarry site, monitoring point 085) from the period 19 January 2010 to 11 September 2014 and the results are summarised in Table 6-44 of the EIS. Comparison of this water quality data to the catchment specific Regional Environmental Health Values (REHV) adopted by Council (refer to Table 6-44 of the EIS) for monitoring water quality within the Berowra sub catchment, which covers the project site, indicates that the water quality of the Hornby Quarry void is of generally good quality.

Analysis of quarry discharge water quality data collected by Council indicates mean values in compliance with Council’s REHV values for dissolved oxygen saturation, suspended solids, nutrient levels (nitrogen and phosphorous) and faecal coliform levels. The monitoring data also indicates water temperatures between 12 and 27 degrees Celsius. These results indicate that the void water is of good quality, with low stratification of water temperature and oxygen levels across water depth, and low nutrient enrichment levels. This analysis is supported by water quality testing of the void undertaken by PB in 2004, which also concluded low stratification of the void and good water quality that was potentially suitable for a range of uses including disposal into freshwater ecosystems, long term irrigation of all but the most sensitive crops, and recreational purposes (PB, 2004). On this basis it is considered unlikely that discharge from the quarry void would lead to adverse impacts to the water quality or aquatic ecosystems of Old Mans Creek or downstream waterways.

It is also noted that the water quality of Waitara Creek and Calna Creek downstream of Old Mans Creek is primarily controlled by the discharge of tertiary treated wastewater from the West Hornsby and Hornsby Heights Waste Water Treatment Plants (WWTPs) respectively. In this context, discharge from the quarry void would have limited influence on water quality of these downstream creeks.
Once the initial dewatering of the quarry void is complete, ongoing dewatering would be conducted during the spoil emplacement activities. There is potential for sediment to be mobilised in the void water at this stage of the project. The turbidity of the water would be managed prior to discharge using techniques such as compartmentalising of the pumping area (e.g. using on site sediment basins and silt curtains), treatment of the water (e.g. using flocculants) and testing to determine compliance with licence limits prior to discharge. Sediment laden water would also be used on site for dust suppression, in preference to discharge as far as possible. With the implementation of these measures discharge form the quarry would be controlled so as not to result in adverse water quality impacts to downstream waterways.

**Issue description**

Further information on whether Old Mans Creek west of the quarry void has been affected by the quarry dewatering to date is required. It is recommended that details be provided on any existing impacts along Old Mans Creek west of the quarry void which have been caused by the existing maximum discharge rate of 33 litres per second, and any relevant mitigation or management measures proposed.

**Response**

Impacts that may have been caused or contribute to by existing groundwater dewatering and discharge in accordance with the licence held by Hornsby Shire Council are beyond the scope of this project. The project would not result in discharge/flow impacts to Old Mans Creek beyond what is already approved and allowed by the existing groundwater licence.

5.1.6 Fire and Rescue NSW

**Issue description**

It is requested that Hornsby Fire Station be given 24 hour traffic light signal access override (via a switch installed inside the fire station) or, if this is not possible, consideration should be given to traffic controllers operating outside Hornsby Fire Station for the duration of the project.

**Response**

A Special Fire Station Traffic Signal Phase switch was installed within Hornsby Fire Station as part of the installation of the traffic signals. The emergency signal control enables Fire and Rescue to override the signals to the Pacific Highway (D-Phase) in an emergency. As such, in the event that traffic is queued across the driveway of the fire station, Fire and Rescue can use the phase switch and exit the Fire Station in a timely manner.

Further traffic control measures at the Hornsby Fire Station during the project are not required. Roads and Maritime would continue to consult with Fire and Rescue NSW as the project proceeds.

5.2 Local councils

5.2.1 Hornsby Shire Council

5.2.1.1 Noise

**Issue description**

The EIS proposes that 770 heavy vehicle movements per day would be required to transport spoil to the quarry and return with Bridge Road as the access point. This would cause noise impacts on an area which is a relatively quiet residential street and effective noise minimisation measures would be required.

Council recommends that further detailed assessment of noise be undertaken by a suitably qualified acoustic consultant, with further mitigation measures proposed to address noise impacts caused by the development and associated truck movements. Part of this assessment should involve community consultation.

**Response**

A noise assessment was carried out for the project and is provided in Section 6.2 and Appendix D of the EIS. The EIS has been publicly exhibited with additional community consultation activities conducted, as outlined in Chapter 2.

The assessment of road traffic noise generated by heavy vehicles on Bridge Road identified that road traffic noise levels may increase by up to 10 dB(A) during the lowest background traffic hour of the day. During the peak traffic hour, traffic noise levels are anticipated to increase by around 7 dB(A).
The increases in traffic noise would be relative to existing road traffic noise, which has been monitored at noise monitoring location NL02 as being 53 dB(A) ($L_{Aeq(1\text{ hour})}$) during the day time and 49 dB(A) during the night time. These traffic noise levels are external noise predictions (at the building façade) and it is likely that some noise attenuation would be achieved by the building, resulting in lower internal traffic noise effects.

There are few feasible and reasonable mitigation measures available to manage temporary construction traffic noise, noting that:

- Measures such as quieter road pavements and at-property acoustic treatments are generally not reasonable for temporary impacts.
- Measures such as extensive use of noise barriers are generally not reasonable along local roads because of undesirable impacts on property access, visual amenity and additional land take (including potential impacts on the environmental values of that additional land).

As detailed in the EIS, particular attention has been paid to identifying an appropriate balance between minimising elevated amenity impacts for residents along Bridge Road and undertaking the project in a timely manner. This balance has resulted in a commitment to not exceed 35 heavy vehicles per hour on Bridge Road, and recognition that:

- Traffic volumes above this would generate unacceptable amenity impacts for local residents.
- Traffic volumes below this would extend the construction period and associated impacts, leading to longer periods of impacts on affected receivers.

Section 5.1.5 of the Technical working paper: noise and vibration lists mitigation measures to be implemented to reduce and manage truck noise impacts. Induction and training would be provided to relevant staff and sub-contractors, including haulage vehicle drivers, outlining their responsibilities with regard to noise and vibration. As part of the training and induction, haulage vehicle drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours and required practices relating to minimising noise impacts (e.g. no compression braking, no extended periods of engine idling, etc). Appropriate documentation, such as a Code of Conduct or similar, for haulage vehicles drivers outlining these responsibilities would be prepared.

In addition, environmental management measure NV19 demonstrates Roads and Maritime's commitment to implementing a noise monitoring program to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities at the commencement of activities and periodically during the project. The results of the monitoring would be reviewed to determine if additional feasible and reasonable mitigation measures are required at the time. All measurements would be undertaken in accordance appropriate standards and guidelines for noise monitoring. The noise monitoring program would be detailed in the Construction Noise and Vibration Management Plan.

Should the project be approved, the community would continue to be consulted in accordance with the Community Communication Strategy for the project. Consultation with the community would include ongoing consultation with any sensitive receivers identified via the noise monitoring program as requiring additional mitigation.

5.2.1.2 Water quality

*Issue description*

Council raised issues relating to appropriate management of water discharge, including:

- Commitment SW9 should be amended to include reference to ANZECC 2000 Water Quality Guidelines and Hornsby Shire Council's derived guidelines (REHV's).
- Measures to mitigate and prevent turbid water discharge to Old Mans Creek should be detailed in a Water Management Plan and provided to Hornsby Shire Council for approval prior to commencement of works.
- Contingencies and responsibilities should be identified in the Water Quality Management Plan to manage water volumes, should greater volumes be encountered and alterations to the existing groundwater dewatering licence conditions be required.
- Hornsby Shire Council requests that the Soil and Water Management Plan be provided to Council for review prior to commencement of construction activities.
Response

The ANZECC Guidelines recommend using trigger values developed on a local or regional scale in preference to using the ‘default’ values within the guidelines. Hornsby Shire Council has developed a set of Regional Environmental Health Values (REHV), which in cases are more stringent than the ANZECC guidelines, and in other cases are less stringent. However, these values are considered to be more appropriate than the ANZECC ‘default’ values as they have been determined in the context of the existing ecosystem condition, and provide a realistic baseline to monitor water quality impacts downstream. Council’s REHVs would continue to be adopted for the project.

Dewatering of the quarry void is currently undertaken by Hornsby Shire Council and water is discharged to Old Mans Creek in accordance with the water quality limits in the Hornsby Shire Council’s groundwater dewatering licence. Dewatering of the void would continue to be undertaken in accordance with the licence held by Council. The turbidity of the water would be managed prior to discharge using techniques such as compartmentalising of the pumping area (e.g. using on site sediment basins and silt curtains), treatment of the water (e.g. using flocculants) and testing to determine compliance with licence limits prior to discharge. On site use for dust suppression would be implemented in preference to discharge as far as possible. Testing of the discharge water would be undertaken during the project to monitor compliance with the licence conditions.

A Construction Environmental Management Plan (CEMP) would be prepared for the project and would include a Construction Soil and Water Management Plan (CSWMP), which would outline the mitigation measures and controls to manage surface water and groundwater impacts of the project. A copy of the CSWMP would be provided to Hornsby Shire Council for consideration and comment.

The CSWMP would also outline responsibilities for implementing each environmental management measure relevant to soil and water management, including discharge rates, volumes and water quality of discharged water.

5.2.1.3 Haulage traffic

Issue description

Council has made a number of recommendations to improve intersections and road safety, and reduce heavy vehicle volumes through the Hornsby Town Centre. These include:

- Extend the right turn bay on Pacific Highway (south approach) into Yirra Road.
- Further optimisation of main road signal timings without incurring significant increases in delays in inside streets.
- Remove kerbside parking on Bridge Road west of Peats Ferry Road during duration of the project.
- Provide peak period clearway parking restrictions on Peats Ferry Road in vicinity of Bridge Road.
- Temporary closure of Roper Lane and signalisation of Peats Ferry Road and Watson Avenue.
- All equipment at the works site be contained wholly within the site.
- Undertake adequate notification and consultation if the proposed haulage routes are changed.

Response

In response to submissions and through further development and assessment of the haulage routes since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and Haulage Management Sub Plan (HMSP) approval stage. Further details of this change are provided in Section 7.2 and shown in Figure 7.1.

Optimisation response

To maintain public safety and to facilitate safe two-way passage of haulage vehicles on Bridge Road, parking restrictions are likely to be needed west of Pacific Highway/Peats Ferry Road. The total number of potential car parking spaces impacted between the Peats Ferry Road/Bridge Road intersection and the TAFE entrance would be approximately 30 spaces (assuming both sides of Bridge Road have parking restrictions).
Other arrangements such as peak hour clearways would be investigated as the design progresses and would, should they be required, be documented in the Traffic Management Plan (TMP) for the project.

Roper Lane would be closed at the intersection of Bridge Road to maintain public safety and to minimise interaction of project haulage vehicles with local traffic. The closure would require residents from Roper Lane (and connected streets such as Fern Tree Close, Summers Avenue and Silvia Street) to use alternative roads to access the Pacific Highway/Peats Ferry Road rather than the signalised Bridge Road/Peats Ferry Road intersection. Alternative access to the Pacific Highway/Peats Ferry Road is available via Summers Avenue and Watson Avenue which provides for all movements, and signalised access is available via Galston Road. Notwithstanding, it is acknowledged that these alternative access routes are already constrained during peak hours at un-signalised intersections and impact on traffic conditions for local commuters. As such, the installation of additional signalised access at Watson Avenue/Peats Ferry Road to provide alternative safe access to Peats Ferry Road is being investigated in consultation with Hornsby Shire Council and the Transport Management Centre. Further details regarding the provision of signalised access at Watson Avenue are provided in Section 3.1 of this report.

In response to submissions, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, road modifications are under investigation to assist in optimising traffic performance and road safety along this route, including consideration of lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road. The road modification works would not be required if investigations currently underway determine that northbound haulage vehicles would access the Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of the proposed use of the Windybanks Interchange refer to Section 7.3).

All equipment for the project would be stored in designated locations within the Old Mans Valley works area. During the upgrade works on Bridge Road, some heavy equipment may be required to be parked on Bridge Road overnight, however appropriate signage and traffic management measures would be implemented to ensure public safety and safe passage of vehicles using Bridge Road. The community would continue to be consulted throughout the project. Should haulage routes change, appropriate notification and consultation would be undertaken, including for example updated community newsletters and letter box drops, in accordance with the Community Communication Strategy for the project.

5.2.1.4 Swept path of haulage vehicles

**Issue description**

Council requests that the adopted heavy vehicle haulage route, including all turns at junctions, complies with the swept path of truck and dog haulage vehicles prior to the approval of the project.

**Response**

Expected haulage routes to and from the Hornsby Quarry site have been derived in consultation with the NorthConnex construction contractor, Hornsby Shire Council and Roads and Maritime to minimise impacts on the community and road infrastructure.

However, in response to submissions and through further development and assessment of the haulage routes since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and Haulage Management Sub Plan (HMSP) approval stage. Further details of this change are provided in Chapter 7 and shown in Figure 7.1.

Section 6.1.4 of the EIS describes the results of a preliminary analysis of swept path of a truck and dog haulage vehicle along the northern outbound peak hours haulage route. The preliminary analysis found that the Pacific Highway to Yirra Road movement could be completed satisfactorily, however the corresponding right turn movement from Yirra Road to Belmont Parade indicated potential conflicts.

In response to submissions, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, the following road modifications are under investigation to assist in optimising traffic performance and road safety along this route:

- Optimisation of signal timings to provide a safe right turn movement from Pacific Highway onto Yirra Road.
• Lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road.
• New line marking in both directions on the Pacific Highway immediately south of the Pacific Highway and Yirra Road intersection, which could result in the loss of some on street parking along the Pacific Highway southbound.
• Widening of Belmont Parade to improve the right turn path from Yirra Road onto Belmont Parade.
• Improvements to the left turn path from Belmont Parade onto Ku-ring-gai Chase Road, including reconfiguration of the traffic island at this location.

The road modification works described above would not be required if investigations currently underway determine that northbound haulage vehicles would access the M1 Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of investigations into the use of the Windybanks Interchange refer to Section 7.3).

In addition, a TMP, which would include a HMSP to manage haulage vehicles traveling to and from the Hornsby Quarry site, would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network.

This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project.

5.2.1.5 Traffic management on local roads

Issue description

Council raised road safety concerns resulting from the use of local roads for spoil haulage, including concerns relating to removal of vehicles parked illegally in Bridge Road West, the safe management of pedestrian access along Bridge Road, and the closure of Roper Lane at Bridge Road and the corresponding recommendation that a signalised alternative to access Galston Road and Peats Ferry Road be provided.

In addition, Council suggests that bringing forward part closure of Railway Parade may assist in further ameliorating traffic impacts.

Response

Bridge Street parking restrictions and removal of illegally parked vehicles

Restrictions on kerbside parking between Peats Ferry Road and the Hornsby TAFE access on Bridge Road would be in place during Bridge Road upgrade works (approximately three months). Once the upgrade works are complete, parking would be restricted during standard work hours only, for the remaining duration of the project. Parking for site personnel would be provided within the quarry site. Non-adherence to parking restrictions would be expected to be policed appropriately by the relevant authorities for the duration of the project.

The TMP to be developed to manage traffic for the duration of the project would include driver protocols to ensure appropriate driver behaviour that adheres to all road rules and speed limits (e.g. school zones, clear ways etc.) along haulage routes including Bridge Road. Signage and other appropriate measures would be put in place to inform road users and pedestrians of changed conditions on Bridge Road and at the TAFE access.

Pedestrian access along Bridge Street

There is no formal footpath on either side of Bridge Road (from where Bridge Road turns south towards the TAFE) but it is acknowledged that pedestrians currently use the roadside verge or Bridge Road itself, primarily to access the TAFE campus. Pedestrian access on Bridge Road would be restricted during the project, for safety reasons. Signage would be provided to redirect pedestrians along an alternative route, including an alternative route to the TAFE entrance on Pacific Highway/Peats Ferry Road.

Closure of Roper Lane and alternative signalised access to Galston Road and Peats Ferry Road

Roper Lane would be closed at the intersection of Bridge Road to maintain public safety and minimise interaction of project haulage vehicles with local traffic. The closure would require residents from Roper Lane (and connected streets such as Fern Tree Close, Summers Avenue and Silvia Street) to use alternative roads to access the Pacific Highway/Peats Ferry Road rather than the signalised Bridge Road/Peats Ferry Road intersection.
Alternative access to the Pacific Highway/Peats Ferry Road is available via Summers Avenue and Watson Avenue which provides for all movements, and signalised access is available via Galston Road.

Notwithstanding, it is acknowledged that these alternative access routes are likely to be constrained during peak hours at un-signalised intersections and have the potential to impact on traffic conditions for local commuters.

As per Hornsby Shire Council’s submission, the design of a signalised intersection at Watson Avenue/Peats Ferry Road to provide alternate safe access to Peats Ferry Road is understood to be well advanced and consultation between Roads and Maritime, Hornsby Shire Council and the Transport Management Centre regarding the provision of alternative signalised access is ongoing. Further details regarding the provision of signalised access at Watson Avenue are provided in Section 3.1 of this report.

**Railway Parade closure**

The suggestion by Hornsby Shire Council that potential traffic impacts as a result of the project may be further ameliorated by the part closure of Railway Parade is noted. However, this would be a decision for Council and is outside the scope of the project.

5.2.1.6 Construction traffic management

**Issue description**

Council recommended that a detailed traffic management plan (TMP) be prepared as part of the Construction Environmental Management Plan, in consultation with Council. This TMP should include requirements and procedures to be used when construction activities would have a potential impact on existing traffic arrangements.

**Response**

A TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project. Council would be consulted during preparation of the TMP.

5.2.1.7 Aquatic biodiversity

**Issue description**

Council raised concern that there is insufficient aquatic biodiversity data for Old Mans Creek and the existing data may not be sufficient to monitor changes in water quality after the project commences. It recommended baseline aquatic biodiversity data be obtained as part of the Water Management Plan to monitor the biological condition of Old Mans Creek during infill operations to assess the adequacy of mitigation measures. Aquatic biodiversity should be regularly monitored and mitigation measures assessed for their effectiveness and reported annually.

**Response**

Surface water impacts of the project have been assessed in Section 6.4 of the EIS.

The water quality of the quarry void has been monitored over time by Hornsby Shire Council. Monthly measurements of discharge water quality from the quarry void have been collected by Hornsby Shire Council upstream from Old Mans Creek (at the flow monitoring tank at the quarry site, monitoring point 085) from the period 19 January 2010 to 11 September 2014 and the results are summarised in Table 6-44 of the EIS. Comparison of this water quality data to the catchment specific Regional Environmental Health Values (REHV) adopted by Council (refer to Table 6-44 of the EIS) for monitoring water quality within the Berowra sub catchment, which covers the project site, indicates that the water in the Hornsby quarry void is of generally good quality.

Analysis of quarry discharge water quality data collected by Council indicates mean values in compliance with Council’s REHVs for dissolved oxygen saturation, suspended solids, nutrient levels (nitrogen and phosphorous) and faecal coliform levels. The monitoring data also indicates water temperatures between 12 and 27 degrees Celsius. These results indicate that the void water is of good quality, with low stratification of water temperature and oxygen levels across water depth, and low nutrient enrichment levels.
This analysis is supported by water quality testing of the void undertaken in 2004, which also concluded low stratification of the void and good water quality that was potentially suitable for a range of uses including disposal into freshwater ecosystems, long term irrigation of all but the most sensitive crops, and recreational purposes (PB, 2004).

On this basis it is considered unlikely that discharge from the quarry void would lead to adverse impacts to the water quality or aquatic ecosystems of Old Mans Creek or downstream waterways in relation to the release of excessively cold or anoxic waters.

The water quality of Waitara Creek and Calna Creek downstream of Old Mans Creek is primarily controlled by the discharge of tertiary treated wastewater from the West Hornsby and Hornsby Heights Waste Water Treatment Plants (WWTPs) respectively. In this context, discharge from the quarry void would have limited influence on water quality of these downstream creeks.

Once the initial dewatering of the quarry void is complete, ongoing dewatering would be conducted during the spoil emplacement activities. There is potential for sediment to be mobilised in the void water at this stage of the project. The turbidity of the water would be managed prior to discharge using techniques such as compartmentalising of the pumping area (e.g. using on site sediment basins and silt curtains), treatment of the water (e.g. using flocculants) and testing to determine compliance with licence limits prior to discharge. Sediment laden water would also be used on site for dust suppression, in preference to discharge as far as possible.

With the implementation of these measures discharge from the quarry would be controlled so as not to result in adverse water quality or biodiversity impacts to downstream environments and therefore additional monitoring of aquatic diversity and water quality in Old Mans Creek is not proposed.

Management measures, such as visual monitoring of the creek condition at the outlet point, would be included in the CEMP. Should impacts be identified, further control measures (such as temporary localised attenuation) would be implemented to minimise the potential for damage to Old Mans Creek and its aquatic biodiversity.

5.2.1.8 Seed collection and seed bank topsoil translocation

Issue description

Council’s submission includes reference to opportunities for seed collection (prior to vegetation removal) and seed bank topsoil translocation (during vegetation removal) and recommends that a Soil Seed Bank, Topsoil Translocation and Seed Collection Plan be prepared as part of the proposed Flora and Fauna Management Plan and provided to Council approval prior to commencement of works.

Response

A Flora and Fauna Management Plan (FFMP) would be prepared to define management and mitigation measures. The FFMP would have regard to opportunities for seed collection taking into account that final landform rehabilitation and revegetation works would be undertaken by Hornsby Shire Council at a later date as part of the future redevelopment of the site. Future redevelopment of the site does not form part of this project. Council would be consulted during preparation of the FFMP.

5.2.1.9 Biodiversity offsets

Issue description

The site is on the margin of two IBRA subregions (Cumberland and Pittwater) and that this may result in the outcomes of the Framework for Biodiversity Assessment methodology not being in accord with local knowledge.

Response

The NSW Framework for Biodiversity Assessment has been applied to the project to assess impacts on biodiversity and to determine biodiversity offsets required for any unavoidable impacts, as required by the SEARs for the project.

Section 7.3.10 of the EIS identifies the need for the project to provide biodiversity offsets. It also provides a preliminary offset calculation, consistent with the assessment of the project as a ‘Major Project’ under the NSW Framework for Biodiversity Assessment.
Measures to offset the loss of native vegetation, including the loss of endangered ecological communities, which cannot be avoided or mitigated, would be detailed in a Biodiversity Offset Package to be prepared for the project. The offset strategy would be consistent with the offset strategy prepared for the NorthConnex project.

Roads and Maritime would consult with Office of Environment and Heritage to ensure that its scope and the subsequent Biodiversity Offsets Package are appropriate and account for local conditions.

5.2.1.10 Biodiversity management and mitigation measures

**Issue description**

Council recommends that the FFMP include avoidance and mitigation measures identified in Table 7-27 of the EIS, specifically the provision of nest boxes, pathogen management, weed management and re-establishment of native vegetation. In addition, Council recommends that:

- An appointed project ecologist/environmental officer be present during commencement of on-ground works.
- Council be provided the opportunity to approve the FFMP.
- Soil seed bank topsoil translocation and seed collection be considered as a ‘standard’ mitigation measure prior to commencement and during works
- Collected seed be donated to Council’s community native nursery at Pennant Hills.

Council also suggests that seed collection timing be considered as soon as possible.

**Response**

In accordance with the environmental management measures identified in Section 7.3.12 of the EIS, a Flora and Fauna Management Plan (FFMP) would be prepared for the works to identify potential impacts and to define management and mitigation measures.

The table of management and mitigation measures in Section 7.3.12 of the EIS includes management and mitigation measures relating to nest boxes, pathogen management, weed management and reestablishment of native vegetation and these would be carried forward into the Flora and Fauna Management Plan. Implementation of the management and mitigation measures to be described in the FFMP would be the responsibility of an appropriately qualified person(s) to be appointed in accordance with the CEMP. Hornsby Shire Council would be consulted during preparation of the FFMP.

5.2.1.11 Walking and mountain bike trails

**Issue description**

Council recommends that trails be relocated to retain a safe and viable trail network in accordance with a Trail Relocation Plan during the period of works and reinstated following works, for the approval of Council.

**Response**

An assessment of the impacts on access to existing community facilities in the vicinity of the project, including walking and mountain bike trails is included in Section 7.5.2 of the EIS. The project has been designed to avoid direct impacts on community facilities where feasible and reasonable, with the exception of unavoidable restrictions to some existing mountain bike trails to ensure public safety during the project.

The majority of bike trails which fall within the construction area are sections graded as easy or intermediate. The majority of trails graded as more difficult and advanced are located to the south and north of the construction area and are not expected to be directly affected by the project. Most of these trails would continue to be available for use by mountain bike enthusiasts for the duration of the project.

In response to submissions received and through design development, the boundary of the south western corner of the Old Mans Valley works area has been realigned to maintain access to the ‘more difficult’ mountain bike trail (Turkey Royale) in this section for the duration of the works (refer to Section 3.2).

In the north eastern part of the site, minor refinements of the fence line would allow access to the Lava Flow trail to remain open for the duration of the works, with only temporary restrictions on access during the construction of the Bridge Road crossing.
Temporary crossing access for the bike trail would be provided across Bridge Road (quarry access track), likely in the form of a culvert under the road near where the Tech Track currently joins the existing quarry access track. In addition, a temporary crossing over the conveyor would be provided. The location and configuration of this crossing over the conveyor would be confirmed during detailed design. Investigations are continuing into the possibility of providing temporary crossing access across Quarry Road where reasonable and feasible and with consideration to safety.

Further information relating to the changes to bike trails is provided in Section 3.2 of this report. Following project completion and handover of the site back to Hornsby Shire Council, the reopening or any proposed expansion of the mountain bike network would be a decision for Council and outside of the scope of the project.

5.2.1.12 Quarry Road

**Issue description**

Council recommends that the unsealed section of Quarry Road be upgraded and sealed to Council’s standards to accommodate construction traffic which would be using this access track.

**Response**

Quarry Road would be used for deliveries to the site or emergency access only. The use of Quarry Road for these purposes is consistent with the roads existing condition. No sealing or widening or other improvement works are necessary along Quarry Road.

5.2.1.13 Heritage

**Issue description**

Council provides an inventory of heritage items within the Hornsby Quarry and environs and includes recommendations to manage heritage impacts, consisting of:

- The uppermost section of the exposed diatreme rock face should remain visible (uncovered) for future public view, with any fill material not exceeding RL 55 on the eastern face.
- The EIS measures to protect the diatreme from the proposed conveyor located on the eastern side of the Quarry and associated machinery should be implemented.

**Response**

The project would result in the partial filling of the quarry, which would not physically damage the diatreme however would cover sections of the geology.

In response to concerns raised in submissions by agencies and the community, an assessment of the feasibility of contouring spoil as it is placed into the quarry void to facilitate as much visual access to the east face as possible at the completion of the project is currently underway. Contouring of the quarry void would result in filling of the quarry void to around RL 54 metres on the eastern side of the void, which would leave exposed an additional 10 metres of the void’s eastern face when compared to the proposal identified in the EIS for the project (filling of the quarry void to RL 64 m).

Any contouring of fill material would need to have regard to the future use of the site. Where contouring is deemed viable, this would be included as an additional mitigation measure and would be documented in the CEMP and/or sub-plans for the project.

Mitigation and management measures have been identified in Section 10 of Appendix I of the EIS and include measures to ensure that conveyor construction and use and stabilisation works are designed so as to minimise any potential impacts on the diatreme. These mitigation and management measures would be implemented for the duration of the works.

5.2.1.14 Community information

**Issue description**

Council requires that the operator establish a register to record community complaints received during works and provide adequate signage with contractor contact details on site fencing around works.
Response
Appropriate signage, including contractor and site contact information, would be displayed on the perimeter fencing to be erected around the works areas. A Complaints Management System would be developed and would be consistent with current Australian Standards for complaints handling (AS-4269).

5.3 Peak groups and advisory organisations

5.3.1 Geological Society of Australia

5.3.1.1 Consultation

Issue description
The Geological Society of Australia expressed concern that it was not regarded as a stakeholder during the preparation of the EIS and therefore was not previously consulted.

Response
Roads and Maritime have undertaken consultation on the project in accordance with the SEARs. The concerns raised by the Geological Society of Australia are acknowledged, particularly in relation to the protection of the diatreme within the quarry. Management and mitigation measures have been identified to protect the diatreme where feasible and reasonable. These include investigations related to contouring of the spoil material as it is placed into the quarry void to provide as much visual access to the quarry diatreme as possible. Refer to Section 3.5 for further detail.

5.3.1.2 Project Alternatives

Issue description
The Geological Society of Australia recommends that access to the eastern face of the quarry void be retained.

The submission states that the finished level of the fill material should be revised to a maximum of around 40 metres (RL). Spoil material should also not be allowed to accumulate and/or be removed from the eastern face of the quarry void or from the benching on the eastern wall during filling operations.

Response
The quarry void is currently unsafe for public access given the steep sides and flooded nature of the void and Hornsby Shire Council currently maintains exclusion fencing around the void to prevent public access for safety reasons.

The project would result in the partial filling of the quarry from RL 10 m AHD to a level of around RL 64 m AHD. At this level, the top most sections of the basinal layering of the Hornsby Diatreme on the eastern wall of the quarry void would remain visible (from approximately RL 64 m to RL 100 m). The partial filling of the quarry would not physically damage the diatreme.

In response to concerns raised in submissions, an assessment of the feasibility of contouring spoil as it is placed into the quarry void to facilitate as much visual access to the east face as possible at the completion of the project is currently underway. Contouring of the quarry void would result in filling to around RL 54 m on the eastern side of the void, which would leave exposed an additional 10 metres of the void’s eastern face when compared to the proposal identified in the EIS for the project.

Consideration of contouring of the spoil material within the quarry void is being undertaken in consultation with Hornsby Shire Council and any contouring of fill material would need to have regard to the future use of the site. Where contouring is deemed viable, this would be included as an additional mitigation measure and would be documented in the CEMP and/or sub-plans for the project.

5.3.1.3 Adequacy of the assessment

Issue description
The assessment of the Hornsby Quarry Diatreme does not appropriately consider the geological significance of the diatreme.
Response

An assessment of the non-Aboriginal heritage significance of the Hornsby Diatreme at the Hornsby Quarry is included in Section 7.6 and Appendix I of the EIS. This assessment is based on the statutory heritage listing of the Hornsby Diatreme, which does not include geological significance as a key component of the value of the diatreme. It is recognised and accepted that the EIS does not consider the potential geological significance of the diatreme.

As detailed in Section 5.3.1 and Section 3.5, investigations are currently underway into opportunities to further maximise the extent of the diatreme that would be visible at the conclusion of the project.

5.3.1.4 Impacts to heritage items

Issue description

The Geological Society of Australia is concerned about the impact filling the Hornsby Quarry void would have on the heritage item Diatreme Hornsby Quarry and surrounding vegetation.

Response

The EIS identified that the project would result in the partial filling of the quarry from RL 10 m AHD to a level of around RL 64 m AHD. At this level, the top most sections of the basinal layering of the Hornsby Diatreme visible on the eastern wall of the quarry void would remain visible (from approximately RL 64 m to RL 100 m). The partial filling of the quarry would not physically damage the diatreme however would cover sections of the geology. The full extent of the diatreme (from the base of the quarry to the void rim) currently remains publicly inaccessible and not visible due to being underwater and this would continue to be the case if the quarry is retained in its current state. The project would facilitate the ultimate rehabilitation of the quarry site by Council which would enable the site to become accessible to the public and would provide the opportunity for the public to view the upper parts of the diatreme that remain visible.

Mitigation and management measures have been identified in Section 10 of Appendix I of the EIS and include the recommendation that archival recording of the extent of the diatreme be undertaken following the initial dewatering of the quarry void, which would occur prior to the commencement of works within the quarry void. The archival recordings would be made available to the Hornsby Shire Council for its records and use.

In response to concerns raised in submissions, an assessment of the feasibility of contouring spoil as it is placed into the quarry void to facilitate as much visual access to the east face as possible at the completion of the project is currently underway. Contouring of the quarry void would result in filling of the quarry void to around RL 54 m on the eastern side of the void, which would leave exposed an additional 10 metres of the void’s eastern face when compared to the proposal identified in the EIS for the project.

Consideration of contouring of the spoil material within the quarry void is being undertaken in consultation with Hornsby Shire Council and any contouring of fill material would need to have regard to the future use of the site. Where contouring is deemed viable, this would be included as an additional mitigation measure and would be documented in the CEMP and/ or sub-plans for the project.

5.4 Environmental Groups

5.4.1 Association for Berowra Creek

5.4.1.1 Biodiversity

Issue description

The Association for Berowra Creek raises concerns in relation to the loss of native vegetation associated with the project, in particular the loss of the critically endangered ecological community Blue Gum High Forest. The Association suggests that the degraded nature of the extant vegetation communities should not be used as justification for their removal and that recovery of the understorey of Blue Gum High Forest and Sandstone Blackbutt Woodland communities is viable.

Response

The scarcity of Blue Gum High Forest is recognised, and is a key reason for committing to avoidance and mitigation measures in the design of the project.
A biodiversity impact assessment is provided in Section 7.3 and Appendix G of the EIS and includes an assessment of potential impacts to the Blue Gum High Forest community.

During the design of the project, opportunities to avoid high value ecological matters and minimise potential impacts were explored, through detailed assessment of the study area and refinements to the project design. In particular, the project has sought to use previously cleared areas and areas with a dominance of weeds and/or exotic grasslands for project infrastructure, conveyors, access and spoil stockpiles.

Further opportunities to reduce the clearing of native vegetation, particularly of the Blue Gum High Forest community and Sandstone Blackbutt Woodland vegetation, would be investigated during the development of the design for the project and pursued if feasible and reasonable.

The project would result in unavoidable impacts on 0.06 hectares of poor condition Blue Gum High Forest in Old Mans Valley where the conveyor is to be located. The Blue Gum High Forest in Old Mans Valley meets the criteria for a critically endangered ecological community under the Threatened Species Conservation Act 1997, but it does not meet the criteria for listing as a threatened community under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Compensation for the loss of native vegetation, including the loss of Blue Gum High Forest and Sandstone Blackbutt Woodland, which cannot be avoided or mitigated, would be detailed in a Biodiversity Offset Package to be prepared for the project and align with the requirements of the NSW Biodiversity Offsets Policy for Major Projects. The offset package would be consistent with the offset strategy prepared for the NorthConnex project and all reasonable and feasible attempts would be made to secure an appropriate offset site. If it is not possible to obtain a site, other supplementary offset measures would be included in the offset strategy, such as commitment to actions outlined in threatened species recovery programs, biodiversity research and survey programs or rehabilitating degraded habitat.

5.4.1.2 Biodiversity offsets

Issue description

The Association for Berowra Creek suggested that the offsets for the project would result in the management of existing plant communities and not the purchasing of new land to replace the communities which are being impacted.

Response

Compensation for the loss of native vegetation, including the loss of Blue Gum High Forest and Sandstone Blackbutt Woodland, which cannot be avoided or mitigated, would be detailed in a Biodiversity Offset Package to be prepared for the project and align with the requirements of the NSW Biodiversity Offsets Policy for Major Projects. The offset package would be consistent with the offset strategy prepared for the NorthConnex project and all reasonable and feasible attempts would be made to secure an appropriate offset site.

5.4.1.3 Site access

Issue description

Use of Quarry Road as the primary site access road for the project (in preference to Bridge Road) would avoid the loss of vegetation including the loss of endangered ecological communities (Blue Gum High Forest and Sandstone Blackbutt Woodland) and the loss of potential foraging and breeding habitat for the Gang-gang Cockatoo.

Response

Bridge Road is currently proposed as the primary access route into and out of the quarry site. This was determined having regard to community and environmental impacts associated with site access and following detailed consultation with Hornsby Shire Council. The use of Quarry Road would require trucks to travel through local roads including Dural Street and William Street to connect from Peats Ferry Road onto Quarry Road including the potential for additional road augmentation works along these roads to allow for safe haulage movements. In contrast Bridge Road connects directly onto the Peats Ferry Road (an arterial road) without the need to traverse intervening local roads. The use of Bridge Road as the primary access route into and out of the quarry site would minimise the requirement for haulage along local roads and the associated amenity impacts as far as possible.
The widening of Bridge Road to allow for safe traffic movements into and out of the site would result in vegetation disturbance and clearance and this impact has been assessed in Section 7.3 of the EIS. No Blue Gum High Forest would be cleared as a result of the Bridge Road upgrade works.

The works on Bridge Road would result in the loss of native vegetation, including the loss of locally significant Sandstone Blackbutt Woodland, and the loss of potential foraging and potential breeding habitat for the Gang-gang Cockatoo. The total area of suitable habitat for the Gang-gang Cockatoo that would be impacted by the project is 1.64 hectares.

There are eight hollow bearing trees (with a total of 12 hollows) likely to be impacted by the project, however none of the hollows are large enough to be roosting or breeding habitat for the Gang-gang Cockatoo.

5.4.2 STEP Inc.

5.4.2.1 Hornsby Quarry Diatreme

Issue description
The EIS does not provide sufficient detail on the final level of the fill within the quarry and there should be that at least two of the uppermost faces of the Hornsby Quarry Diatreme left exposed so as not to diminish the diatreme’s potential educational use and/or the future enjoyment of the diatreme by the public. Due care should be taken during the project so as not to damage the exposed face(s) of the Hornsby Quarry Diatreme or obscure them with dust and rubble.

Response
The project would result in the partial filling of the quarry from RL 10 m AHD to a level of RL 64 m AHD. This is shown in Figure 4-1 of the EIS.

At this level, the top most sections of the basinal layering of the Hornsby Diatreme visible on the eastern wall of the quarry void would remain visible (from approximately RL 64 metres to RL 100 metres). Investigations are currently underway to determine whether reduced filling near the diatreme (to a height of RL 54 metres) is viable.

The partial filling of the quarry would not physically damage the diatreme however would cover sections of the geology. The full extent of the diatreme (from the base of the quarry to the void rim) currently remains publicly inaccessible and not visible due to being underwater and this would continue to be the case if the quarry is retained in its current state. The project would facilitate the ultimate rehabilitation of the quarry site by Council which would enable the site to become accessible to the public and would provide the opportunity for the public to view the upper parts of the diatreme that remain visible above the level of the fill (an opportunity which is currently not available to the community).

5.4.2.2 Habitat of the endangered Gang-gang Cockatoo

Issue description
The EIS has quantified the potential for the project to impact on the Gang-gang Cockatoo and that the project would result in a requirement for ecosystem credits and species credits. The submission recommends that the use of the offset credits should have regard to the cumulative impact of the continuing loss of habitat, and suggests that the credits generated by the project facilitate the purchase of Malton Road land to assist in preservation of Gang-gang Cockatoo habitat.

Response
Section 7.3.9 of the EIS assesses the potential impact on the endangered population of the Gang-gang Cockatoo, which was identified as having the potential to occur within the study area. However, surveys of the study area did not identify the presence of the Gang-gang Cockatoo.

The total area of suitable habitat for the Gang-gang Cockatoo that would be impacted by the project is 1.64 hectares. There are eight hollow bearing trees (with a total of 12 hollows) likely to be impacted by the project, however none of the hollows are large enough to be roosting or breeding habitat for the Gang-gang Cockatoo.

The assessment of biodiversity offset requirements in the EIS identified that 33 species credits would be required to offset impacts on the Gang-gang Cockatoo.
The biodiversity offset package for the project, including any offset lands identified and secured, would satisfy this species credit requirement (in addition to ecosystem credit requirements).

5.5 Community Groups

5.5.1 Galston Area Residents Association

5.5.1.1 Traffic and Transport

Issue description

The Association expressed its concerns and objection to the proposed plan to truck NorthConnex tunnel spoil through the already congested central business district of Hornsby.

The Association raised safety issues with B-doubles negotiating sharp bends especially at Bridge Road and Mount Colah at Yirra Road and Belmont Road. These intersections are already at capacity during peak traffic periods.

The inconvenience of traffic congestion caused by these trucks for such a long time is an unreasonable imposition to inflict on the community.

The association believes the constant noise, dust pollution and additional diesel fumes from the trucks is environmentally irresponsible. This is an imposition that residents and visitors to the area should not have to endure.

Response

Expected haulage routes to and from the Hornsby Quarry site have been derived in consultation with the NorthConnex construction contractor, Hornsby Shire Council and Roads and Maritime to minimise impacts on the community and road infrastructure.

However, in response to submissions and through further development and assessment of the haulage routes since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Further details of this change are provided in Chapter 7 and shown in Figure 7.1.

Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and Haulage Management Sub Plan (HMSP) approval stage.

The traffic and transport impacts of project generated traffic on network performance (including intersection performance and peak hour traffic) have been assessed in Section 6.1 and Appendix C of the EIS. The traffic assessment found that the project would contribute to additional queuing and the lowering of intersection performance at a number of intersections including the M1 Pacific Motorway/Pacific Highway, Pacific Highway/Bridge Road (AM and PM peak) and Pacific Highway/Yirra Road (PM peak). These delays however need to be considered in the context of the forecast future performance of the intersections, which would already be operating above capacity in 2016 due to natural traffic growth. Project related traffic would contribute to existing congestion at these intersections. However, given the temporary nature of the project, the project traffic impacts would be acceptable and management in the context of the strategic benefits of the project.

A TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project. In particular, haulage operations would be undertaken such that haulage trucks would arrive at the Hornsby Quarry no earlier than the commencement of spoil emplacement activities nominated in the EIS, being 7 am on weekdays and 8 am on Saturdays. Trucks would not, under normal operating conditions, be required to queue outside of the Hornsby Quarry site outside of these hours.

Noise, dust and other air quality impacts generated by the project would be temporary during construction of the project only. The EIS includes detailed assessments of both noise and air quality impacts during construction of the project, and demonstrates that potential impacts would be within acceptable, manageable limits.
The assessment of exhaust emissions demonstrates that impacts from heavy vehicle exhaust emissions on receivers along haulage routes would be negligible and well within applicable air quality criteria. The human health risk assessment carried out for the project also demonstrates that heavy vehicle exhaust emissions would not pose an unacceptable health risk.

All loads of spoil carried by heavy vehicles would be covered during haulage along public roads. This would ensure dust emissions from haulage vehicles are minimised, and would further contribute to reducing the potential air quality impacts of the project.

The assessment of road traffic noise generated by heavy vehicles on Bridge Road identified that road traffic noise levels may increase by up to 10 dB(A) during the lowest background traffic hour of the day. During the peak traffic hour, traffic noise levels are anticipated to increase by around 7 dB(A). The increases in traffic noise would be relative to existing road traffic noise, which has been monitored at noise monitoring location NL02 as being 53 dB(A) (L_{Aeq}^{(1 hour)}) during the day time. These traffic noise levels are external noise predictions (at the building façade) and it is likely that some noise attenuation would be achieved by the building, resulting in lower internal traffic noise effects.

Section 5.1.5 of the Technical working paper: noise and vibration lists mitigation measures to be implemented to reduce and manage truck noise impacts. Induction and training would be provided to relevant staff and sub-contractors, including haulage vehicle drivers, outlining their responsibilities with regard to noise and vibration. As part of the training and induction, haulage vehicle drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours and required practices relating to minimising noise impacts (e.g. no compression braking, no extended periods of engine idling, etc).

Appropriate documentation, such as a Code of Conduct or similar, for haulage vehicles drivers outlining these responsibilities would be prepared.

5.5.1.2 Hazard and Risk

Issue description

The Association questions the geotechnical assessment and its consideration of issues relating to stability of the quarry and surrounds. It recommends that additional studies be assessed to ensure that the stability of the surrounding land is not compromised, particularly in the Manor Road precinct, and that the project does not compromise the integrity of the quarry.

Response

Land stability risks at the quarry site are identified and assessed in Section 6.3 of the EIS based on a review of previous geological, geotechnical and stability assessments undertaken at the Hornsby Quarry site by:


The EIS (Section 6.3.2) identifies areas within the quarry site (Old Mans Valley and in the vicinity of the quarry void) which have been emplaced with non-engineered fill material by previous site operations and areas of potential unstable land around the quarry void as identified by PSM 2007. Based on assessments undertaken by Cardno 1990 and PSM 2007, the EIS identifies that:

- The quarry void presents a moderate to high risk of small scale instability (at bench scale) around all four faces, which would present a safety risk to workers within the void (without appropriate mitigation).
- The overburden placed on the eastern fill area at Old Mans Valley (where the spoil conveyer and stockpile area for the project would be located) is comprised of non-engineered overburden material, which would require further investigation during detailed design to determine any stabilisation requirements (e.g. additional compaction) to provide for the structural stability of project infrastructure.

The assessment of stability issues at the Hornsby Quarry have been comprehensively considered through previous investigations and are well understood. Further investigation of stability issues is not warranted at this stage.

The stability of the quarry and surround areas would continue to be monitored during the project, to ensure a safe work environment and to protect surrounding receivers.
Based on this monitoring, additional measures may be implemented to enhance the geological integrity of the quarry void and surrounding land where significant stability risks are identified or anticipated.

5.5.1.3 Project development and alternatives

Issue description

A tunnel containing a conveyor from the NorthConnex tunnel portals to the quarry would be the most economical and environmentally responsible means of transporting the spoil to the quarry site.

Response

A number of alternatives to the transport of spoil via road haulage were investigated for the project and are discussed in detail in Section 3.3.3 of the EIS. This included the consideration of an underground spoil delivery system involving a spoil unloading facility built adjacent to the Pacific Highway, Hornsby, and an underground conveyor to the quarry void. This alternative was not pursued for various reasons, including significant additional capital costs and potential environmental and land use impacts associated with the spoil unloading facility and tunnelling under residential properties.

Construction of a more significant tunnel, from the NorthConnex tunnel portals all the way to the Hornsby Quarry site is not feasible for similar reasons.

Such a tunnel alternative would introduce significant additional establishment costs, the likelihood for additional environmental and community impacts and for impacts to be shifted to different locations in addition to the quarry site itself, significant constructability risks, and the potential for the spoil transfer infrastructure facility to not be ready in time for the commencement of construction of the NorthConnex project given the complexities and timing associated with land acquisition and construction.

Whilst the current proposal would involve road haulage and the potential for associated amenity impacts at surrounding receivers, with the implementation of appropriate mitigation measures, the current proposal has the potential for less risk and environmental and social impacts than a tunnel option.

5.5.2 Sydney MTB Riders

Issue description

The project should avoid or minimise damage or closure of any mountain bike trails and ensure the re-establishment/ restoration of the trails to current or higher standard following the completion of the project.

Response

The project has been designed to avoid and minimise direct impacts on the existing mountain bike trails. Temporary closure of some existing mountain bike trails would be required at the start of the project to ensure public safety. The majority of bike trails which fall within the construction area are sections graded as easy or intermediate. The majority of trails graded as more difficult and advanced are located to the south and north of the construction area and are not expected to be directly affected. As such, most of these trails would continue to be available for use by mountain bike enthusiasts for the duration of the project.

In the north eastern part of the site, minor refinements of the fence line would allow access to the Lava Flow trail to remain open for the duration of the works, with only temporary restrictions on access during the construction of the Bridge Road crossing. Temporary crossing access for the bike trail would be provided across Bridge Road (quarry access track), likely in the form of a culvert under the road near where the Tech Track currently joins the existing quarry access track.

In addition, a temporary crossing over the conveyor would be provided. The location and configuration of this conveyor crossing would be confirmed during detailed design.

Investigations are continuing into the possibility of providing temporary crossing access across Quarry Road where reasonable and feasible and with consideration to safety.

Further information relating to the changes to bike trails is provided in Section 3.2 of this report. Following project completion and handover of the site back to Hornsby Shire Council, the reopening or any proposed expansion of the mountain bike network would be a decision for Council and outside of the scope of the project.
5.5.3 Pennant Hills District Civil Trust Inc.

5.5.3.1 Statutory requirements / other approvals

Issue description

The scope of the traffic and transport assessment should be limited to the assessment of potential impacts on roads other than Pennant Hills Road, the Hills M2 Motorway and the M1 Pacific Motorway. This is to ensure that the assessment does not override or conflict with any assessment of traffic impacts associated with the planning approval of the NorthConnex project, including any assessment required under the NorthConnex Spoil Management Strategy.

Response

The assessment of potential traffic impacts from the project is included in Section 6.1 and Appendix C of the EIS and has been conducted in accordance with the SEARs issued for the project. The SEARs required an assessment (including modelling) of the traffic impacts of spoil emplacement works, including impacts (number, frequency and type/size of construction related vehicles volumes; speeds; intersection performance; etc.) on Pennant Hills Road, the Pacific Highway, Peats Ferry Road, Bridge Road, and the surrounding local, regional and State road network.

The traffic impact assessment carried out for the project does not override or conflict with obligations and commitments made with respect to the NorthConnex project. The requirements of the NorthConnex project, including the outcomes of the NorthConnex Spoil Management Strategy would continue to be complied with, in addition to any other commitments and conditions applied to an approval for the current spoil management project.

5.5.3.2 Haulage route options and site access

Issue description

Quarry Road should be used in preference to Bridge Road as the preferred access road for the project, or a circular route using both Bridge Road and Quarry Road should be considered.

Response

Bridge Road is currently proposed as the primary access route into and out of the quarry site. This access arrangement was identified following detailed consultation with Hornsby Shire Council to minimise the requirement for haulage along local roads or through residential areas as far as possible.

The use of Quarry Road as the primary access or exit for haulage vehicles would require trucks to travel through local roads including Dural Street and William Street to connect from Peats Ferry Road onto Quarry Road including the potential for additional road augmentation works along these roads to allow for safe haulage movements. In contrast Bridge Road connects directly onto the Peats Ferry Road (an arterial road) without the need to traverse intervening local roads.

One-way haulage along Bridge Road or the use of a circular haulage route would require the additional use of Quarry Road for haulage trucks to either enter or exit the site and result in the introduction of haulage traffic onto local roads such as Dural Street and William Street (which connect to Quarry Road).

5.5.3.3 Traffic safety

Issue description

Bridge Road as the principal access presents a serious safety risk and the appropriateness of using Bridge Road is question on this basis.

Response

Bridge Road would be widened and regraded, reducing the steepness of the road, to allow for safe traffic movements into and out of the site.

Safety risks posed by haulage traffic to other vehicles, cyclists and pedestrians along the haulage routes are considered in Section 6.5 of the EIS. A TMP would be prepared prior to the commencement of works to manage potential safety risks to other vehicles, pedestrians and cyclists, including around school zones, from project related traffic. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.
5.5.4 Community Voice

5.5.4.1 Strategic alternatives

Issue description

Query as to whether options to fill the quarry void via onsite processes, to minimise project duration and the number of spoil haulage vehicles entering and exiting the site, were considered and assessed prior to the assessment of the option considered in the EIS.

Response

Section 3.2.2 of the EIS identifies the previous investigations for future use of the Hornsby Quarry site which have been commissioned by Hornsby Shire Council. These investigations include consideration of a number of options for filling of the quarry void to facilitate future rehabilitation and use of the site, including the option of using material from the quarry site to ‘backfill’ the quarry void by cutting back or flattening the existing quarry faces (Pells Sullivan Meynink Pty Ltd 2007). Section 3.3 of the EIS provides further detail regarding the options and alternatives that were considered when determining the preferred option for the management of road construction spoil at the Hornsby Quarry site.

Construction planning and traffic scheduling has been subject to detailed sensitivity investigations to identify an appropriate balance between the need to complete the project in a timely manner, and to minimise impacts to local receivers. Specifically, early project planning considered about 50 haulage trucks per hour entering the site. Although this would be consistent with the rate of spoil generated by the NorthConnex project, the sensitivity analysis identified that this would result in unacceptable impacts on nearby receivers (in particular, in relation to road traffic noise receivers along Bridge Road).

As detailed in the EIS, particular attention has been paid to identifying an appropriate balance between minimising elevated amenity impacts for residents along Bridge Road and undertaking the project in a timely manner. This balance has resulted in a commitment to not exceed 35 heavy vehicles per hour on Bridge Road, and recognition that:

- Traffic volumes above this would generate unacceptable amenity impacts for local residents.
- Traffic volumes below this would extend the construction period and associated impacts, leading to longer periods of impacts on affected receivers.

To ensure potential impacts from the project are minimised where feasible and reasonable and that the number of truck movements was sufficient to ensure the viability of the project, the maximum number of haulage trucks entering the site per hour was reduced from 50 to 35. This is considered a realistic balance between the project objectives and ensuring potential impacts to the environment and the community from haulage vehicles are mitigated as far as feasible and reasonable.

5.5.4.2 Land stability

Issue description

Queries regarding whether a geotechnical assessment has been undertaken to ascertain if filling the quarry void would allow for the future remediation and ongoing safe use of the site, and if the amount of spoil to be transported to the quarry site is sufficient to result in a safe and stabilised environment suitable for passive recreation and for adjacent active recreation area.

Response

Land stability risks at the quarry site are identified and assessed in Section 6.3 of the EIS based on a review of previous geological, geotechnical and stability assessments undertaken at the Hornsby Quarry site by:


Stability issues at the Hornsby Quarry have been comprehensively considered through previous investigations and are well understood.
The stability of the quarry and surrounding areas would continue to be monitored during the project, to ensure a safe work environment and to protect surrounding receivers. Based on this monitoring, additional measures may be implemented to enhance the geological integrity of the quarry void and surrounding land where significant stability risks are identified or anticipated.

The proposal is for the quarry void to be filled to a level that would facilitate its future use for rehabilitation, this being an approximate height of RL 64 metres. Hornsby Shire Council has confirmed that this depth of fill is sufficient and appropriate to facilitate its future plans to rehabilitate and redevelop the site.

5.5.4.3 Community consultation and project reporting

**Issue description**
Recommendation for ongoing consultation with the community to report on traffic, air and noise impacts associated with the project.

**Response**
The EIS includes detailed assessment of the potential impacts of the project relating to traffic (Section 6.1), air quality (Section 7.1) and noise (Section 6.2) and includes feasible and reasonable mitigation measures to manage potential impacts to receivers.

Consultation on the project would continue throughout the remainder of the planning process and during construction. The 1800 number and email address would continue to operate and the website would be updated as the project progresses. If approved, the project would be constructed and delivered in accordance with the conditions of approval, including any conditions specifically related to consultation. Future consultation would be carried out by LLBJV in partnership with Roads and Maritime and the NorthConnex Project Company.

5.5.4.4 Haulage route options

**Issue description**
Expresses concern on behalf of the community regarding the tight turns for truck and dog haulage vehicles, particularly at the intersection of:

- Bridge Road and George Street.
- Bridge Road and Jersey Street North.
- Pacific Highway and Yirra Road
- Yirra Road and Belmont Parade.
- Belmont Parade and Ku-ring-gai Chase Road.

Recommendation that a trial be undertaken using haulage vehicles to assist in preparing the TMP and to address community concerns.

Expresses concern around the structural capacity of road bridges along the haulage routes (Bridge Road and Yirra Road) taking into account a minimum of 35 truck movements per hour over a 2.5 year period. Requests that the community be provided with information regarding the structural capacity of these road bridges.

**Response**
Expected haulage routes to and from the Hornsby Quarry site have been identified in consultation with the NorthConnex construction contractor, Hornsby Shire Council and Roads and Maritime to minimise impacts on the community and road infrastructure. To best meet the project objectives and to mitigate as far as feasible and reasonable potential impacts on the community and the environment, the haulage routes presented in the EIS primarily use the arterial or sub-arterial road network.

Haulage routes would be confirmed during detailed design to ensure that haulage routes are safe, and would include an assessment of swept paths of truck and dog haulage vehicles to ensure compliance with relevant road design requirements.

Section 6.1.4 of the EIS describes the results of a preliminary analysis of swept path of a truck and dog haulage vehicle along the northern outbound peak hours haulage route.
The preliminary analysis found that the Pacific Highway to Yirra Road movement could be completed satisfactorily, however the corresponding right turn movement from Yirra Road to Belmont Parade indicated potential conflicts.

In response to submissions, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, the following road modifications are under investigation to assist in optimising traffic performance and road safety along this route:

- Optimisation of signal timings to provide a safe right turn movement from Pacific Highway onto Yirra Road
- Lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road
- New line marking in both directions on the Pacific Highway immediately south of the Pacific Highway and Yirra Road intersection, which could result in the loss of some on street parking along the Pacific Highway southbound
- Widening of Belmont Parade to improve the right turn path from Yirra Road onto Belmont Parade
- Improvements to the left turn path from Belmont Parade onto Ku-ring-gai Chase Road, including reconfiguration of the traffic island at this location

The road modification works described above would not be required if investigations currently underway determine that northbound haulage vehicles would access the Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of the proposed use of the Windybanks Interchange refer to Section 7.3).

In addition, a TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project.

As haulage routes would be confirmed during detailed design, any requirement for the assessment of traffic loads on road bridges along the haulage routes would also be determined during this period.

5.5.4.5 Traffic and safety

Issue description

Recommendation for assessment of road safety impacts associated with parking in Asquith and Mount Colah and for ongoing community consultation regarding these impacts.

Response

Safety risks posed by haulage traffic to other vehicles, cyclists and pedestrians along the haulage routes are considered in Section 6.5 of the EIS and the traffic and transport impacts of the project on network performance (including intersection performance and peak hour traffic) are assessed in Section 6.1 and Appendix C of the EIS.

Construction traffic volumes are expected to be relatively low when compared to existing traffic volumes within the study area. As a worst-case scenario, 385 spoil haulage vehicles per day would be generated by the project. When compared to existing traffic volumes, this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway during the peak periods.

Project traffic contributions in the peak hours would be minimal relative to total forecast traffic and would result in negligible potential road safety impacts for road users parking on the Pacific Highway in Asquith and Mount Colah.

Consultation on the project would continue throughout the remainder of the planning process and during construction. If approved, the project would be constructed by Lend Lease Bouygues Joint Venture (LLBJV) and delivered in accordance with any conditions of approval. Future consultation would be carried out by LLBJV in partnership with Roads and Maritime and the NorthConnex Project Company.

Issue description

Concern regarding safety of road users during peak school travel times, specifically at those intersections described in Section 5.5.4 of this report.
Response

Safety risks posed by haulage traffic to other vehicles, cyclists and pedestrians along the haulage routes are considered in Section 6.5 of the EIS. As described in Section 5.5.4 of this report, an assessment of haulage route options, including any augmentation required at intersections along the haulage routes to manage and mitigate impacts on network performance and road safety is ongoing and would be confirmed during detailed design.

Construction traffic volumes are expected to be relatively low when compared to existing traffic volumes within the study area. As a worst-case scenario, 385 spoil haulage vehicles per day would be generated by the project. When compared to existing traffic volumes, this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway during the peak periods.

Project traffic contributions in the peak hours would be minimal relative to total forecast traffic and would result in negligible potential road safety impacts for road users on the Pacific Highway.

A TMP would be prepared prior to the commencement of works to manage potential safety risks to other vehicles, pedestrians and cyclists, including around school zones. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.

5.5.4.6 Network performance

Issue description

Project traffic would result in increased congestion and associated time delays for road users, particularly during the peak periods, and specifically at the intersections described in Section 5.5.4 of this report.

Response

The traffic and transport impacts of the project on network performance (including intersection performance and peak hour traffic) are assessed in Section 6.1 and Appendix C of the EIS.

Up to 385 haulage vehicles would enter the quarry site per day (35 haulage vehicles per hour over the course of an 11 hour working day) when spoil generation by NorthConnex is at its peak. Haulage vehicles would use the designated haulage routes between 7 am and 6 pm on weekdays and between 8 am and 1 pm on Saturdays.

The traffic assessment identifies that the project would contribute to additional queuing and the lowering of intersection performance at a number of intersections including the M1 Pacific Motorway/Pacific Highway, Pacific Highway/Bridge Road (AM and PM peak) and Pacific Highway/Yirra Road (PM peak). These delays however need to be considered in the context of the forecast future performance of the intersections, which would already be operating above capacity in 2016 due to background traffic growth. Project related traffic would contribute to existing congestion at these intersections, but would not be the underlying cause of the congestion, which would occur irrespective of the project. Given the temporary nature of the project, the project traffic impacts would be minimal in the context of the strategic benefits of the project.

The traffic assessment also includes consideration of cumulative traffic. This includes modelling based on contemporary traffic counts undertaken at key intersections (to account for existing traffic levels including recent high density residential development in the local area) as well as the assessment of potential cumulative traffic impacts from other key projects (e.g. Epping to Thornleigh Third Track Project, North West Rail Link, NorthConnex and WestConnex). The traffic assessment identifies that given the isolation of the project study area from other key transport projects, potential cumulative interactions of traffic would be minimal.

A TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project. In particular, haulage operations would be undertaken such that haulage trucks would arrive at the Hornsby Quarry no earlier than the commencement of spoil emplacement activities nominated in the EIS, being 7 am on weekdays and 8 am on Saturdays. Trucks would not, under normal operating conditions, be required to queue outside of the Hornsby Quarry site outside of these hours.
5.5.4.8 Project description

**Issue description**

Recommendation that water from the Hornsby Quarry be used to water roads, stockpiles and conveyor transfer points.

**Response**

Water from the Hornsby Quarry void would be used where feasible and reasonable for project activities, such as for dust suppression on site (including for the conveyor, haulage roads and stockpiles).

5.6 Educational institutions

5.6.1 Hornsby TAFE

5.6.1.1 Air quality and health

**Issue description**

Concern that heavy vehicles using Bridge Road would cause particulate emissions, which would have a detrimental impact on the health of TAFE staff and students. Concern that higher dust levels would affect staff and students’ health, including the risk that dust could exacerbate existing respiratory conditions.

Wind dispersion of dust could impact on tools, equipment, machinery and other teaching resources and would require increased cleaning, maintenance and other operating costs.

Building H would require mitigation treatments such as glazing and air conditioning due to the risks and impacts of air quality and dust infiltration in damaging sensitive and expensive equipment.

**Response**

The air quality impact assessment carried out for the project includes consideration of dust generation from spoil handling and reuse activities on the site. It also includes vehicle exhaust emissions on the site and along haulage routes. Potential exhaust emissions and air quality impacts from haulage vehicles and project activities are assessed in Section 7.1 and Appendix E of the EIS.

The assessment of exhaust emissions demonstrates that impacts from heavy vehicle exhaust emissions on receivers along haulage routes would be negligible and well within applicable air quality criteria. The human health risk assessment carried out for the project also demonstrates that heavy vehicle exhaust emissions would not pose an unacceptable health risk.

All loads of spoil carried by heavy vehicles would be covered during haulage along public roads. This would ensure dust emissions from haulage vehicles are minimised, and would further contribute to reducing the potential air quality impacts of the project.

Potential dust impacts from activities on the site were assessed using dispersion modelling to predict pollutant concentrations resulting from the project. The assessment took into account existing air quality, and the additional dust that would be contributed by project activities. The assessment demonstrates that the air quality impacts of the project would comply with applicable criteria set by the NSW Environment Protection Authority for dust deposition, total suspended particulates, carbon monoxide, volatile organic compounds and polycyclic aromatic hydrocarbons. In particular, applicable air quality criteria would be complied with at the Hornsby TAFE.

In the case of PM$_{10}$ and PM$_{2.5}$, contributions from the project are low, and within applicable air quality criteria and advisory reporting standards. However, it is recognised that on some occasions, background concentrations of dust across Sydney can be high (as a result of events such as bushfires) and under these conditions, the relatively small contribution of dust from the project may contribute to a short term cumulative dust level (project contribution plus background dust concentration) above applicable criteria and standards. These exceedances of dust criteria and standards are dominated by existing background dust levels and would continue to occur irrespective of the project.

It is recognised that dust deposition and potential impacts on sensitive equipment and other resources within the Hornsby TAFE is of particular concern. The air quality impact assessment demonstrates that maximum dust deposition on surrounding land as a result of the project would be 1.0 g/m$^2$/month.
This is lower than the criterion set by the NSW Environment Protection Authority of 2.0 g/m²/month (project-only contribution) and is not anticipated to significantly affect sensitive equipment, or increase the requirement for maintenance and cleaning costs. Notwithstanding, the Hornsby TAFE would be consulted during the preparation and implementation of the Dust Management Plan for the project, including in relation to measures to ensure that dust impacts at the TAFE do not damage equipment or otherwise generate a nuisance for staff or students.

5.6.1.2 Noise and vibration

Issue description

Noise generated by the project has the potential to impact on teacher instructed classes in buildings J, H and U, which could result in significant disruption and/or make the classes untenable.

There are safety concerns relating to the noise generated by haulage vehicles using Bridge Road, including concerns that project noise would result in students not being able to hear teacher instructions, health impacts or the exacerbation of existing hearing conditions suffered by students or staff.

Vibration resulting from heavy vehicle movements on Bridge Road could impact on the building structure of multi-storey buildings.

Response

A noise and vibration impact assessment was carried out for the project and is provided in Section 6.2 and Appendix D of the EIS. The assessment demonstrates that at the Hornsby TAFE, the project would result in:

- Noise within the most affected buildings of the TAFE of 54 dB(A) during the initial site establishment phase, which is 9 dB(A) above the applicable noise management level.
- Noise within the most affected buildings of the TAFE of around 46-47 dB(A) during the remainder of the project (conveyor construction and haulage, and spoil haulage and emplacement), which is 1-2 dB(A) above the applicable noise management level.

Noise impacts of around 46-47 dB(A) during most of the project works are not anticipated to adversely affect the normal operations of the Hornsby TAFE, although peak noise impacts of up to 54 dB(A) during site establishment may be slightly disruptive in some circumstances. Hornsby TAFE would be consulted during planning for site establishment works, to identify opportunities that may exist to schedule noise intensive works and apply feasible and reasonable noise mitigation and management measures to minimise noise impacts during the relatively short site establishment phase of the project.

The assessment of road traffic noise generated by heavy vehicles on Bridge Road identifies that road traffic noise levels may increase by up to 10 dB(A) during the lowest background traffic hour of the day. During the peak traffic hour, traffic noise levels are anticipated to increase by around 7 dB(A). The increases in traffic noise would be relative to existing road traffic noise, which has been monitored at noise monitoring location NL02 as being 53 dB(A) (L_Aeq(1 hour)) during the day time. These traffic noise levels are external noise predictions (at the building façade) and it is likely that some noise attenuation would be achieved by the building, resulting in lower internal traffic noise effects. At these predicted noise levels, traffic noise would be audible but is unlikely to disrupt communications within classrooms of the Hornsby TAFE, and would not pose a risk to safety/emergency communications.

The movement of heavy vehicles along Bridge Street is unlikely to lead to vibration at a level affecting structural integrity or human comfort because:

- The movement of heavy vehicles is not a particularly vibration intensive activity, with heavy vehicles generally not creating significant vibration.
- Receivers that may be affected by vibration are sufficiently separated from heavy vehicles using Bridge Street so as to attenuate vibration effects to negligible levels.

Section 5.3 of Appendix D of the EIS considers the potential for noise impacts associated with the project to impact on human health. The assessment indicates that where feasible and reasonable noise management and mitigation measures are adopted, adverse health impacts are not expected within the local community as a result of project generated noise.

Section 5.1.5 of the Technical working paper: noise and vibration lists mitigation measures to be implemented to reduce and manage truck noise impacts.
Induction and training would be provided to relevant staff and sub-contractors, including haulage vehicle drivers, outlining their responsibilities with regard to noise and vibration. As part of the training and induction, haulage vehicle drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours and required practices relating to minimising noise impacts (e.g. no compression braking, no extended periods of engine idling, etc). Appropriate documentation, such as a Code of Conduct or similar, for haulage vehicles drivers outlining these responsibilities would be prepared.

In addition, environmental management measure NV19 demonstrates Roads and Maritime’s commitment to implementing a noise monitoring program to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities at the commencement of activities and periodically during the project. The results of the monitoring would be reviewed to determine if additional mitigation measures are required at the time. All measurements would be undertaken in accordance appropriate standards and guidelines for noise monitoring. The noise monitoring program would be detailed in the Construction Noise and Vibration Management Plan.

**Issue description**

The submission proposes a number of measures to minimise noise from the movement of trucks and filling activities. These include:

- Limiting filling activities to the proposed hours of operation
- Requiring that there be no queuing of vehicles on adjoining streets outside the approved hours
- Minimising the number of plant items in the Quarry at any one time
- Designing the facility to minimise any requirement for trucks to reverse
- Provision of acoustic treatments to Buildings H, D and U, including installation of double glazing and air conditioning
- Erection of acoustic fencing/barriers between the end of Bridge Road and along the eastern Quarry site boundary to a point that aligns with the southern-most point of the Hornsby Campus grounds.

**Response**

In recognition of the locality of the quarry site and the proximity to noise sensitive receivers, the project has sought to minimise impacts on amenity and environmental values through refinement and improvements during design development.

These refinements include restricting of project works hours to standard construction hours; using initial loads of spoil to construct noise mounds approximately five metres high around the stockpiling area to provide noise mitigation; reducing the maximum number of haulage vehicles entering the site from 50 to only 35 per hour; providing hoarding around stationary plant; and optimising the type and number of plant and equipment operating in the stockpiling area and the void.

Environmental management measure NV12 states that the site would be arranged to limit the need for reversing associated with regular and repeatable movements (e.g. trucks transporting spoil within the stockpiling area) to minimise the use of reversing alarms. Measure NV13 also commits the project to using non-tonal reversing alarms where feasible and reasonable and taking into account workplace health and safety requirements.

Roads and Maritime has commenced consultation with the Hornsby TAFE in relation to potential measures that could be applied to further minimise impacts on the campus, particularly as a result of heavy vehicle traffic associated with the project. This consultation has included initial inspection of key affected areas within the TAFE site to identify opportunities for noise and dust mitigation and attenuation measures.

Roads and Maritime is committed to ongoing consultation with the Hornsby TAFE to identify and implement feasible and reasonable measures to minimise project impacts on campus activities. Consultation between the parties would continue prior to the commencement of works on the quarry site.

Consideration of further feasible and reasonable noise mitigation is ongoing during design development which, in conjunction with the mitigation and management measures proposed in the EIS, would minimise noise impacts on sensitive receivers as far as feasible and reasonable while allowing the project to remain viable.
5.6.1.3 TAFE access and car parking

Issue description

Hornsby TAFE is dependent on Bridge Road as the only vehicle access available to service the business needs of the lower campus and impacts to the access and car park would:

- Seriously impact on business operations of the TAFE, including the lower campus canteen that is operated by a contractor
- Impede the delivery of materials (wood, sand etc) to the buildings in the lower campus
- Require students attending classes to manually carry heavy tools and equipment approximately 500 metres from the car park in the eastern section of the TAFE
- Potentially delay access by emergency services to Buildings J, H and U that currently deliver courses with a potential high safety risk.
- Create a significant safety hazard for inexperienced teenage drivers, students and staff walking to and from classes, increasing the risk of accidents.

Response

Vehicular access to the Hornsby TAFE via Bridge Road would be maintained during the project. Access would be temporarily restricted during the upgrade works on Bridge Road, to maintain public safety. In the longer term, these upgrade works would benefit the Hornsby TAFE through improved access arrangements from Bridge Road.

Access to the TAFE would also be reduced from the current two-lane arrangement for bi-directional traffic to one lane for shared entry and exit from the TAFE, which may result in some minor delays for vehicles entering and exiting the TAFE. The car park would therefore be accessible for staff, students, deliveries and emergency services vehicles for the duration of the project, albeit with some necessary disruptions to access during upgrade works on Bridge Road in the site establishment phase of the project. The TAFE would continue to be consulted during these works, to identify and implement reasonable measures to minimise disruptions where possible.

Traffic management measures would be implemented to ensure safe access to the TAFE is maintained for students, staff and deliveries. The TMP to be developed to manage traffic for the duration of the project would include driver protocols to ensure appropriate driver behaviour that adheres to all road rules and speed limits (e.g. school zones, clear ways etc.) along haulage routes including Bridge Road.

Signage and other appropriate measures would be put in place to inform road users and pedestrians of changed conditions on Bridge Road and at the TAFE access.

Access to the car park would be maintained during the project to ensure safe access for drivers and pedestrians. The TMP would also incorporate measures for managing access and egress on Bridge Road for emergency vehicles, including to TAFE, residences and the project site.

Restrictions on kerbside parking between Peats Ferry Road and the TAFE access would be in place during Bridge Road upgrade works (approximately three months). Once the upgrade works are complete, parking would be restricted during standard work hours only, for the remaining duration of the project. Parking for site personnel would be provided within the quarry site.

5.6.1.4 Pedestrian access

Issue description

Assistance is requested in the form of the provision of an alternative safe pedestrian access to service buildings on the lower level of the Hornsby TAFE Campus.

Response

There is no formal footpath on either side of Bridge Road (from where Bridge Road turns south towards the TAFE) but it is acknowledged that pedestrians currently use the roadside verge or Bridge Road itself to access the TAFE. Pedestrian access to the TAFE via Bridge Road would be restricted during the project, for safety reasons. Signage would be provided to redirect pedestrians along an alternative route to the TAFE entrance on Pacific Highway/Peats Ferry Road. Figure 7-4 in the EIS shows the indicative alternative access route for pedestrians. Other access points to the TAFE site would be maintained during the project.
5.6.1.5 Social and economic

Issue description

There is potential for the project to present a business continuity risk to Northern Sydney Institute of TAFE Hornsby Campus as a result of the use of Bridge Road by haulage vehicles and associated impacts (air quality, noise, traffic, landscape character and visual amenity), restrictions to the use of outdoor learning spaces and a loss of outdoor amenity for the TAFE.

As a result of the project the capacity for classes to be conducted in Buildings J, H, D and U would be significantly impacted and could also result in a reduced number of new enrolments and/or an increase in student withdrawals.

Response

Section 5.6.1 of this submissions report addresses the potential air quality, noise and vibration, human health, traffic and landscape character and visual amenity impacts of the project on the Hornsby TAFE and outlines feasible and reasonable management and mitigation measures to manage potential impacts. In summary:

- Potential exhaust emissions from haulage vehicles to receivers along the haulage routes would be negligible and within air quality assessment criteria.

- Predicted 24-hour PM_{10} and PM_{2.5} concentrations would comply with applicable criteria and advisory reporting standards when considering impacts from the project alone. Where background PM_{10} and PM_{2.5} concentrations are added, a single exceedance for PM_{10}, and two exceedances at all sensitive receivers for PM_{2.5} have been predicted. In both cases, exceedances are associated with Scenario 2, where both stockpiling and filling works occur concurrently. High background concentrations are the principal reason for the observed exceedances for both PM_{10} and PM_{2.5}.

- Roads and Maritime has committed to implementing a noise monitoring program to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities at the commencement of activities and periodically during the project. The results of the monitoring would be reviewed to determine if additional mitigation measures are required at the time. All measurements would be undertaken in accordance appropriate standards and guidelines for noise monitoring. The noise monitoring program would be detailed in the Construction Noise and Vibration Management Plan.

- Dust deposition would be well below the project contribution criterion of 2 g/m^3 and would not adversely impact on nearby receivers.

- Vehicular access to the Hornsby TAFE via Bridge Road would be maintained throughout the project except for a short period during the Bridge Road upgrade works. A framework traffic management strategy has been prepared and is included in Appendix C of the EIS. This would form the basis of a TMP that would be developed to manage traffic for the duration of the project.

- Pedestrian access to the TAFE via Bridge Road would be restricted during the project, for safety reasons. Signage would be provided to redirect pedestrians along an alternative route to the TAFE entrance on Pacific Highway/Peats Ferry Road. Figure 7-4 in the EIS shows the indicative alternative access route for pedestrians. Other access points to the TAFE site would be maintained during the project.

- Topography and surrounding vegetation would assist in ameliorating temporary outdoor amenity impacts.

With the implementation of the management and mitigation measures to ameliorate potential impacts, the temporary nature of the works, and Roads and Maritime’s ongoing commitment to work with Hornsby TAFE to reach an agreeable outcome for all parties, the commercial viability and/or competitiveness of the Hornsby TAFE is unlikely to be significantly affected.

In addition, a Technical working paper: socio-economic has been prepared for the project (Appendix H of the EIS) that has assessed potential positive and negative socio-economic impacts of the project and management and mitigation measures, and which found that on balance the overall social and economic impacts of the project would be positive for the region.
5.6.1.6 Building improvements and mitigation

Issue description

Building improvements and/or mitigation for road traffic noise impacts would need to be implemented to ensure continued educational delivery is viable in buildings J, H, D and U. Contends that carpentry and joinery classes in Building J would need to be relocated to an alternative location as mitigation for road traffic noise such as noise insulation and air conditioning are not viable due to the specific workplace health and safety requirements associated with these classes.

Response

Roads and Maritime has commenced consultation with the Hornsby TAFE in relation to potential measures that could be applied to further minimise impacts on the campus, particularly as a result of heavy vehicle traffic associated with the project. This consultation has included initial inspection of key affected areas within the TAFE site to identify opportunities for noise and dust mitigation and attenuation measures.

Roads and Maritime is committed to ongoing consultation with the Hornsby TAFE to identify and implement feasible and reasonable measures to minimise project impacts on campus activities. Consultation between the parties would continue to establish mutually agreeable outcomes, prior to the commencement of works on the quarry site.

5.6.2 Barker College

5.6.2.1 Traffic safety

Issue

Haulage vehicles transporting spoil to and from the Hornsby Quarry site present a risk to pedestrians, including students, crossing the Pacific Highway between Waitara Station and Barker College (south of Bridge Road). A pedestrian bridge across the Pacific Highway at Waitara Station is the preferred mechanism to reduce potential danger to pedestrians.

Response

Safety risks posed by haulage traffic to other vehicles, cyclists and pedestrians along the haulage routes are considered in Section 6.5 of the EIS.

Signalised pedestrian crossings to facilitate movement between Waitara Station and Barker College are provided at the Pacific Highway/Waitara Avenue, Pacific Highway/Romsey Street (Unwin Road) and Pacific Highway/College Crescent intersections.

In addition, construction traffic volumes are expected to be relatively low when compared to existing traffic volumes within the study area. As a worst-case scenario, 385 spoil haulage vehicles per day would be generated by the project. When compared to existing traffic volumes, this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway during the peak periods.

Project traffic contributions in the peak hours would be minimal relative to total forecast traffic and would result in negligible potential road safety impacts for pedestrians crossing between Waitara Station and Barker College.

The presence of signalised crossings of the Pacific Highway and the negligible impact on road safety as a result of minor project traffic contributions on the Pacific Highway mean that there is no requirement for a pedestrian bridge to be installed at this location.

A TMP would be prepared prior to the commencement of works to manage potential safety risks to other vehicles, pedestrians and cyclists, including around school zones. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.
5.6.2.2 Haulage route options

**Issue**

The outbound heavy vehicle route as shown in Figure 4-3 of the EIS should be used exclusively to transport spoil to and from the Hornsby Quarry site to negate the need for haulage vehicles to use the Pacific Highway south of Bridge Road. The ‘Old Pacific Highway’ north of Hornsby has greater capacity to manage project traffic.

Where this is not possible, the inbound heavy vehicle route as shown in Figure 4-2 of the EIS should not be used after 2:30 pm on weekdays (i.e. not after the commencement of afternoon school zones).

**Response**

Expected haulage routes to and from the Hornsby Quarry site have been identified in consultation with the NorthConnex construction contractor, Hornsby Shire Council and Roads and Maritime to minimise impacts on the community and road infrastructure. Haulage routes would be confirmed during detailed design to ensure that haulage routes are safe and that project related impacts on network performance are minimised.

A TMP would be prepared prior to the commencement of works to manage potential safety risks to other vehicles, pedestrians and cyclists, including around school zones. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.

5.6.2.3 College access

**Issue**

Truck movements on the Pacific Highway would exacerbate the difficulty and dangerousness of movements into and out of the Pacific Highway entrance to Barker College.

**Response**

The traffic and transport impacts of the project on network performance (including intersection performance and peak hour traffic) are assessed in Section 6.1 and Appendix C of the EIS.

Construction traffic volumes are expected to be relatively low when compared to existing traffic volumes within the study area. As a worst-case scenario, 385 spoil haulage vehicles per day would be generated by the project. When compared to existing traffic volumes, this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway (east of College Crescent).

As the volume of traffic generated by the project is expected to be low compared to existing and forecast traffic, the effects of the short-term increase in traffic because of the project would not significantly impact road safety in the study area. Direct impacts to movements into and out of the entrance to Barker College on the Pacific Highway as a result of the haulage vehicle movements along the Pacific Highway would be minor.

Potential impacts to road safety for all road users during the project would be mitigated via the provision of tailored traffic management plans and measures. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.
6 Responses to community submissions

6.1 Strategic justification and project need

6.1.1 Need for the project

Submission Identification: 0013, 0018, 0020, 0036

Issue description

Submissions relating to the need to fill the quarry, the quarry being opened up to the market to allow other operators to supply fill to the quarry and allowing for ongoing fill operations into the future.

Response

The construction of the NorthConnex project would generate an unavoidable volume of excess spoil, which would require management and emplacement/disposal. The need for a spoil management site, such as the Hornsby Quarry site, is a fundamental requirement of delivering the NorthConnex project. By providing spoil for beneficial reuse within the Hornsby Quarry void, the project would also respond to the need to stabilise the quarry site and to make it safe. Beneficial reuse of spoil within the quarry void would facilitate separate future rehabilitation and redevelopment of the site by Hornsby Shire Council for open space and public benefit.

A key benefit of the project is that the fill requirements for the quarry void would be sourced from a single project (the NorthConnex project), rather than potentially multiple projects over an indefinite period which may result in stop-start fill operations.

The project only covers the beneficial reuse of spoil generated from the NorthConnex project, and does not contemplate opening up the quarry site for commercial fill operations. The project relates to the construction phase of the NorthConnex project only and the beneficial reuse of spoil during this time. Infrastructure to facilitate the fill operations established as part of the project would be decommissioned at the completion of the project and the site would be handed back to Council. As such, project related infrastructure would not be available for any other fill operations outside the scope of the project.

6.1.2 Project Funding

Submission Identification: 0013, 0027, 0028

Issue description

Submissions questioning the cost of the project and whether Council was getting value for money from the project and spoil emplacement activities, including appropriate financial restitution.

Response

The Federal, State and local governments have committed to equally fund the $22 million project. The funding would cover the considerable capital costs required to establish onsite infrastructure to enable filling activities. The project would result in the quarry void being filled to a level that would facilitate Council's long-terms plans for the rehabilitation of the quarry.

An economic assessment by Cardno (2013) identified that if Hornsby Shire Council were to purchase VENM to fill the quarry void to RL 64 metres (as proposed as part of the project), it would cost around $145 million. Provision of spoil from construction of the NorthConnex project therefore represents a significant cost saving.

Stabilising the quarry void through beneficial reuse of spoil would also reduce the ongoing management costs incurred by Council as the owner of the Hornsby Quarry site. It would also remove the risk, and potential liability, that may be incurred in the event of a future incident on the site (such as a geological slip or collapse).

The NorthConnex project provides a unique opportunity to the Council through providing a reliable supply of high quality material within a defined time period to enable the filling of the quarry void to a level that would facilitate Council's long-terms plans for the rehabilitation of the quarry. The NorthConnex project enables Council to avoid filling operations from potentially multiple projects over an indefinite period which may result in stop-start fill operations and greater capital and operational expenditure.
By helping to facilitate the long-term rehabilitation of the site, the project would also contribute to long term public benefits for local residents and the wider community.

6.2 Project development and alternatives

6.2.1 Strategic alternatives

Submission identification: 0020

Issue description

Submission suggesting the use of a bored tunnel from Leighton Place, serviced by a slip lane from the M1 Pacific Motorway, to transport spoil from the NorthConnex construction sites to a spoil unloading location in Old Mans Valley. Suggestion that this option would be cheaper, quieter and avoid traffic impacts.

Response

A number of alternatives to the transport of spoil via road haulage were investigated for the project and are discussed in detail in Section 3.3.3 of the EIS. This included the consideration of an underground spoil delivery system involving a spoil unloading facility built adjacent to the Pacific Highway, Hornsby, and an underground conveyor to the quarry void. As discussed in Section 3.3.3 of the EIS, this option was discounted as it would involve substantial additional upfront capital costs (including property acquisition) and the extended timeframe to construct the tunnel posed a significant risk of the facility not being ready in time for the commencement of construction of the NorthConnex project and associated construction and spoil generation schedule.

The alternative tunnel boring option suggested in the submission would pose similar risks and has the potential to involve greater construction costs and greater environmental and community impacts due to the length of tunnel required (approximately 2.3 km from Leighton Place, Hornsby to the quarry site). In addition to the construction costs of the tunnel itself, this option would involve significant site establishment costs including land acquisition costs of a suitable spoil unloading facility site at Leighton Place, the demolition of any existing buildings/commercial operations at the acquired spoil unloading facility site and the construction of a new access road from the M1 Pacific Motorway to transport spoil from the NorthConnex construction sites to the spoil unloading facility site (including associated land acquisition costs).

A tunnel option would incur significant additional establishment costs, the likelihood for additional environmental and community impacts and for impacts to be shifted to different locations in addition to the quarry site itself, significant constructability risks, and the potential for the facility to not be ready in time for the commencement of construction of the NorthConnex project given the complexities and timing associated with land acquisition and construction.

Whilst the current proposal would involve road haulage and the potential for associated amenity impacts at surrounding receivers, with the implementation of appropriate mitigation measures, it is considered that the current proposal has the potential for less risk and environmental and social impacts than a tunnel option.

6.2.2 Haulage route options

Submission identification: 0001, 0008, 009, 0023, 0026, 0028, 0029, 0034

Issue description

Submissions questioning the appropriateness of the Yirra Road - Belmont Parade - Ku-ring-gai Chase Road haulage route and the need for a northern haulage route through Asquith/Mt Colah during peak times. Submissions also suggested alternative haulage routes/haulage arrangements (use of Berowra on ramp to the M1, use of Lucinda Avenue to avoid using the M1).

Response

In response to submissions and as a result of ongoing assessment of the northern outbound haulage route following the exhibition of the EIS, investigations are underway into the use of either the northern outbound haulage route described in the EIS for the project (via Yirra Road / Belmont Parade / Ku-ring-gai Chase Road) or alternatively the use of the Windybanks Interchange in Berowra.

The Windybanks Interchange (southbound on-ramp onto the Pacific Motorway) is approximately 6.5 kilometres north of the Ku-ring-gai Chase Road Pacific Motorway southbound on-ramp described in the EIS.
Haulage vehicles would travel north on the Pacific Highway (an arterial road) and access the interchange directly via a signalised right hand turn lane at an existing intersection. The Windybanks Interchange is identified by Roads and Maritime as suitable for use by Restricted Access Vehicles.

Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the Traffic Management Plan (TMP) and Haulage Management Sub Plan (HMSP) approval stage. Further details regarding investigations into the haulage routes for the project are provided in Section 7.3 of this report.

The haulage routes for the project have been designed to avoid local roads as far as possible. A haulage route using Lucinda Avenue, to avoid haulage trucks travelling northbound on the M1 Pacific Motorway, would require the use of additional local roads such as Eastbourne Avenue and Hewitt Avenue to access the M1 Pacific Motorway southbound. While the haulage distance and associated fuel use would be reduced, using these local roads would have the potential for additional residential receivers to be impacted by noise and traffic. An intersection would be constructed at the Northern Interchange compound (as part of NorthConnex) to allow safe access to and egress from the M1 Pacific Motorway. Furthermore, the M1 Pacific Motorway is designed to accommodate heavy vehicles and is therefore a safer option for the haulage route.

The haulage routes would be further refined and finalised during detailed design and in consultation with Hornsby Shire Council and the Transport Management Centre.

### 6.2.3 Site access

**Submission identification:** 0017, 0020, 0026, 0027, 0029, 0030, 0035

**Issue description**

Submissions questioning the need to use Bridge Road for site access, given the existence of the Quarry Road access road and suggesting alternative site access arrangements, involving the use of Bridge Road for one-way haulage only (to retain access from Roper Lane to the signalised intersection of Bridge Road/Peats Ferry Road) or a circular haulage route (in via Bridge Road, out via Quarry Road). Submissions also suggested using Quarry Road, to avoid the loss of native vegetation associated with Bridge Road upgrade works and to make use of the gentler road grade.

**Response**

Bridge Road is currently proposed as the primary access route into and out of the quarry site. This access arrangement was identified following detailed consultation with Hornsby Shire Council to minimise the requirement for haulage along local roads or through residential areas as far as possible. The use of Quarry Road as the primary access or exit for haulage vehicles would require trucks to travel through local roads including Dural Street and William Street to connect from Peats Ferry Road onto Quarry Road including the potential for additional road augmentation works along these roads to allow for safe haulage movements. In contrast Bridge Road connects directly onto the Peats Ferry Road (an arterial road) without the need to traverse intervening local roads.

One-way haulage along Bridge Road or the use of a circular haulage route would require the additional use of Quarry Road for haulage trucks to either enter or exit the site and result in the introduction of haulage traffic onto local roads such as Dural Street and William Street (which connect to Quarry Road).

Bridge Road would be regraded, to reduce the steepness of the road, and widened to allow for safe traffic movements into and out of the site. The upgrade works would result in vegetation disturbance and clearance and this impact has been assessed in Section 7.3 of the EIS. No Blue Gum High Forest would be cleared as a result of the Bridge Road upgrade works, The works on Bridge Road would result in the loss of locally significant Sandstone Blackbutt Woodland and potential foraging and breeding habitat for the Gang-gang Cockatoo. Impacts to native vegetation have been minimised as far as possible through the design and location of project infrastructure and unavoidable clearance of protected vegetation communities and habitat would be offset in accordance with the Biodiversity Offset Package to be prepared for the project (refer to Section 6.11.4).

Whilst the primary use of Bridge Road would result in the loss of native vegetation and necessitate the closure of Roper Lane to provide for public safety during haulage operations, on balance the use of Bridge Road for the entry and exit of haulage vehicles has been deemed the optimal solution to avoid haulage traffic impacts to local roads. The impacts and measures to mitigate the closure of Roper Lane are further discussed in Section 3.1 of this report. Impacts and measures to mitigate vegetation clearance are described in more detail in Section 6.11.2 and 6.11.4 of this report.
6.2.4 Location of spoil stockpiles

Submission identification: 0029

Issue description
Submission suggesting the spoil stockpiles are located near the disused quarry buildings, off Quarry Road, to avoid impacts to easier mountain bike trails.

Response
The project has been designed to avoid and minimise direct impacts on the existing mountain bike trails as far as possible. The indicative location of spoil stockpiles has been determined having regard to a range of potential environmental and social impacts. In particular, stockpile sites have been sited within a relatively flat area of the site to limit the amount of ground disturbance required during site preparation works. The stockpile sites also take advantage of areas of Old Mans Valley which have been previously disturbed and/or are dominated by exotic grasslands, to avoid areas of high ecological value.

However, temporary closure of some existing mountain bike trails would be required at the start of the project to ensure public safety. The majority of bike trails which fall within the construction area are sections graded as easy or intermediate. The majority of trails graded as more difficult and advanced are located to the south and north of the construction area and are not expected to be as affected.

Further clarification regarding the closure and restriction of access to some mountain bike trails as a result of the project is provided in Section 3.2.

6.3 Project description

6.3.1 Works on Quarry Road

Submission identification: 0015, 0018

Issue description
Submissions supporting the construction of ‘a new Quarry Road’ and questioning whether the internal haul road within the quarry void is safe for use by workers and machinery and any improvement works proposed.

Response
Quarry Road is proposed to be used for deliveries to the site or emergency access, however no sealing or widening or other improvement works are proposed along Quarry Road.

At this stage no road improvements works are proposed to the internal haulage route providing access into the quarry void. This access would be assessed during detailed design to ensure it is safe and suitable for transporting required plant and equipment into the quarry void. Mine safe equipment, that are designed to operate in these types of environments, are proposed to be used. Access to the quarry floor along the access road will be by these plant only.

If the internal access track to be used to access the quarry void is found to be unsuitable, the machinery would be transported into the void by alternate means (such as using a temporary crane).

The haulage road is expected to be suitable for transporting workers safely into the quarry void, noting that this road is currently used by Council to access the void for dewatering operations.

6.3.2 Spoil emplacement methodology

Submission identification: 0020

Issue description
Submission relating to spoil emplacement methodology at the quarry void suggesting that fill operations (via a tunnel conveyer option) undertaken at a void water level of three metres deep or less, would not require compaction works, as the spoil would naturally settle and would only require spreading to create a stable quarry surface, resulting in cost savings.
Response

The emplacement methodology proposed at the quarry site has been developed to ensure safe working conditions for workers within the quarry void and to allow for efficient filling operations. This includes the initial dewatering of the quarry void to an approximate depth of two metres (and ongoing maintenance dewatering for the duration of the works) to ensure safe and visible working conditions; quarry face stabilisation works (as required) prior to filling works commencing to ensure safe access and working conditions within the void; and the use of compaction and spreading machinery to ensure a stable surface for workers and machinery during the carrying out of the project and to allow for appropriate levels of compaction of the quarry surface (suitable for future recreational land use) at site handover back to Council.

6.3.3 Hours of work
Submission identification: 0020, 0034

Issue description
Submission suggesting that a tunnel option for the delivery and emplacement of spoil at the quarry would allow fill operations to occur on a 24-hour basis and a submission suggesting that haulage trucks should be made to travel at night time.

Response
The feasibility of a tunnel option to the quarry is discussed in Section 6.2.1 of this report. Fill operations on a 24 hour basis are not proposed for the project, as this would generate noise, traffic and lighting impacts at surrounding sensitive receivers on a continuous basis (including at night time) from the quarry site which is considered to be an unacceptable outcome.

6.3.4 Rehabilitation and final landform
Submission Identification: 0036

Issue description
The level of fill at the completion of the project should be raised to facilitate an appropriate outcome for Hornsby Shire Council and the community.

Response
The proposal is for the quarry void to be filled to a level that would facilitate its future use for rehabilitation, this being an approximate height of RL 64 metres. Hornsby Shire Council has confirmed that this depth of fill is sufficient and appropriate to facilitate its future plans to rehabilitate and redevelop the site.

6.4 Traffic and transport
6.4.1 Use of Yirra Road, Belmont Parade/Ku-ring-gai Chase Road for truck haulage
Submission identification: 0008, 0019, 0023, 0028, 0034

Issue description
Submissions relating to the use of the Yirra Road bridge and potential delays turning right from the Pacific Highway. Also the ability of trucks to safely turn right into Belmont Parade from Yirra Road, particularly in the afternoon peak.

Response
The haulage routes for the project, presented in Section 3.3 of the EIS, were identified based on extensive consultation with Hornsby Shire Council.

In response to submissions and through further development and assessment of the haulage route since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses.
Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and HMSP approval stage. Further details of this change are provided in Section 7.2 and shown in Figure 7.1.

Section 6.1.4 of the EIS describes the results of a preliminary analysis of swept path of a truck and dog haulage vehicle along the northern outbound peak hours haulage route. The preliminary analysis found that the Pacific Highway to Yirra Road movement could be completed satisfactorily, however the corresponding right turn movement from Yirra Road to Belmont Parade indicated potential conflicts.

In response to submissions, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, the following road modifications are under investigation to assist in optimising traffic performance and road safety along this route:

- Optimisation of signal timings to provide a safe right turn movement from Pacific Highway onto Yirra Road
- Lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road
- New line marking in both directions on the Pacific Highway immediately south of the Pacific Highway and Yirra Road intersection, which could result in the loss of some on street parking along the Pacific Highway southbound
- Widening of Belmont Parade to improve the right turn path from Yirra Road onto Belmont Parade
- Improvements to the left turn path from Belmont Parade onto Ku-ring-gai Chase Road, including reconfiguration of the traffic island at this location

The road modification works described above would not be required if investigations currently underway determine that northbound haulage vehicles would access the M1 Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of the investigations into the use of the Windybanks Interchange refer to Section 7.3).

In addition, a TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project.

### 6.4.2 Use of the Mt Colah exit and Ku-ring-gai Chase Road U-turn back onto the M1 by haulage trucks

**Submission identification:** 0018, 0019, 0023

**Issue description**

Submissions relating to the safety of view lines for heavy vehicle traffic turning right from the Mt Colah M1 Pacific Motorway exit onto Ku-ring-gai Chase Road. Also suggestions for road widening and lengthening of slip lanes to allow for the safe movement and merging of heavy vehicle traffic.

**Response**

Existing arrangements at the M1 Pacific Motorway Mt Colah exit at its intersection with Ku-ring-gai Chase Road are sufficient and suitable to accommodate the haulage traffic associated with the project without the need for additional modifications to the intersection. The Ku-ring-gai Chase Road bridge over the M1 Pacific Motorway is also capable of accommodating all vehicle types including heavy vehicles and widening of the road bridge is not required. This part of the haulage route is approved for heavy vehicles including B-doubles (in accordance with *NSW Restricted Access Vehicle Enforceable Networks Schedule Amendment (Notice) 2015 (No.1)*).

If required, minor trimming of vegetation may be undertaken as part of road maintenance activities to improve view lines for vehicles turning right from the Mt Colah exit onto Ku-ring-gai Chase Road. The southbound entry onto the M1 Pacific Motorway from Ku-ring-gai Chase Road has been built to Motorway standard to accommodate the entry and merging of vehicles including heavy vehicles. As such, additional augmentation of the existing merging lane is not necessary to accommodate haulage traffic for the project.

Further discussion of road network performance impacts is provided in Section 6.4.3 of this report.
6.4.3 Network performance

Submission identification: 0001, 0008, 0011, 0012, 0021, 0023, 0024, 0028, 0034, 0035

Issue description

Submissions relating to the impact of project traffic on network performance including impacts during peak times and school drop-off/pick up times, traffic queuing and congestion, project haulage vehicle times and numbers, cumulative traffic impacts from other development occurring concurrently and traffic from increased high density development in the area.

Response

The traffic and transport impacts of the project on network performance (including intersection performance and peak hour traffic) are assessed in Section 6.1 and Appendix C of the EIS.

Up to 385 haulage vehicles would enter the quarry site per day (35 haulage vehicles per hour) when spoil generation by NorthConnex is at its peak. Haulage vehicles would use the designated haulage routes between 7 am and 6 pm on weekdays and between 8 am and 1 pm on Saturdays.

The traffic assessment identifies that the project would contribute to additional queuing and the lowering of intersection performance at a number of intersections including the M1 Pacific Motorway/Pacific Highway, Pacific Highway/Bridge Road (AM and PM peak) and Pacific Highway/Yirra Road (PM peak). These delays however need to be considered in the context of the forecast future performance of the intersections, which would already be operating above capacity in 2016 due to natural traffic growth. Project related traffic would contribute to existing congestion at these intersections. However, given the temporary nature of the project, the project traffic impacts would be acceptable in the context of the strategic benefits of the project.

The traffic assessment also includes consideration of cumulative traffic. This includes modelling based on contemporary traffic counts undertaken at key intersections (to account for existing traffic levels including recent high density residential development in the local area) as well as the assessment of potential cumulative traffic impacts from other key projects (e.g. Epping to Thornleigh Third Track Project, North West Rail Link, NorthConnex and WestConnex). The traffic assessment identifies that given the isolation of the project study area from other key transport projects including being located to the north of the NorthConnex study area, cumulative interaction of traffic would be minimal.

A TMP would be incorporated into the CEMP for the project to manage and minimise traffic impacts as far as practicable to the surrounding network. This would include appropriate driver protocols to ensure adherence with all road rules, confinement of haulage to the assessed haulage routes only and to the work hours for the project. In particular, haulage operations would be undertaken such that haulage trucks would arrive at the Hornsby Quarry no earlier than the commencement of spoil emplacement activities nominated in the EIS, being 7 am on weekdays and 8 am on Saturdays. Trucks would not, under normal operating conditions, be required to queue outside of the Hornsby Quarry site outside of these hours.

6.4.4 Roper Lane closure

Submission identification: 0011, 0014, 0017, 0024, 0025, 0026, 0035

Issue description

Submissions relating to the potential traffic impacts from closing Roper Lane including peak hour delays, traffic congestion and accident risks from:

- Accessing Peats Ferry Road via alternative un-signalised intersections (via Watson Avenue or Summers Avenue).
- Accessing Galston Road from alternative un-signalised intersections (e.g. Carrington Road, Clarinda Street, Ethel Street) in order to access Peats Ferry Road via the signalised access of Galston Road.

Response

Roper Lane would be closed at the intersection of Bridge Road to maintain public safety and to minimise interaction of project haulage vehicles with local traffic. The closure would require residents from Roper Lane (and connected streets such as Fern Tree Close, Summers Avenue and Silvia Street) to use alternative roads to access the Pacific Highway/Peats Ferry Road rather than the signalised Bridge Road/Peats Ferry Road intersection.
Alternative access to the Pacific Highway/Peats Ferry Road is available via Summers Avenue and Watson Avenue which provides for all movements, and signalised access is available via Galston Road.

It is acknowledged that these alternative access routes are likely to be constrained during peak hours at un-signalised intersections and have the potential to impact on traffic conditions for local commuters. As such, the option of installing additional signalised access at Watson Avenue/Peats Ferry Road to provide alternate safe access to Peats Ferry Road is being investigated in consultation with Council and the Transport Management Centre. Further details regarding the potential provision of signalised access at Watson Avenue are provided in Section 3.1 of this report.

6.4.5 Road improvements

Submission identification: 0009, 0011, 0014, 0017, 0023, 0024, 0025, 0034

Issue description

Submissions suggesting various road improvements to minimise impacts on network performance, improve intersection safety at alternate access routes (with the removal of the Roper Lane access to the signalised intersection of Bridge Road/Peats Ferry Road) and improve road safety along haulage routes. This included:

- Additional traffic lights/speed bumps at Belmont Parade and Ku-ring-gai Chase Road to provide for safe traffic movements along the northern haulage route.
- Construction of a new on-ramp to the M1 Pacific Motorway from the Pacific Highway using vacant Roads and Maritime land parallel to Ku-ring-gai Chase Road.
- Additional traffic lights on the Watson Avenue/Peats Ferry Road intersection or Summers Avenue/Peats Ferry Road or Roper Lane/Bridge Road as an alternate access to Peats Ferry Road to account for the closure of the Roper Lane access to the signalised intersection of Bridge Road/Peats Ferry Road.
- A roundabout from Ethel Road to Galston Road to provide safe right turn access into Galston Road so that the signalised intersection at Galston Road may be used as an alternate access to Peats Ferry Road (to account for the closure of the Roper Lane access to the signalised intersection of Bridge Road/Peats Ferry Road).
- Lights from Carrington Road into Galston Road to provide safe right turn access into Galston Road so that the signalised intersection at Galston Road may be used as an alternate access to Peats Ferry Road (to account for the closure of the Roper Lane access to the signalised intersection of Bridge Road/Peats Ferry Road).
- Adjustments to traffic signal timing at signalised intersections along the haulage routes.

Response

The haulage routes for the project, presented in Section 3.3 of the EIS, were identified based on extensive consultation with Hornsby Shire Council.

In response to submissions and through further development and assessment of the haulage route since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and HMSP approval stage. Further details of this change are provided in Section 7.2 and shown in Figure 7.1.

Section 6.1.4 of the EIS describes the results of a preliminary analysis of swept path of a truck and dog haulage vehicle along the northern outbound peak hours haulage route. The preliminary analysis found that the Pacific Highway to Yirra Road movement could be completed satisfactorily, however the corresponding right turn movement from Yirra Road to Belmont Parade indicated potential conflicts.
Additionally, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, the following road modifications are under investigation to assist in optimising traffic performance and road safety along this route:

- Optimisation of signal timings to provide a safe right turn movement from Pacific Highway onto Yirra Road
- Lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road
- New line marking in both directions on the Pacific Highway immediately south of the Pacific Highway and Yirra Road intersection, which could result in the loss of some on street parking along the Pacific Highway southbound
- Widening of Belmont Parade to improve the right turn path from Yirra Road onto Belmont Parade
- Improvements to the left turn path from Belmont Parade onto Ku-ring-gai Chase Road, including reconfiguration of the traffic island at this location

The road modification works described above would not be required if investigations currently underway determine that northbound haulage vehicles would access the M1 Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of the investigations into the use of the Windybanks Interchange refer to Section 7.3).

The installation of additional signalised access at Watson Avenue/Peats Ferry Road (to provide alternate safe access to Peats Ferry Road following the closure of access from Roper Lane to the signalised intersection of Bridge Road/Peats Ferry Road) is being investigated in consultation with Council and the Transport Management Centre. Further details regarding the provision of signalised access at Watson Avenue/Peats Ferry Road is provided in Section 3.1.

Based on the traffic assessment undertaken for the project and the temporary nature of project traffic contributions, no other road improvement works are necessary to accommodate the project. Road improvements works associated with the project would be limited to works at Bridge Road (west of Peats Ferry Road) as described in Chapter 4 of the EIS.

6.4.6 Traffic safety

Submission identification: 009, 0012, 0019, 0023, 0024, 0028, 0035

Issue description

Submissions relating to road safety along haulage routes, haulage routes passing near schools and residential areas, haulage vehicle driver safety on Bridge Road (the quarry access road) and mitigation for potential accidents along the northern haulage route.

Response

Safety risks posed by haulage traffic to other vehicles, cyclists and pedestrians along the haulage routes is considered in Section 6.5 of the EIS. A TMP would be prepared prior to the commencement of works to manage potential safety risks to other vehicles, pedestrians and cyclists, including around school zones. This would include appropriate driver protocols to ensure adherence to all road rules and confinement of haulage to the assessed haulage routes only and to the work hours for the project.

Bridge Road would be widened and regraded, reducing the steepness of the road, to allow for safe traffic movements into and out of the site.

The haulage routes for the project, presented in Section 3.3 of the EIS, were identified based on extensive consultation with Hornsby Shire Council.

In response to submissions and through further development and assessment of the haulage route since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the northern outbound haulage route, it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and HMSP approval stage. Further details of this change are provided in Section 7.2 and shown in Figure 7.1.
Section 6.1.4 of the EIS describes the results of a preliminary analysis of swept path of a truck and dog haulage vehicle along the northern outbound peak hours haulage route. The preliminary analysis found that the Pacific Highway to Yirra Road movement could be completed satisfactorily, however the corresponding right turn movement from Yirra Road to Belmont Parade indicated potential conflicts.

In response to submissions, and as a result of ongoing assessment of the northern outbound peak hours haulage route following the exhibition of the EIS, the following road modifications are under investigation to assist in optimising traffic performance and road safety along this route:

- Optimisation of signal timings to provide a safe right turn movement from Pacific Highway onto Yirra Road
- Lengthening of the right turn holding lane at the intersection of Pacific Highway and Yirra Road
- New line marking in both directions on the Pacific Highway immediately south of the Pacific Highway and Yirra Road intersection, which could result in the loss of some on street parking along the Pacific Highway southbound
- Widening of Belmont Parade to improve the right turn path from Yirra Road onto Belmont Parade
- Improvements to the left turn path from Belmont Parade onto Ku-ring-gai Chase Road, including reconfiguration of the traffic island at this location.

The road modification works described above would not be required if investigations currently underway determine that northbound haulage vehicles would access the M1 Pacific Motorway via the southbound on-ramp at the Windybanks Interchange (for further details of the investigations into the use of the Windybanks Interchange refer to Section 7.3).

### 6.4.7 Public transport and emergency services

**Submission identification:** 0026

**Issue description**

Submissions relating to access and egress of NSW Fire and Rescue vehicles being blocked by trucks queuing at the Bridge Road/Peats Ferry Road intersection and whether NSW Fire and Rescue has been consulted as part of the project.

**Response**

An emergency signal control is located within Hornsby Fire Station which enables NSW Fire and Rescue to override the signals at the Bridge Road/Peats Ferry Road intersection in an emergency. As such, in the event that traffic is queued across the driveway of the fire station, NSW Fire and Rescue can use the phase switch to allow traffic to move through the traffic lights and enable fire trucks to exit the fire station in a timely manner. Roads and Maritime has and would continue to consult with Fire and Rescue NSW in relation to relevant aspects of the project.

### 6.4.8 Parking

**Submission identification:** 0026

**Issue description**

Submission requesting further details of parking changes on Bridge Road.

**Response**

Section 6.1.4 of the EIS outlines the potential impacts to parking as a result of maintaining public safety and facilitating safe two-way passage of haulage vehicles on Bridge Road, south of Roper Lane on the descent to the TAFE entrance (approximately 12 car spaces). In addition, parking restrictions are also likely to be needed for the section of Bridge Road west of Pacific Highway/Peats Ferry Road to Roper Lane to facilitate safe two-way passage. The total number of potential car parking spaces impacted between the Peats Ferry Road/Bridge Road intersection and the TAFE entrance would be approximately 30 spaces (assuming both sides of Bridge Road have parking restrictions).

Parking restrictions would be in place all hours during Bridge Road upgrade works (approximately three months). Once the upgrade works are complete, parking would be restricted during standard work hours only, for the remaining duration of the project.
6.4.9 Road dilapidation
Submission identification: 0028, 0034

Issue description
Submission relating to project haulage vehicles causing road damage and the cost and responsibility of any repairs to bridges and road surfaces as a result of heavy vehicle use of the haulage routes.

Response
Project traffic volumes would be relatively low when compared to existing traffic volumes within the study area. At the peak of spoil production a maximum of 385 spoil haulage vehicles per day would access the project site and this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway. As the volume of traffic generated by the project is expected to be low compared to existing traffic along the haulage route, it is unlikely that the additional traffic generated by the project would significantly affect road condition along the haulage routes.

6.5 Noise and vibration

6.5.1 Airborne noise impacts
Submission identification: 0015

Issue description
Noise impacts during the carrying out of the project at nearest residential receivers.

Response
A noise and vibration impact assessment was carried out for the project and is provided in Section 6.2 and Appendix D of the EIS. The noise assessment indicates that noise exceedances above applicable noise management levels are expected to be highest during the site establishment phase (around three months), with lesser exceedances predicted during the spoil haulage and emplacement phases of the project, which would comprise the majority of the duration of the works. The noise assessment was based on conservative worst case noise scenarios of concurrent operation of plant and equipment, and it is noted that all equipment would not be working at their maximum capacity and highest intensity for the entirety of the project. As such, the noise levels experienced at the nearest receivers are in general expected to be less than worst case predictions.

Reasonable and feasible mitigation measures would be identified and implemented during the project to further minimise noise impacts to receivers. In addition, in recognition of the project works being undertaken in close proximity to sensitive receivers, the project has been developed to ensure works are carried out only within standard construction hours (7 am to 6 pm on weekdays, 8 am to 1 pm on Saturdays and no work on Sundays or public holidays), except under specific limited conditions as described in Section 4.5.1 of the EIS.

6.5.2 Traffic noise
Submission identification: 0009, 0021, 0028

Issue description
Submission relating to traffic noise generated by project related traffic and suggestions for noise monitoring.

Response
Traffic noise impacts have been assessed in Section 6.2 and Appendix D of the EIS. The assessment identifies that the project would not increase road traffic noise levels at receivers on any arterial/sub arterial roads by more than 2 dB(A). An increase of less than 2 dB(A) above existing traffic noise is perceptible to the majority of sensitive receivers.

Traffic noise increases greater than 2 dB(A) are predicted along Bridge Road (west of the Peats Ferry Road/Pacific Highway intersection) and are expected to result in appreciable traffic noise impacts at sensitive receivers.
Additional feasible and reasonable noise management and mitigation measures (including noise monitoring if required) would be considered during detailed design to minimise impacts at affected receivers. Detailed consideration of feasible and reasonable noise management and mitigation measures would include consideration of the nature and timing of impacts and the sensitivity of individual receivers to noise impacts.

6.6 Hydrology and soils

6.6.1 Quarry diatreme

Submission Identification: 0005

Issue description

Submission advocating additional assessment of the geological significance of the Hornsby diatreme.

Response

The Hornsby Diatreme is visible on the eastern wall of the quarry void and has been reviewed and interpreted in detail by PSM (2007) as part of its assessment of geotechnical and hydrogeological constraints relating to the Hornsby Quarry. This included review of the geological setting and quarry development at the site; interpretation of the formation of the Hornsby diatreme and description of the geological units at the site; inspection and geo-mechanical and borehole testing of the site; and geological and geomorphological mapping including detailed cross sections. This study was commissioned by Hornsby Shire Council as part of its investigations into land use options for the quarry site and is available on Hornsby Shire Council’s website. The PSM study reviewed a range of geological and geotechnical reports as part of its assessment including:

- Two geotechnical investigation reports by Coffey and Partners (1990) for Hornsby Shire Council.

Given the detailed review of the geology of the Hornsby Quarry by the previous PSM study, an additional detailed assessment of the geology of the site is not warranted as part of the project EIS.

The geological and geomorphological setting of the Hornsby Quarry is described in Section 6.3 of the EIS based on previous assessments carried out at the study area. In addition, the EIS included a specialist heritage assessment assessing potential impacts to the heritage listed parts of the Hornsby Diatreme (Section 7.6 and Appendix I of the EIS). Existing publicly available studies already provide relevant information on the geological setting, formation and characteristics of the geology of the Hornsby Quarry site and that additional assessment is not warranted as part of the project.

The project would result in the partial filling of the quarry from RL 10 metres AHD to a level of RL 64 metres AHD. At this level, the top most sections of the basinal layering of the Hornsby Diatreme visible on the eastern wall of the quarry void would remain visible (from approximately RL 64 metres to RL 100 metres). The partial filling of the quarry would not physically damage the diatreme.

The full extent of the diatreme (from the base of the quarry to the void rim) currently remains publicly inaccessible and is not visible due to being underwater. This would continue to be the case if the quarry is retained in its current state.
The project would facilitate the ultimate rehabilitation of the quarry site by Council which would enable the site to become accessible to the public and would provide the opportunity for the public to view the upper parts of the diatreme that remain visible above the level of the fill (an opportunity which is currently not available).

Some physical intrusion to the geological face of the quarry may be required (e.g. installation of rock bolts) as part of facia stabilisation works to ensure the quarry is safe to work within. However, in the context of past quarrying activities which have excavated the diatreme geology, this damage is considered to be minor.

The impacts of the project on the heritage values of the diatreme have been assessed as not being significant and in the context of existing limited visibility of the diatreme features. The visual impacts of filling have also been assessed as not being significant.

As part of the heritage mitigation measures for the project, photographic archival recording of the heritage listed parts of the quarry diatreme would be undertaken following the dewatering of the quarry and prior to the commencement of fill operations and made available to Council. This archival recording in combination with existing geological information on the site can be used by Council (should it wish) as part of the future rehabilitation of the site into recreational land use (e.g. to inform interpretive signage on the site etc.). This would be decision for Council and outside the scope of the project.

6.6.2 Land stability

Submission identification: 0018, 0028

Issue description

Submissions related to land stability issues at the quarry site at Old Mans Valley and within the void including:

- **Localised (local) stability:**
  - Instability in the void, including unstable void walls, presenting a safety risk to workers, plant and equipment.
  - Unstable fill areas within Old Mans Valley.
  - Need for the entire area to be made safe and stable in an environmentally sustainable manner for community use.
  - Need for monitoring of the stability of land under bike trails which would remain open during the project.

- **Larger scale (global) stability:**
  - Increasing the risk of land slip through construction related vibration
  - Risks to housing surrounding the site due to unstable land around the site.

Response

Land stability risks at the quarry site are identified and assessed in Section 6.3 of the EIS based on a review of previous geological, geotechnical and stability assessments undertaken at the Hornsby Quarry site by:


The EIS (Section 6.3.2) identifies areas within the quarry site (Old Mans Valley and in the vicinity of the quarry void) which have been emplaced with non-engineered fill material by previous site operations and areas of potential unstable land around the quarry void as identified by PSM 2007. Based on assessments undertaken by Cardno 1990 and PSM 2007, the EIS identifies that:

- The quarry void presents a moderate to high risk of small scale instability (at bench scale) around all four faces, which would present a safety risk to workers within the void (without appropriate mitigation).
The overburden placed on the eastern fill area at Old Mans Valley (where the spoil conveyor and stockpile area for the project would be located) is comprised of non-engineered overburden material, which would require further investigation during detailed design to determine any stabilisation requirements (e.g. additional compaction) to provide for the structural stability of project infrastructure.

The assessment of stability issues at the Hornsby Quarry have been comprehensively considered through previous investigations and are well understood. Further investigation of stability issues is not warranted at this stage.

The stability of the quarry and surround areas would continue to be monitored during the project, to ensure a safe work environment and to protect surrounding receivers. Based on this monitoring, additional measures may be implemented to enhance the geological integrity of the quarry void and surrounding land where significant stability risks are identified or anticipated.

6.7 Surface water and flooding

6.7.1 Aquatic ecology and watercourses

Submission identification: 0013

Issue description

Submission relating to the impacts to downstream water courses, aquatic ecology and water quality from quarry discharge including risks from discharge of stratified, anoxic, low temperature water and risks from the discharge of sediment laden discharge water.

Response

Surface water impacts of the project have been assessed in Section 6.4 of the EIS.

The water quality of the quarry void has been monitored over time by Hornsby Shire Council. Monthly measurements of discharge water quality from the quarry void have been collected by Hornsby Shire Council upstream from Old Mans Creek (at the flow monitoring tank at the quarry site, monitoring point 085) from the period 19 January 2010 to 11 September 2014 and the results are summarised in Table 6-44 of the EIS. Comparison of this water quality data to the catchment specific Regional Environmental Health Values (REHV) adopted by Council (refer to Table 6-44 of the EIS) for monitoring water quality within the Berowra sub catchment, which covers the project site, indicates that the water in the Hornsby quarry void is of generally good quality.

Analysis of quarry discharge water quality data collected by Council indicates mean values in compliance with Council's REHVs for dissolved oxygen saturation, suspended solids, nutrient levels (nitrogen and phosphorus) and faecal coliform levels. The monitoring data also indicates water temperatures between 12 and 27 degrees Celsius. These results indicate that the void water is of good quality, with low stratification of water temperature and oxygen levels across water depth, and low nutrient enrichment levels. This analysis is supported by water quality testing of the void undertaken by PB in 2004, which also concluded low stratification of the void and good water quality that was potentially suitable for a range of uses including disposal into freshwater ecosystems, long term irrigation of all but the most sensitive crops, and recreational purposes (PB, 2004). On this basis it is considered unlikely that discharge from the quarry void would lead to adverse impacts to the water quality or aquatic ecosystems of Old Mans Creek or downstream waterways in relation to the release of excessively cold or anoxic waters.

It is also noted that the water quality of Waitara Creek and Calna Creek downstream of Old Mans Creek is primarily controlled by the discharge of tertiary treated wastewater from the West Hornsby and Hornsby Heights Waste Water Treatment Plants (WWTPs) respectively. In this context, discharge from the quarry void would have limited influence on water quality of these downstream creeks.

Once the initial dewatering of the quarry void is complete, ongoing dewatering would be conducted during the spoil emplacement activities. There is potential for sediment to be mobilised in the void water at this stage of the project. The turbidity of the water would be managed prior to discharge using techniques such as compartmentalising of the pumping area (e.g. using on site sediment basins and silt curtains), treatment of the water (e.g. using flocculants) and testing to determine compliance with licence limits prior to discharge. Sediment laden water would also be used on site for dust suppression, in preference to discharge as far as possible. With the implementation of these measures discharge form the quarry would be controlled so as not to result in adverse water quality impacts to downstream waterways.
6.7.2 Drainage of the fill area
Submission identification: 0036

Issue description
Submission relating to drainage of the filled area.

Response
Surface water and flooding impacts have been assessed in Section 6.4 of the EIS. The assessment found that adverse impacts to surface flows as a result of the project would be unlikely.

Impacts to surface water flows would be appropriately managed via the design of stormwater infrastructure to accommodate expected changes in flow rates and volumes and through the implementation of standard construction management and mitigation measures.

6.8 Air quality

6.8.1 Emissions from haulage vehicles
Submission identification: 0001, 0021, 0024

Issue description
Submission relating to exhaust emissions/dust/pollution from haulage traffic.

Response
Potential exhaust emission impacts from haulage vehicles was assessed in the EIS (Section 7.1 and Appendix E). The assessment found that impacts from combustion emissions from haul trucks to receivers adjacent to haul routes would be negligible and well within air quality assessment criteria. In addition, all loads would be covered during haulage along public roads to ensure no dust emissions from haulage vehicles at sensitive receivers.

6.9 Land use and property

6.9.1 Impacts to mountain bike trails at Old Mans Valley
Submission identification: 0002, 0004, 0006, 0007, 0010, 0016, 0022

Issue description
Submissions relating to project impacts to mountain bike trails, including avoiding the closure of any bike trails or facility as a whole, suggestions to minimise project footprint intrusion on the bike trails, establishment of appropriate crossing points to maintain access during the project, re-establishment/restoration of the trails/mountain bike facility following the completion of the project.

Response
Some existing mountain bike trails would be closed at the start of the project to maintain public safety. The majority of bike trails which fall within the construction area are sections graded as easy or intermediate. The majority of trails graded as more difficult and advanced are located to the south and north of the construction area and are not expected to be directly affected. As such, most of these trails would continue to be available for use by mountain bike enthusiasts for the duration of the project.

In response to submissions received and through design development, the boundary of the south western corner of the Old Mans Valley works area has been realigned to maintain access to the ‘more difficult’ mountain bike trail (Turkey Royale) in this section for the duration of the works (refer to Section 3.2). The works area boundary has also been realigned in the north east corner to maintain access to the Lava Flow trail.

Temporary crossing access for the bike trail would be provided across Bridge Road (quarry access track), likely in the form of a culvert under the road near where the Tech Track currently joins the existing quarry access track. In addition, temporary crossing over the conveyor would be provided. The configuration of this crossing over the conveyor would be confirmed during detailed design.
In the north eastern part of the site, minor refinements of the fence line would allow access to the Lava Flow trail to remain open for the duration of the works, with only temporary restrictions on access during the construction of the Bridge Road crossing. Investigations are continuing into the possibility of providing temporary crossing access across Quarry Road where reasonable and feasible and with consideration to safety.

Further information relating to the changes to bike trails is provided in Section 3.2 of this report. Following project completion and handover of the site back to Hornsby Shire Council, the reopening or any proposed expansion of the mountain bike network would be a decision for Council and outside of the scope of the project.

6.9.2 Rehabilitation and final land use of the quarry void

Submission identification: 0018

Issue description
Submission asserting that land at the quarry site would not be used for recreational facilities but sold to private developers.

Response
A key objective of the project is to provide sufficient spoil to facilitate the future redevelopment of the site by Council for public recreation and community benefit. Hornsby Shire Council is committed to rehabilitating the site to provide open space for residents consistent with the RE1 (public recreation) zoning of the site under the Hornsby Local Environmental Plan 2013. Further information regarding Hornsby Shire Council's considerations for the future use of the quarry site can be obtained from its website (www.hornsby.nsw.gov.au/council/major-projects/hornsby-quarry).

Future rehabilitation of the site into recreational land use by Council would occur following the completion of the project and handover of the site back to Council. The final recreational land use of the site and its timing for development would be determined by Council and is outside the scope of this project.

6.10 Health

6.10.1 Impacts of vehicle emissions on health

Submission identification: 0024

Issue description
Submission relating to health impacts of emissions from haulage vehicles.

Response
Potential impacts on health resulting from exhaust emissions from haulage vehicles were assessed in the EIS (Section 7.2 and Appendix F). The health assessment considered the predicted concentrations of air pollutants associated with vehicle exhaust, including particulate matter, nitrogen dioxide, carbon monoxide, volatile organic compounds and polycyclic aromatic hydrocarbons. The assessment concluded that with the project the predicted concentrations for all these pollutants are below health-based guidelines and no adverse health effects would be expected in the local area surrounding the project.

6.11 Biodiversity

6.11.1 Vegetation in the quarry void

Submission identification: 0018

Issue description
Submission relating to vegetation within the quarry void, including whether the vegetation would be removed, the methodology and costs for vegetation removal, the inability to undertake fill operations successfully if the vegetation was retained, the impacts of vegetation roots on quarry face stability and the contamination of void water quality by deceased vegetation.
Response

The biodiversity assessment included in Section 7.3 and Appendix G of the EIS included assessment of vegetation loss within the quarry void and included this in the quantification of total vegetation impacts for the project. While there would be vegetation loss in the quarry void as a result of spoil emplacement, it is not proposed to remove the vegetation prior to spoil emplacement as it would not conflict with emplacement and compaction activities.

Leaving the vegetation in the void would not affect the effectiveness of compaction or the structural integrity of the compacted spoil. Leaving the vegetation in place would also mean that vegetation roots in the benches and quarry walls would remain.

The quarry void would be dewatered prior to the commencement of any works within the void and the water discharged in accordance with Council’s existing groundwater licence. Based on water quality monitoring results at the quarry void, it is likely that vegetation growing within the quarry void has low influence on the water quality of the void (through dead or decaying vegetation matter falling into the void water) (refer to Section 6.7.1 which identifies the existing water quality of the quarry). Following dewatering, the quarry void would be assessed for stability and any required local stabilisation works undertaken of the quarry face, prior to access being provided into the void for workers and plant and equipment for emplacement activities.

6.11.2 Vegetation clearing and impacts to threatened vegetation communities

Submission identification: 0027, 0030

Issue description

Submissions raising the loss of Blue Gum High Forest critically endangered ecological community and Sandstone Blackbutt Woodland (Smooth-barked Apple - Red Bloodwood). That these communities can be regenerated and their poor condition/management should not be a reason to remove these plant communities.

Response

The scarcity of Blue Gum High Forest is recognised, and is a key reason for committing to avoidance and mitigation measures in the design of the project.

A biodiversity impact assessment is provided in Section 7.3 and Appendix G of the EIS and includes an assessment of potential impacts on the Blue Gum High Forest and Sandstone Blackbutt Woodland communities.

During the design of the project, opportunities to avoid high value ecological matters and to minimise potential impacts were explored as much as possible, through detailed assessment of the study area and refinements to the project design. In particular, the project has sought to use previously cleared areas and areas with high dominance of weeds and/or exotic grasslands for project infrastructure, conveyors, access and spoil stockpiles. By doing this, impacts to higher quality native vegetation and communities have been avoided or minimised as far as possible.

The upgrade works on Bridge Road would result in unavoidable impacts on about 1.58 hectares of poor to moderate condition Sandstone Blackbutt Woodland. The project would also result in impacts to about 0.06 hectares of poor condition Blue Gum High Forest in Old Mans Valley where the conveyor is to be located (refer to Figure 8 in Appendix G (Technical working paper: biodiversity) of the EIS).

The Blue Gum High Forest in Old Mans Valley meets the criteria for a critically endangered ecological community under the Threatened Species Conservation Act 1997, but it does not meet the criteria for listing as a threatened community under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

In accordance with the assessment criteria defined in the NSW Framework for Biodiversity Assessment, because the area of Blue Gum High Forest to be impacted is less than 0.25 hectares, this vegetation zone was combined with the Sandstone Blackbutt Woodland vegetation zone and ecosystem credits for the loss of this vegetation have been determined. A Biodiversity Offset Package would be provided for the project to offset these losses and may include regeneration or rehabilitation of communities in poor condition.

Further opportunities to reduce the clearing of vegetation, particularly of the Blue Gum High Forest community and Sandstone Blackbutt Woodland vegetation, would continue to be investigated during the development of the design for the project and pursued if feasible and reasonable.
6.11.3 Impacts to threatened fauna
Submission identification: 0027, 0030

Issue description
Submission relating to the impacts of the project on habitat for the Gang-gang Cockatoo as a result of upgrade works on Bridge Road.

Response
The works on Bridge Road would result in the loss of native vegetation, including the loss of locally significant Sandstone Blackbutt Woodland, and the loss of potential foraging and potential breeding habitat for the Gang-gang Cockatoo. The total area of suitable habitat for the Gang-gang Cockatoo that would be impacted by the project is 1.64 hectares. There are eight hollow bearing trees (with a total of 12 hollows) likely to be impacted by the project, however none of the hollows to be impacted are large enough to be roosting or breeding habitat for Gang-gang Cockatoos.

Impacts to native vegetation and hollow bearing trees have been minimised as far as possible through the design and location of project infrastructure and unavoidable clearance of protected vegetation communities and habitat would be offset in accordance with the Biodiversity Offset Package to be prepared for the project.

6.11.4 Biodiversity offsets
Submission Identification: 0027, 0030

Issue description
Submission concerned that biodiversity offsets for the project would be in the form of managing existing communities rather than land purchase to replace habitat.

Response
The biodiversity offsets for the project would be detailed in a Biodiversity Offset Package to be prepared for the project and would align with the requirements of the NSW Biodiversity Offsets Policy for Major Projects. The offset strategy would be consistent with the offset strategy prepared for the NorthConnex project and Roads and Maritime would consult with Office of Environment and Heritage during this process to ensure that the scope of the offset strategy and subsequent Biodiversity Offsets Package is appropriate.

6.12 Social and economic
6.12.1 Accessibility of the EIS
Submission identification: 0027

Issue description
Submission concerned that the EIS was not translated into languages other than English and that residents from non-English speaking backgrounds have therefore not been appropriately consulted about amenity issues likely to affect them.

Response
Roads and Maritime is committed to ensuring the environmental assessment process is open, transparent and accessible across demographics. Demographic investigations of the project area, including the suburb of Hornsby, were carried out during the preparation of the EIS. This investigation concluded that there are a number of languages other than English spoken at home in the area including, but not limited to, Cantonese, Mandarin, Korean, Hindi, Persian/Dari and Arabic. Each individual language makes up small proportions of the total population within the area and the majority of these also identified as speaking English proficiently. Given the small representation of languages other than English it was not deemed necessary to translate the EIS.

To ensure access to information for people whose first language is not English, Roads and Maritime offered a translating and interpreting service where any person could access project information in their own language by phone. In addition, the project team contacted multicultural organisations operating in Hornsby to ensure their members were able to access project information. Roads and Maritime also offered to facilitate a dedicated workshop with the project team and a translator, if it was required.
6.13 Resources and waste

6.13.1 Contaminated material and asbestos

Submission identification: 0018

Issue description

Submission relating to the potential for contaminated land at the quarry site and the uncovering of asbestos in disused quarry buildings including how asbestos would be disposed of.

Response

Sections 6.3 and 7.9 respectively of the EIS assess the potential for uncovering contaminated material within the quarry site and potential waste impacts of the project, including consideration of asbestos.

The assessment identifies that the project has the potential to disturb two potentially contaminated areas at the quarry site, comprising the eastern fill area (likely to consist of overburden material extracted from the quarry pit during quarry operations) and the 1,000 litre diesel generator located inside of a container at RL 46 metres AHD on the western side of the quarry void. Mitigation measures have been included in the EIS to ensure that works within these areas are undertaken with due consideration of the risk of uncovering potentially contaminated material. This includes procedures for the appropriate identification, management and disposal of any contaminated or hazardous materials uncovered during the carrying out of the works.

There is also the possibility that asbestos containing materials are present in areas of existing quarry infrastructure. The project is unlikely to require demolition of quarry building infrastructure and therefore asbestos is unlikely to be encountered as part of the project. Notwithstanding this low risk, the CEMP would include measures to manage asbestos in the event that it is encountered during the works. Section 7.9.1 of the EIS outlines the general process that would be followed, in accordance with statutory requirements, in the event that asbestos is encountered and requires removal during the project.
7 Preferred Infrastructure Report

7.1 Overview

During and subsequent to the exhibition of the EIS, one change has been made to the project to reduce its potential environmental impacts. This change is a result of ongoing design development and in response to concerns raised in public submissions and other community and stakeholder engagement mechanisms. The change to the project consists of:

- Revision of the outbound peak hour haulage route so that outbound haulage during the peak periods is via a combination of the northern route and the southern route, both of which are identified in the EIS.

Section 7.2 assesses the potential impacts on the community and the environment of haulage vehicles using both the northern and southern outbound haulage routes during the peak periods. The assessment has used the northern outbound haulage route described in the EIS.

In addition to the change to the project described in Section 7.2, one potential change to the project is currently under investigation. This potential change to the project would consist of a change to the northern haulage route, whereby haulage vehicles would travel north on the Pacific Highway to the Windybanks Interchange, Berowra to access the southbound lanes of the M1 Pacific Motorway.

Additional detail regarding investigations into the use of the Windybanks Interchange for outbound haulage vehicles is provided in Section 7.3.

7.2 Proposed outbound heavy vehicle route

7.2.1 Description of changes

In the EIS, the proposed outbound haulage route during the peak period was identified as being out through Bridge Road and north along Jersey Street North, the Pacific Highway, Yirra Road, Belmont Parade and Ku-ring-gai Chase Road to connect with the M1 Pacific Motorway (refer to section 4.3.1 and Figure 4-3 of the EIS).

In response to submissions and through further development and assessment of the haulage route since the EIS was exhibited, the use of the outbound haulage route during peak periods has been amended. Rather than all of the trucks using the outbound haulage route via Yirra Road, Belmont Parade and Ku-ring-gai Chase Road (the northern haulage route), it is proposed that trucks would use the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haul routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and HMSP approval stage.

The change to outbound haulage routes is shown in Figure 7.1. The following section provides an overview of environmental impacts and benefits associated with the proposed change to the outbound peak hours haulage route.

7.2.2 Environmental overview of changes

The change to the outbound haulage routes compared to that presented in the EIS has been reviewed to identify potential relevant environmental impacts for further assessment. The environmental impacts associated with the exclusive use of the northern outbound haulage route during the peak periods have already been assessed within the EIS. This review has focused solely on the potential environmental impacts associated with the exclusive use of the southern outbound haulage route during the peak periods.

This assessment methodology would result in a ‘worst case’ assessment being undertaken for exclusive use of the northern outbound haulage route or exclusive use of the southern outbound haulage route. As the change to the haulage route options would consist of trucks using a combination of the northern and southern outbound haulage routes during the peak periods, the impacts would be less than those assessed under the worst case scenario for each option. For both options there is no change to the inbound routes as described in section 4.3.1 of the EIS.
This review has identified the following issues that require further assessment under the worst case southern outbound haulage route scenario:

- A change to the outbound peak period route for heavy vehicles may affect the performance of the surrounding road network. Further assessment of traffic impacts has therefore been conducted and is included in Section 7.2.3.

- A change to the outbound peak period route for heavy vehicles may affect traffic noise impacts for receivers along the haulage routes, including for receivers east and south of the Peats Ferry Road/Bridge Road intersection, including along George Street and the Pacific Highway.

- A change to the outbound peak hour route for heavy vehicles may change haulage vehicle exhaust emissions impacts on receivers along haulage routes.

The review of potential relevant environmental impacts concluded that the change to the outbound peak period haulage route would not change the assessment presented in the EIS for other environmental, community and land use issues.
Figure 7.1 Proposed outbound haulage routes
7.2.3 Traffic and transport

The maximum number of heavy vehicles entering and exiting the Hornsby Quarry site would be 35 per hour. This would result in a maximum potential total of 385 trucks per weekday of operation. While the program of spoil haulage is anticipated to run for 28 months, acceleration and deceleration of the NorthConnex construction program would mean that these maximum traffic numbers would not be reached every month. However, the updated traffic impact assessment assumes a worst case (i.e. that the maximum number of heavy vehicles would be hauling spoil for the duration of the haulage period).

Level of service definition

Average delay is commonly used to assess the operational performance of intersections, with Level of Service (LoS) used as an index. A summary of the LoS index is shown in Table 7.1.

Table 7.1 Level of service criteria for intersections

<table>
<thead>
<tr>
<th>Level of service</th>
<th>Average delay / vehicle (seconds/vehicle)</th>
<th>Traffic signals / roundabouts</th>
<th>Give way and stop signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt;14</td>
<td>Good operation</td>
<td>Good operation</td>
</tr>
<tr>
<td>B</td>
<td>15 to 28</td>
<td>Good with acceptable delays and spare capacity</td>
<td>Acceptable delays and spare capacity</td>
</tr>
<tr>
<td>C</td>
<td>29 to 42</td>
<td>Satisfactory</td>
<td>Satisfactory, but accident study required</td>
</tr>
<tr>
<td>D</td>
<td>43 to 56</td>
<td>Operating near capacity</td>
<td>Near capacity and accident study required</td>
</tr>
<tr>
<td>E</td>
<td>57 to 70</td>
<td>At capacity; at signals incidents would cause excessive delays</td>
<td>At capacity; requires other control mode</td>
</tr>
<tr>
<td>F</td>
<td>&gt;70</td>
<td>Roundabouts require other control mode</td>
<td>At capacity; requires other control mode</td>
</tr>
</tbody>
</table>

(Source: Guide to Traffic Generating Developments, RTA, 2002)

When a roadway or intersection level of service falls below LoS D, investigations are generally initiated to provide suitable remediation, however constraints in built-up urban areas mean that LoS E and F are regularly experienced by motorists at pinch points on the existing strategic road network in Sydney. These conditions are generally experienced during traffic peak periods.
Table 7.2 Intersection performance – AM peak period

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Initial haulage assessment (EIS) (Northern haulage route option)</th>
<th>Revised haulage assessment (amended haulage route) (Southern haulage route option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>Average delay (s)</td>
</tr>
<tr>
<td>M1 Pacific Motorway / Pacific Highway interchange</td>
<td>4,794</td>
<td>48</td>
</tr>
<tr>
<td>Pennant Hills Road / Pacific Highway</td>
<td>3,170</td>
<td>90</td>
</tr>
<tr>
<td>Pacific Highway / College Crescent / Pretoria Parade</td>
<td>2,873</td>
<td>52</td>
</tr>
<tr>
<td>Pacific Highway / Edgeworth David Avenue</td>
<td>3,277</td>
<td>32</td>
</tr>
<tr>
<td>Pacific Highway / George Street</td>
<td>2,987</td>
<td>42</td>
</tr>
<tr>
<td>Pacific Highway / Bridge Road</td>
<td>2,110</td>
<td>58</td>
</tr>
<tr>
<td>Bridge Road / Jersey Street North</td>
<td>2,121</td>
<td>26</td>
</tr>
<tr>
<td>Pacific Highway / Jersey Street North / Wattle Street</td>
<td>1,762</td>
<td>21</td>
</tr>
<tr>
<td>Pacific Highway / Yirra Road</td>
<td>2,351</td>
<td>42</td>
</tr>
<tr>
<td>Pacific Highway / Ku-ring-gai Chase Road</td>
<td>560</td>
<td>4</td>
</tr>
</tbody>
</table>

(Source: Guide to Traffic Generating Developments, RTA, 2002)
<table>
<thead>
<tr>
<th>Intersection</th>
<th>Initial haulage assessment (EIS) (Northern haulage route option)</th>
<th>Revised haulage assessment (amended haulage route) (Southern haulage route option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>Average delay (s)</td>
</tr>
<tr>
<td>M1 Pacific Motorway / Pacific Highway interchange</td>
<td>5,165</td>
<td>77</td>
</tr>
<tr>
<td>Pennant Hills Road / Pacific Highway</td>
<td>3,518</td>
<td>50</td>
</tr>
<tr>
<td>Pacific Highway / College Crescent / Pretoria Parade</td>
<td>3,014</td>
<td>53</td>
</tr>
<tr>
<td>Pacific Highway / Edgeworth David Avenue</td>
<td>3,594</td>
<td>31</td>
</tr>
<tr>
<td>Pacific Highway / George Street</td>
<td>3,358</td>
<td>52</td>
</tr>
<tr>
<td>Pacific Highway / Bridge Road</td>
<td>2,308</td>
<td>75</td>
</tr>
<tr>
<td>Bridge Road / Jersey Street North</td>
<td>2,254</td>
<td>25</td>
</tr>
<tr>
<td>Pacific Highway / Jersey Street North / Wattle Street</td>
<td>2,170</td>
<td>37</td>
</tr>
<tr>
<td>Pacific Highway / Yirra Road</td>
<td>2,718</td>
<td>62</td>
</tr>
<tr>
<td>Pacific Highway / Ku-ring-gai Chase Road</td>
<td>676</td>
<td>4</td>
</tr>
</tbody>
</table>

(Source: AECOM; 2015)
7.2.4 Noise

Section 6.2.3 of the EIS includes an assessment of the construction traffic noise impacts of the project. The relative traffic noise level increases for both arterial/sub arterial roads and local roads are summarised in Table 6-28 and Table 6-29 of the EIS.

The change in outbound peak hour haulage route would:

- Not change the number of vehicles using Bridge Road between the quarry site and Peats Ferry Road (Pacific Highway), because this part of the road network is common to the original haulage routes identified in the EIS and the amended outbound peak haulage route. Predicted construction traffic noise impacts along Bridge Road therefore would not change as a result of the amended outbound peak haulage route.
- Change the actual number of vehicles travelling along the southern haulage route (south along George Street and the Pacific Highway onto Pennant Hills Road) in the peak period relative to the number of vehicles that would have been expected to use this route based on the haulage route arrangements presented in the EIS. These changes in vehicle numbers may affect anticipated construction traffic noise impacts along this route.

The EIS presents a conservative construction traffic noise impact assessment, which assumes that the maximum heavy vehicle numbers (35 per hour) would be experienced in each hour of the 11 hour construction day. This assumption was applied to the assessment of both the northbound and the southern haulage routes. In effect, this assumption means that the southern haulage route has already been assessed at maximum heavy vehicle numbers during peak and non-peak periods.

Because of the conservative nature of the construction traffic noise impact assessment, changes in road traffic noise as a result of the amended outbound peak hour haulage route have already been included in predicted traffic noise levels. The construction traffic noise impacts generated by the amended haulage route would be no greater than the worst case maximum noise levels presented in the EIS. These worst case maximum noise levels for relevant roads are reproduced in Table 7.4.

Table 7.4 Road traffic during day-time (15 hours) – arterial/sub arterial roads

<table>
<thead>
<tr>
<th>Route</th>
<th>Direction</th>
<th>15-hour flow (number of vehicles)</th>
<th>Relative noise Level increase (dB(A))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Existing Light</td>
<td>Heavy</td>
</tr>
<tr>
<td>Pacific Highway - south of Bridge Road</td>
<td>14,753</td>
<td>762</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - north of William Street</td>
<td>14,152</td>
<td>835</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - south of William Street</td>
<td>15,542</td>
<td>1,165</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - between Bridge Road and Edgeworth David Avenue</td>
<td>32,786</td>
<td>1,983</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - between Edgeworth David Avenue and College Crescent</td>
<td>31,756</td>
<td>1,989</td>
<td>0</td>
</tr>
<tr>
<td>Edgeworth David Avenue</td>
<td>14,194</td>
<td>605</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - between Bridge Rd and College Crescent</td>
<td>28,119</td>
<td>1,824</td>
<td>0</td>
</tr>
<tr>
<td>Pacific Highway - east of Pretoria Parade</td>
<td>15,101</td>
<td>1,656</td>
<td>0</td>
</tr>
</tbody>
</table>

Note 1: 770 represents the number of haulage vehicles entering and leaving the site in the 15 hour period, noting that spoil haulage for the project is restricted to standard work hours (11 hours).

Under the worst case southern outbound haulage route option scenario, construction traffic noise impacts along the northern haulage route presented in the EIS would no longer occur.
7.2.5 Air quality

Potential exhaust emission impacts from haulage vehicles were assessed in the EIS (Section 7.1 and Appendix E). The assessment found that impacts from combustion emissions from haul trucks to receivers adjacent to haul routes would be negligible and well within air quality assessment criteria.

The change in outbound peak hour route would:

- Not change the number of vehicles using Bridge Road between the quarry site and Peats Ferry Road (Pacific Highway), because this part of the road network is common to the original haulage routes identified in the EIS and the amended outbound peak haulage route. Predicted impacts along Bridge Road therefore would not change as a result of the amended outbound peak haulage route.
- Change the actual number of vehicles travelling along the southern haulage route (south along George Street and the Pacific Highway onto Pennant Hills Road) in the peak period relative to the number of vehicles that would have been expected to use this route based on the haulage route arrangements presented in the EIS. These changes in vehicle numbers may result in a change to predicted ground level concentrations from the surface roads along this route.

Revised surface road air dispersion modelling has been undertaken to ascertain the potential change in ground level concentrations from the surface roads used in the project should the southern outbound haulage route be used exclusively during the peak periods.

The revised modelling has applied the same assumption used for the assessment presented in the EIS, whereby at the peak of site activity (year 2017) a maximum of 35 trucks per hour would be employed between the hours of 7 am and 6 pm Monday to Sunday. The assumption of seven days per week is a conservative measure to test all assessed meteorological conditions; the haulage operations would only occur between 8 am and 1 pm Saturdays and would not be not operational on Sundays.

The surface road modelling has been undertaken for comparative purposes against the original modelling of haul route impacts. The data presented in Table 7.5 shows the ground level impacts of the original routes, the revised route, and the difference between each route, together with the NSW EPA criteria. The percentage of the NSW EPA criteria of the difference in ground level concentration between the routes has been calculated and presented.

### Table 7.5 Summary of revised surface road modelling

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Average Period</th>
<th>EPA Criteria (ug/m3)</th>
<th>Maximum Receptor Ground Level Concentration (ug/m3)</th>
<th>Difference % of EPA Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Original Routes</td>
<td>Revised Routes</td>
<td>Difference</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>1 hour</td>
<td>30,000</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>8 hour</td>
<td>10,000</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>NO2</td>
<td>1 hour</td>
<td>246</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>62</td>
<td>0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>PM10</td>
<td>24 hour</td>
<td>50</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>30</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>PM2.5</td>
<td>24 hour</td>
<td>25</td>
<td>0.8</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>8</td>
<td>0.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

7.2.6 Benefits of the change

The change of the peak period outbound haulage to using a combination of the northern outbound haulage route and the southern outbound haulage route during the peak periods would result in the following benefits:

- A minor reduction in the impacts of project traffic on intersection performance along the haulage routes as a consequence of ‘spreading’ of the haulage vehicle load across both the northern outbound haulage route and the southern outbound haulage route during the peak periods.
7.2.7 Summary and justification

A change to the outbound peak hour haulage route has been made as a result of ongoing investigations following exhibition of the EIS and in response to feedback raised in agency and public submissions. The proposed change would result in trucks using the northern and southern route, with the preferred route selected based on traffic congestion and incident management responses. Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the TMP and HMSP approval stage.

To determine the environmental impacts of this change, a worst case scenario assessment methodology has been applied (i.e. exclusive use by haulage vehicles of the northern route, or exclusive use by haulage vehicles of the southern route).

Environmental impacts as a result of exclusive use of the northern outbound haulage route during the peak periods have already been assessed within the EIS. The assessment within this Preferred Infrastructure Report has therefore focused solely on the potential environmental impacts associated with the exclusive use of the southern outbound haulage route during the peak periods. This has derived a ‘worst case’ assessment for exclusive use of the southern outbound haulage route for comparison against the environmental impacts assessed for the northern route within the EIS.

In reality, as the change to the haulage route options would be likely to consist of trucks using a combination of the northern and southern outbound haulage routes during the peak periods, the impacts would be less than those assessed under the worst case scenario for each option.

It is recognised that during periods of heavy congestion, exclusive use of the northern outbound haulage route or the southern outbound haulage route may contribute temporarily to increased congestion at intersections. However, the project contribution to congestion during these periods would be limited. Construction traffic volumes are expected to be relatively low when compared to existing traffic volumes within the study area. As a worst-case scenario, 385 spoil haulage vehicles per day would be generated by the project. When compared to existing traffic volumes, this equates to less than five per cent of forecast 2016 total daily traffic on the Pacific Highway.

The effects of the short-term increase in traffic because of the project would therefore result in minor additional impacts to network performance.

The assessment of the worst case scenario for the southern outbound haulage route has shown that, compared to the impacts described in the environmental impact statement, there would be:

- Negligible differences across the study area regarding intersection performance, with all intersections recording identical levels of service during the AM and PM peak periods when compared to the initial scenario.
- A reduction of the impact of construction traffic on the following locations:
  - Pacific Highway / Jersey Street North / Wattle Street.
  - Pacific Highway / Yirra Road.
  - Pacific Highway / Ku-ring-gai Chase Road.
- A minor increase to average delays during the AM peak at three intersections:
  - Pennant Hills Road / Pacific Highway interchange (additional eight seconds).
  - Pacific Highway / Edgeworth David Avenue (additional one second).
  - Pacific Highway / George Street (additional 11 seconds).
- A minor increase to average delays during the PM peak at three intersections:
  - Pennant Hills Road / Pacific Highway (additional four seconds).
  - Pacific Highway / Edgeworth David Avenue (additional two seconds).
  - Pacific Highway / George Street (additional three seconds).
- Negligible change to the assessment of potential road traffic noise impacts on sensitive noise receivers.
• Negligible change to the assessment of potential air quality impacts to sensitive receivers associated with vehicle emissions.

The changes made to the peak haulage routes would reduce the overall impacts of the project relative to the assessment presented in the environmental impact statement. Under a worst case scenario, exclusive use of the southern outbound haulage route would result in minor increases to average delays at three intersections during the AM and peak periods, negligible change to the assessment of potential road traffic noise impacts and negligible change to the assessment of potential air quality impacts to sensitive receivers. As the change would result in haulage vehicles using both the northern and southern outbound haulage routes during the peak periods, impacts would be equal to or less than those assessed under the worst case scenario.

7.3 Investigations into the use of Windybanks Interchange

In response to submissions and as a result of ongoing assessment of the northern outbound haulage route following the exhibition of the EIS, investigations are underway into a revision to the northern outbound haulage route, whereby haulage vehicles would travel north on the Pacific Highway to access the M1 Pacific Motorway southbound on-ramp at the Windybanks Interchange in Berowra.

Access via the Pacific Highway to the Windybanks Interchange would require haulage vehicles to travel approximately 6.5 kilometres further to the north than the northern haulage route described in the EIS. The alignment of the Pacific Highway (an arterial road) in the section between Yirra Road and the Windybanks Interchange generally follows the alignment of the Main North Railway Line and the M1 Pacific Motorway.

Haulage vehicles would access the interchange directly via a signalised right hand turn lane at an existing intersection. The Windybanks Interchange is identified by Roads and Maritime as suitable for use by Restricted Access Vehicles.

Potential environmental impacts and benefits associated with the use of this route relative to the northern outbound haulage route described in the EIS have been identified, and include:

• Reduced impact on network performance at the Pacific Highway / Yirra Road intersection, particularly for vehicles making a right hand turn into Yirra Road from the Pacific Highway.
• Reduced impacts on the community and road users via the removal of requirements to modify the Pacific Highway / Yirra Road and/or Yirra Road / Belmont Parade intersections.
• Minor relative increase in exhaust emissions from haulage vehicles due to the increased haulage distance. This would result in a minor increase in greenhouse gas emissions and potential minor air quality impacts to receivers along the haulage route.

Investigations would continue into the use of the haulage route to the Windybanks Interchange and into the potential road modifications along the current northern outbound haulage route described in the EIS (via Yirra Road, Belmont Parade/Ku-ring-gai Chase Road). The purpose of these investigations would be to identify the route most suitable for use by haulage vehicles during the peak periods for the duration of the project. Investigations would take into consideration potential impacts to traffic safety, network performance and amenity along the route as well as any requirement for road modifications.

7.4 Conclusion

This section has provided an assessment of the proposed project change and has shown that the use of both the northern and southern outbound haulage routes during the peak period (with the preferred route to be selected based on traffic congestion and incident management responses), would reduce the overall impacts of the project relative to the assessment presented in the environmental impact statement.

Investigations would continue into the use of the haulage route to the Windybanks Interchange and into the potential road modifications along the current northern outbound haulage route described in the EIS to identify the preferred route. Investigations would take into consideration potential impacts to traffic safety, network performance and amenity along the route as well as any requirement for road modifications.

Final outbound haulage routes would be developed and managed in close consultation with Roads and Maritime and the Transport Management Centre at the Traffic Management Plan (TMP) and Haulage Management Sub Plan (HMSP) approval stage. In addition, ongoing consultation activities would include informing the community and affected motorists of any upcoming changes to the road network and any requirement for road modifications.
8 Revised summary of mitigation measures

The EIS for the project identified a range of management and mitigation measures that would be required to avoid or reduce the environmental impacts.

These measures have been revised on the basis of the submissions received and the proposed changes to the project. In some cases new measures have been added, while in others, the wording of existing measures has been adjusted. Should the project be approved, the revised summary of mitigation measures in Table 8.1 would guide the subsequent phases of the project.

Additions to mitigation measures are shown in **bold italic text** and deletions are shown in strikethrough text.

Table 8.1 Revised summary of mitigation measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>No.</th>
<th>Environmental management measure</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>Traffic</td>
<td>TT01</td>
<td>A TMP would be prepared prior to the commencement of works as part of the CEMP. The TMP would be submitted in stages to reflect the progress of work and would include: • Signage requirements (e.g. temporary speed restrictions, changes to the road environment, traffic management controls deployed). • Traffic control devices such as temporary traffic signals. • A local and regional communications strategy. This would include methods to provide advanced notice of any major or prolonged impacts. • The strategy and procedures to minimise, mitigate and communicate the impacts of the project on the capacity, performance and safety of the local road network and traffic systems. • Management of impacts on emergency services, cyclists, pedestrians, public transport and parking.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td>Impacts to road network performance (delays) and safety</td>
<td>TT02</td>
<td>Works which would significantly reduce the performance of the road network would be scheduled for periods of typically lower traffic volumes, where feasible and reasonable.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>TT03</td>
<td>Work methods and staging would be designed to minimise road closures, subject to other project constraints, and ensure that disruptions to existing traffic are minimised as much as feasible and reasonable.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>TT04</td>
<td>Signage would be used to clearly indicate traffic controls in use. This could include truck and pedestrian warning signs for Roper Lane and Bridge Road, temporary speed restrictions and passing constraints if required to maintain road safety levels.</td>
<td>During the project</td>
</tr>
<tr>
<td>Impact</td>
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<td>Environmental management measure</td>
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<tr>
<td></td>
<td>TT05</td>
<td>The TMP would provide details of both the general approach to be used to ensure suitable locations have been chosen for access and egress points to worksites (e.g. minimum sight distances, maximum grade allowances, etc.) and the specific controls required at selected locations (signage, barriers, signalling requirements).</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td></td>
<td>TT06</td>
<td>Access to local roads / streets and properties would be maintained wherever possible. If local roads / streets need to be closed (short or long term), arrangements would be made to provide access to properties of affected residents and their visitors.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>TT07</td>
<td>Road occupancy licences would be obtained for work that impacts traffic on existing roads.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>TT08</td>
<td>The TMP would be developed in consultation with local emergency services with a view to planning and executing the works to minimise any impact of the works on their ability to respond to an incident, whenever and wherever possible.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td></td>
<td>TT09</td>
<td><strong>Haulage vehicles</strong> Haulage vehicles would be managed to arrive at the Hornsby Quarry no earlier than the commencement of spoil emplacement activities (being 7 am on weekdays and 8 am on Saturdays) and depart the quarry site no later than the completion of emplacement activities (being 6 pm on weekdays and 1 pm on Saturdays). Trucks would not, under normal operating conditions, be permitted to queue outside of the Hornsby Quarry site outside of these hours.</td>
<td>During the project</td>
</tr>
</tbody>
</table>
|        | NV1 | A CNVMP would be prepared and implemented, and would include the following:  
• Identification of nearby residences and other sensitive land uses.  
• Description of approved hours of work.  
• Description and identification of project activities, including work areas, equipment and duration.  
• Description of what work practices (generic and specific) would be applied to minimise noise and vibration.  
• A complaints handling process.  
• Noise and vibration monitoring procedures.  
• Overview of community consultation required for identified high impact works.  
The CNVMP would also give consideration to | Pre-commencement              |
<table>
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<th>Environmental management measure</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>cumulative construction noise impacts associated with the maintenance pumping of the quarry void.</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>NV2</td>
<td>Respite periods for high noise impact activities would be put in place. Such activities would be restricted to 8 am start, operating in 3 hour blocks with 1 full hour respite between blocks of work.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td>Consultation</td>
<td>NV3</td>
<td>Drivers would be informed during induction of techniques and practices to minimise noise from tipping of materials.</td>
<td>Pre-commencement</td>
</tr>
</tbody>
</table>
|                      | NV4 | Sensitive receivers impacted by noise from the proposed works which are expected to exceed the NMLs would be notified prior to the commencement of the project. Information provided to the sensitive receivers would include:  
  - Programmed times and locations of work.  
  - The hours of proposed works.  
  - A 24-hour telephone hotline.  
  - Complaints management process. | Pre-commencement            |
<p>|                      | NV5 | Community notification regarding construction noise and vibration would be detailed in the Community Involvement Plan for the project. | All phases                  |
| Training             | NV6 | Induction and training would be provided to relevant staff and sub-contractors outlining their responsibilities with regard to noise and vibration. | All phases                  |
|                      | NV7 | Project activities (including deliveries) would be undertaken during standard work hours as far as feasible and reasonable. | All phases                  |
|                      | NV8 | Particularly noisy activities associated with the site establishment and demobilisation would be scheduled where feasible and reasonable around times of high background noise to provide masking. | Pre-commencement, Demobilisation |
| Construction         | NV9 | Further detailed consideration of reasonable and feasible noise mitigation management measures for affected receivers on Bridge Road, would be investigated by the Contractor, in consultation with affected receivers, and presented in the CNVMP. | Pre-commencement            |
| traffic              | NV10| Truck drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours and other relevant practices (e.g. minimising the use of engine brakes, and no extended periods of engine idling). | All phases                  |
|                      | NV11| Deliveries and spoil removal would be planned to avoid queuing of trucks in or around the construction compound. | All phases                  |
|                      | NV12| The site would be arranged to limit the need for reversing associated with regular / repeatable movements (e.g. trucks transporting spoil) to minimise the use of | All phases                  |</p>
<table>
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<th>Timing</th>
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<tbody>
<tr>
<td>Impact</td>
<td>NV13</td>
<td>Non-tonal reversing alarms would be used where feasible and reasonable, and taking into account the requirements of Workplace Health and Safety legislation.</td>
<td>All phases</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>NV14</td>
<td>Equipment would be regularly inspected and maintained to ensure it is in good working order.</td>
<td>All phases</td>
</tr>
<tr>
<td></td>
<td>NV15</td>
<td>Appropriately sized equipment would be used (e.g. during stockpiling) to minimise any unnecessary noise (e.g. shaking of bucket) where feasible and reasonable.</td>
<td>All phases</td>
</tr>
<tr>
<td></td>
<td>NV16</td>
<td>Opportunities to further reduce noise from the conveyor would be investigated and implemented where reasonable and feasible.</td>
<td>Pre-commencement and during the project</td>
</tr>
<tr>
<td></td>
<td>NV17</td>
<td>Alternative works methods such as use of hydraulic or electric-controlled units in place of diesel units would be considered and implemented where feasible and reasonable. The use of alternative machines that perform the same function (such as rubber wheeled plant) would be considered in place of steel tracked plant.</td>
<td>All phases</td>
</tr>
<tr>
<td>Noise attenuation</td>
<td>NV18</td>
<td>Noise mounds about 5 metres high would be provided surrounding the stockpiling area. Wherever possible stockpiling would be used as additional, temporary noise shielding to manage noise impacts. Hoarding will also be located surrounding some fixed sources such as the mulchers.</td>
<td>During the project</td>
</tr>
<tr>
<td>Noise monitoring</td>
<td>NV19</td>
<td>A noise monitoring program would be implemented to assist in confirming and controlling the site specific potential for disturbance at particularly sensitive localities at the commencement of activities and periodically during the construction program. The results would be reviewed to determine if additional mitigation measures are required. All measurements would be undertaken in accordance appropriate standards and guidelines for noise monitoring. The noise monitoring program would be presented in the CNVMP.</td>
<td>All phases</td>
</tr>
<tr>
<td>Vibration impacts</td>
<td>NV20</td>
<td>The safe working distances would be complied with where feasible and reasonable.</td>
<td>All phases</td>
</tr>
<tr>
<td></td>
<td>NV21</td>
<td>If the use of vibration intensive plant cannot be avoided within the safe working distance for cosmetic damage, potentially affected receivers would be notified and vibration measurements would be undertaken to confirm levels and compliance with DIN guidelines.</td>
<td>All phases</td>
</tr>
<tr>
<td>Hydrogeology and soils</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>HS1</td>
<td>Project personnel would be competent and trained in systems and procedures.</td>
<td>Pre-commencement / during the project</td>
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<tr>
<td>Impact</td>
<td>No.</td>
<td>Environmental management measure</td>
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<tr>
<td>Acid sulfate soils</td>
<td>HS2</td>
<td>If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998).</td>
<td>During the project</td>
</tr>
<tr>
<td>Groundwater</td>
<td>HS3</td>
<td>Undertake groundwater monitoring for the duration of the project in accordance with Hornsby Shire Council’s licence requirements.</td>
<td>Pre-commencement / during the project</td>
</tr>
<tr>
<td></td>
<td>HS4</td>
<td>Compliance records of any groundwater monitoring undertaken would be retained.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>HS5</td>
<td>Where available, and of appropriate chemical and biological quality, subject to a health risk assessment, stormwater, recycled water, groundwater inflows or other water sources would be used in preference to potable water for construction activities, including concrete mixing and dust control.</td>
<td>During the project</td>
</tr>
<tr>
<td>Ground movement and settlement</td>
<td>HS6</td>
<td>Further investigation would be undertaken during detailed design to determine if stabilising is required to minimise localised instability of the quarry walls.</td>
<td>Pre-commencement / during the project</td>
</tr>
<tr>
<td></td>
<td>HS7</td>
<td>Ongoing assessments would be undertaken during detailed design and construction to determine the level of potential impact on personnel and structures and to identify feasible and reasonable mitigation and management measures required to minimise potential ground movement impacts. This includes assessment of the potential for instability risks associated with the quarry walls and the design and development of appropriate mitigation measures.</td>
<td>During the project</td>
</tr>
<tr>
<td>Contamination</td>
<td>HS8</td>
<td>A CEMP prepared for the project would include provisions to manage potential contaminants and hazardous materials identified during works.</td>
<td>Pre-commencement / during the project</td>
</tr>
<tr>
<td></td>
<td>HS9</td>
<td>Potentially contaminated areas directly affected by the project would be managed in accordance with the requirements of the CLM Act and Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (EPA, 1997).</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>HS10</td>
<td>Procedures to address spills and leaks would be developed and implemented during the works.</td>
<td>Pre-commencement / during the project</td>
</tr>
<tr>
<td></td>
<td>HS11</td>
<td>A procedure to relocate the existing 1,000 litre AST containing diesel on the western side of the quarry void would be established to ensure relocation would not result in any potential contaminates being leached from the tank.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>HS12</td>
<td>ENM imported to the site for the purpose of emplacement into the quarry pit would meet chemical and other material requirements of the ‘excavated natural material order’ under Part 9, clause 93 of the Protection of the Environment Operations (Waste) Regulation</td>
<td>During the project</td>
</tr>
</tbody>
</table>
### Impact No. Environmental management measure Timing

#### HS13

A CEMP prepared for the project would include provisions to manage unexpected finds and hazardous materials identified during works.

Pre-commencement, during the project

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#### General

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<th>Environmental management measure</th>
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<tbody>
<tr>
<td>HS14</td>
<td>Demobilisation personnel would be competent and trained in systems and procedures.</td>
<td>Demobilisation</td>
</tr>
</tbody>
</table>

#### Contamination

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<tr>
<th>No.</th>
<th>Environmental management measure</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS15</td>
<td>Procedures to address spills and leaks would be developed and implemented during demobilisation of the project.</td>
<td>Demobilisation</td>
</tr>
</tbody>
</table>

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#### Surface water and flooding

### Erosion and sediment control

<p>| SW1 | A Construction Soil and Water Quality Management Plan would be prepared to manage surface and groundwater impacts during construction of the project. | Pre-commencement |
| SW2 | Progressive erosion and sediment control plans (ESCPs) would be prepared and implemented in advance of construction, including earthworks and stockpiling. ESCPs would be updated as required. | All phases |
| SW3 | Erosion and sediment controls, including sedimentation basins, would be designed, installed and managed in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004). | All phases |
| SW4 | A project soil conservationist would be engaged and consulted during construction to provide advice on erosion and sediment control design, installation and maintenance. | Pre-commencement, during the project |
| SW5 | Works would be programmed to minimise the extent and duration of disturbance to vegetation. | Pre-commencement and during the project |
| SW6 | Soil and land stabilisation would occur as soon as practicable following construction. The site would be stabilised through the application of a sterile cover crop to achieve a stabilised groundcover. Stabilisation would be in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and would not preclude future land use at the site. | During the project, demobilisation |
| SW7 | Diversion drains and erosion and sediment control measures would be in place prior to the commencement of any stockpiling activities. Material would only be stockpiled in designated stockpiling areas. | Pre-commencement, during the project |
| SW8 | Inspection of water quality mitigation controls (e.g. sediment fences, sediment basins) would be carried out regularly and following significant rainfall to detect any breach in performance. | All phases |</p>
<table>
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<th>Impact</th>
<th>No.</th>
<th>Environmental management measure</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>Dewatering</td>
<td>SW9</td>
<td>Water discharge quality from the quarry would comply with the requirements of Hornsby Shire Council’s existing groundwater licence.</td>
<td>All phases</td>
</tr>
<tr>
<td>Water efficiency</td>
<td>SW10</td>
<td>Water efficiency measures would be implemented with a focus on achieving water savings and targeting water recycling and reuse.</td>
<td>All phases</td>
</tr>
<tr>
<td>Localised flooding of receiving watercourses</td>
<td>SW11</td>
<td>On-site detention would be provided where required to mitigate impacts associated with increased impervious areas.</td>
<td>Pre-commencement and during the project</td>
</tr>
<tr>
<td></td>
<td>SW12</td>
<td>The maximum discharge rate from the discharge point at Old Mans Creek would not exceed 33 litres per second.</td>
<td>Pre-commencement and during the project</td>
</tr>
<tr>
<td>Contamination</td>
<td>SW13</td>
<td>Installation of temporary septic, sewerage and stormwater facilities would be undertaken in a manner to avoid contact with the groundwater.</td>
<td>Pre-commencement and during the project</td>
</tr>
</tbody>
</table>

### Hazards and risk

| General                                    | HR1 | Site-specific hazard and risk management measures would be included within the CEMP, which may include items such as:                                                                                                           | Pre-commencement and during the project|
|                                            |     | • Details of the hazards and risk associated with construction activities for both surface works and works within the quarry void.                                                                                      |                                       |
|                                            |     | • Procedures to comply with legislative and industry standard requirements.                                                                                                                                          |                                       |
|                                            |     | • Contingency plans, as required.                                                                                                                                                                                      |                                       |
|                                            |     | • Site-specific Work Health and Safety plans and SWMS.                                                                                                                                                              |                                       |
|                                            |     | • Training for relevant personnel (including subcontractors) and site inductions, including the recognition and awareness of site hazards and locations of relevant equipment.                                      |                                       |

| Storage, handling and use of dangerous goods and hazardous substances | HR2 | Storage of dangerous goods and hazardous materials would occur in accordance with supplier’s instructions and relevant Australian Standards and may include bulk storage tanks, chemical storage cabinets / containers or impervious bunds. | During the project                  |

| HR3 | Storage, handling and use of dangerous goods and hazardous substances would be in accordance with the *Occupational Health and Safety Act 2000* (OHS Act) and the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005). | During the project                  |

<p>| HR4 | A register and inventory of the dangerous goods and hazardous substances to be stored on-site would be kept as part of the CEMP and Material Safety Data Sheets (MSDS) for each substance which would be obtained prior to their arrival. | During the project                  |</p>
<table>
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<th>Timing</th>
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<tr>
<td>HR5</td>
<td>Secure, bunded areas would be provided around storage areas for oils, fuels and other hazardous liquids. Impervious bunds would be of sufficient capacity to contain at least 110 per cent of the volume of the largest stored container.</td>
<td>During the project</td>
<td></td>
</tr>
<tr>
<td>HR6</td>
<td>MSDS would be obtained for dangerous goods and hazardous substances stored on-site prior to their arrival.</td>
<td>During the project</td>
<td></td>
</tr>
<tr>
<td>Transportation of dangerous goods and hazardous substances</td>
<td>HR7</td>
<td>Transport of dangerous goods and hazardous substances would be conducted in accordance with relevant legislation and codes, including the Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998 and the Australian Code for the Transport of Dangerous Goods by Road and Rail (National Transport Commission, 2008).</td>
<td>During the project</td>
</tr>
<tr>
<td>Bush fire risk management</td>
<td>HR8</td>
<td>Liaise with responsible agencies regarding the objectives of and compliance with the bush fire risk mitigation measures for Asset 50 and Asset 79 as defined in the BRMP.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>HR9</td>
<td>Assess the requirement for any additional APZ to be established within and around the temporary construction area. APZs will have regard to the site assessment methodology outlined in the NSW Rural Fire Service’s publication entitled Planning for Bush Fire Protection 2006 (NSW RFS, 2006) and will be documented in the Pollution and Incident Response Management Plan for the project.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td></td>
<td>HR10</td>
<td>Where feasible and reasonable to do so, fire resistant materials would be used in the construction of site infrastructure, having regard to the relevant provisions of AS3959-2009: Construction of a Building in Bush Fire Prone Areas (Standards Australia, 2009).</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>HR11</td>
<td>Maintain the temporary construction site in a tidy and orderly manner, with the aim of minimising potential fuel loads in the event that the sites are affected by a bushfire.</td>
<td>During the project</td>
</tr>
</tbody>
</table>
| Air quality                        | General | A dust management plan would be prepared incorporating an air quality monitoring program. The dust management plan would include:  
• A reactive management strategy with site procedures for targeting the visual observation of dust leaving the site. Dust observations would be undertaken on a regular basis by trained site staff with all staff encouraged to make proactive dust control. | Pre-commencement, during the project |
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<td></td>
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<td>observations whenever on-site. Should visible dust be observed to be crossing the site boundary, contingency measures would be implemented to reduce the potential for off-site impacts.</td>
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<td></td>
<td></td>
<td>• Details of contingency measures that would be further considered as part of the reactive management strategy where dust is observed to be crossing the site boundary. Contingency measures would be confirmed as part of detailed design and would target activities that are expected to result in the highest dust generation. Contingency measures are expected to include measures such as:</td>
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<td>− Increases to active mitigation measures such as additional watering, covering stockpiles (where practical) etc.</td>
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<td></td>
<td>− Temporary modifications to dust generating activities e.g. focusing on activities to the pit when dust problems occur on the flats (where practicable).</td>
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<td></td>
<td></td>
<td>− Temporary reductions in materials handling intensity (where practicable).</td>
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<td></td>
<td>• Key performance indicators (KPIs) for dust management at the site. The emissions inventory assumptions used in project modelling, which are considered to be key controlling factors for dust generation for the project (such as, the number of trucks per hour delivering spoil to the site) would form the basis of KPIs for dust management in the plan. The plan would detail the KPIs and monitoring measures for each to measure their performance during the project.</td>
<td></td>
</tr>
<tr>
<td>AQ2</td>
<td></td>
<td>Site inductions and ongoing toolbox talks would be provided to make project works aware of sound air quality control practices and responsibilities.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td>AQ3</td>
<td></td>
<td>Construction activities would be modified, reduced or controlled during high or unfavourable wind conditions if they may potentially increase off-site dust emissions.</td>
<td>During the project</td>
</tr>
<tr>
<td>AQ4</td>
<td></td>
<td>All site haul roads will be sealed and controls such as good housekeeping practices on hardstand areas, would be implemented to minimise the tracking of dirt onto public roads.</td>
<td>During the project</td>
</tr>
<tr>
<td>AQ5</td>
<td></td>
<td>Control measures would be implemented to control dust emissions, which could</td>
<td>During the project</td>
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### Environmental management measure

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<td></td>
<td></td>
<td>include water carts, sprinklers, sprays, internal site road speed limits and shade cloth on perimeter fencing (wind barrier).</td>
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<tr>
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<td>AQ6</td>
<td>Exposed areas will be minimised as much as practical to prevent or minimise wind-blown dust.</td>
<td>During the project</td>
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<tr>
<td></td>
<td>AQ7</td>
<td>Drop height from excavators and front-end loaders would be maintained at 1.5 metres or less.</td>
<td>During the project</td>
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<tr>
<td></td>
<td>AQ8</td>
<td>All material handled by bulldozers would be kept moist through the use of water carts, sprinklers or sprays.</td>
<td>During the project</td>
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<td>AQ9</td>
<td>Speed limits would be posted and observed by all vehicles on the site.</td>
<td>During the project</td>
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<td>AQ10</td>
<td>Vehicular access will be confined to designated access roads. Haul road lengths will be minimised.</td>
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<td></td>
<td>AQ11</td>
<td>All loaded haulage trucks would be covered at all times on public roads and onsite where there is a risk of release of dust or other materials.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>AQ12</td>
<td>A complaints management system will be implemented and maintained to manage and respond to any complaints regarding dust (as well as other issues).</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>AQ13</td>
<td>The weather forecast would be reviewed daily, and appropriate measures implemented where unfavourable weather conditions (dry weather, strong winds) are anticipated.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>AQ14</td>
<td>Construction plant, vehicles and machinery would be maintained in good working order and in accordance with manufacturers’ specifications.</td>
<td>During the project</td>
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<tr>
<td></td>
<td>AQ15</td>
<td>Where required onsite generators would be switched off when facilities and associated plant and equipment are non-operational.</td>
<td>During the project</td>
</tr>
<tr>
<td></td>
<td>AQ16</td>
<td>Haul trucks and plant equipment would be switched off when not used for periods of greater than 15 minutes. Vehicle engines will be turned off while parked on site.</td>
<td>During the project</td>
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<tr>
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<td></td>
<td><strong>Biodiversity</strong></td>
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<td></td>
<td>B1</td>
<td>A Flora and Fauna Management Plan would be developed for the works to identify potential impacts and to define management and mitigation measures.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>Construction personnel would be made aware of the presence and distribution of native vegetation and would be informed of their responsibility regarding the protection of native vegetation.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>B3</td>
<td>Disturbance and clearance of established vegetation would be minimised as far as feasible and reasonable.</td>
<td>Pre-commencement, during the project</td>
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<td>B4</td>
<td>Areas of vegetation to be retained would be demarcated prior to the</td>
<td>Pre-commencement</td>
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<td><strong>Timing</strong></td>
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<td>Impact</td>
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<td><strong>Commencement of works to protect from damage.</strong></td>
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</table>
| B5                                        |        | Pre-clearing surveys would be undertaken by a suitably qualified ecologist to identify the presence of:  
|                                           |        | - Hollow-bearing trees and other habitat features  
|                                           |        | - Threatened flora and fauna  
<p>|                                           |        | Pre-commencement                                                                                      |                             |
| B6                                        |        | Where feasible and reasonable, topsoil and habitat elements (such as woody debris and bushrock) would be stored and reused onsite or in adjacent bushland.                                                                                                                                                  | Pre-commencement, during the project. |
| Spread of weeds                            | B7     | Weeds within the construction footprint would be actively managed prior to vegetation clearing. Cleared weed material would be disposed of to a facility licenced to receive green waste.                                                                                                                                                      | Pre-commencement, during the project. |
| Spread of pathogens                        | B8     | Machinery would be checked and/or cleaned to ensure that it comes to site in a weed free state.                                                                                                                                                                                                                                                                   | During the project          |
| B9                                        |        | The identification of pathogens would be undertaken as part of pre-clearing inspections. In the event that pathogens are identified within the construction footprint, appropriate mitigation measures would be identified and implemented.                                                                                                           | Pre-commencement            |
| Adverse impacts to riparian zones and aquatic habitats | B10    | A Construction Soil and Water Quality Management Plan would be prepared prior to commencement of the works to manage surface and groundwater impacts.                                                                                                                                                           | Pre-commencement            |
|                                            | B11    | The discharge of groundwater would be undertaken in accordance with the requirements of Hornsby Shire Council’s existing groundwater dewatering licence.                                                                                                                                                                                                               | During the project          |
| Loss of hollow bearing trees               | B12    | The loss of hollow bearing trees would be mitigation by provision of replacement nest boxes for hollow bearing trees impacted by construction.                                                                                                                                                                                                                 | During the project          |
| Impact                                    |        | <strong>Social and economic</strong>                                                                                                                                                                                                                                                                                                                                 |                             |
| Community cohesion                        | SEc1   | A community involvement plan would be developed and implemented to provide timely, regular and transparent information about changes to access and traffic conditions, details of future work programs and general construction progress throughout the project. Information would be provided in a variety of ways including letter box drops, media releases, internet sites, signage and a hotline.                                                       | Pre-commencement, during the project. |
| Cumulative impacts                        | SEc2   | Monitor the development of significant projects with significant proximity to the project and amend the CEMP for the project if, or when, required.                                                                                                                                                                                                               | Pre-commencement, during the project. |</p>
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<tr>
<td>Property access</td>
<td>LP1</td>
<td>Where property access is affected as a result of the project, consultation with the property owner(s) would be undertaken prior to the commencement of construction and would include the identification of temporary alternate access for affected properties.</td>
<td>Detailed design / during the project.</td>
</tr>
<tr>
<td>Community notification</td>
<td>LP2</td>
<td>The TAFE and surrounding landowners would be provided with advanced notification of relevant project schedules, construction works and changes to access arrangements.</td>
<td>Pre-commencement and during the project.</td>
</tr>
<tr>
<td></td>
<td>LP3</td>
<td>Community updates would be provided on changes to the local road network within the project area during construction.</td>
<td>During the project.</td>
</tr>
<tr>
<td>Impacts on community facilities</td>
<td>LP4</td>
<td>Opportunities to maintain public access to the Hornsby mountain bike trail and pedestrian trail network, where reasonable and practical, would be explored with Hornsby Shire Council.</td>
<td>Pre-commencement and during the project.</td>
</tr>
<tr>
<td></td>
<td>LP5</td>
<td>Appropriate signage would be erected prior to and during the project to advise the public of the alterations to mountain bike trails and pedestrian access, including information regarding alternative cycling and walking routes.</td>
<td>Pre-commencement and during the project.</td>
</tr>
<tr>
<td>Non-Aboriginal heritage</td>
<td>NAH1</td>
<td>A Heritage Management Plan (HMP), which includes provisions to manage non-Aboriginal heritage, would be prepared prior to the commencement of works. The plan would include procedures for an appropriately qualified heritage consultant to conduct periodic inspections of heritage sites for which baseline dilapidation surveys are undertaken, to monitor their condition during construction. The HMP will also outline stop work procedures for use in the event of unexpected finds.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td></td>
<td>NAH2</td>
<td>Construction personnel would be made aware of non-Aboriginal heritage sites during the site induction and would be informed of their responsibility regarding the protection of heritage items. These sites would be identified on sensitive area plans prepared for the project and in the HMP and with the exception of the Hornsby Quarry Diatreme site, no works are permitted that would result in direct impacts to these sites including vehicle turning or material or plant storage.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>NAH3</td>
<td>Immediately prior to the commencement of works a heritage specialist would prepare a dilapidation survey to enable the condition of the items located within 100 metres of vibration intensive works to be assessed and to produce a baseline</td>
<td>Pre-commencement</td>
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<tr>
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<tr>
<td>Direct impacts to the Diatreme Hornsby Quarry and surrounding vegetation</td>
<td>NAH5</td>
<td>Feasible and reasonable options to minimise direct impacts to the item Diatreme Hornsby Quarry and surrounding vegetation would be investigated during the design development phase.</td>
<td>Pre-commencement, during the project</td>
</tr>
<tr>
<td></td>
<td>NAH6</td>
<td>Archival recording of the extent of the diatreme would be undertaken following initial dewatering of the quarry void to show the full extent of the geological feature. The archival recordings would be made available to Hornsby Shire Council for its records and future use.</td>
<td>Pre-commencement</td>
</tr>
<tr>
<td>Indirect impacts to non-Aboriginal heritage items</td>
<td>NAH7</td>
<td>The identified heritage items ‘Old Mans Valley Cemetery/Higgins’ Family Cemetery’, ‘sandstone receptacle’, ‘cool room’, ‘site of Higgins homestead/memorial and sandstone stairs’ and ‘Hornsby Quarry Industrial Machinery and Buildings’ would be avoided during the proposed works.</td>
<td>During the project</td>
</tr>
<tr>
<td>Dust</td>
<td>NAH8</td>
<td>Dust accumulation at the Old Mans Valley Cemetery/Higgins’ Family Cemetery heritage item would be monitored during the works. Feasible and reasonable measures would be implemented in consultation with a heritage specialist, if monitoring results identify impacts from dust deposition.</td>
<td>During the project</td>
</tr>
</tbody>
</table>

### Aboriginal heritage

<p>| Impacts on culturally sensitive Aboriginal sites | AH1 | Direct impacts to AHIMS sites and the sandstone overhang with PAD would be avoided. | Pre-commencement and during the project |
| AH2 | In the event that the project is required to extend outside the assessed construction footprint or study area, these additional areas would be assessed in accordance with the RMS PACHCI guideline and additional approvals obtained (as required) where additional impacts are identified, prior to the commencement of construction within those identified areas. | Pre-commencement and during the project |
| AH3 | Impacts to the sandstone overhang with | Pre-commencement, |</p>
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<tr>
<td>PAD would be avoided. If changes to the proposed construction footprint would result in the project footprint being within 200 metres of this feature, an appropriate curtilage around this item would be clearly delineated via the installation of temporary fencing with star pickets and hi-vis mesh. Fencing around the sandstone overhang with PAD would be supervised by an archaeologist prior to works commencing in order to protect it from harm.</td>
<td>AH4</td>
<td>Pre-commencement and during the project</td>
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<tr>
<td>If the current project design changes and impacts to previously identified AHIMS sites and/or the sandstone overhang with PAD cannot be avoided, the assessment process would progress to Stage 3 for formal consultation, as per the flowchart for the Roads and Maritime PACHCI and additional approvals obtained (as required) where additional impacts are identified.</td>
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<tr>
<td>In the event that additional areas outside the study area assessed are identified as having potential for Aboriginal heritage and the potential for disturbance as a result of the project, the need for a supplementary Stage 2 assessment would be reviewed. If required, additional approvals would be obtained, where additional impacts are identified.</td>
<td>AH5</td>
<td>Pre-commencement and during the project</td>
<td></td>
</tr>
<tr>
<td>In the event of unanticipated impacts to Aboriginal objects or places during implementation of the project, including unexpected finds and/or skeletal material, the works would cease until further advice and/or approvals have been obtained.</td>
<td>AH6</td>
<td>During the project</td>
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</tr>
<tr>
<td>Unexpected finds and/or skeletal material identified during the works would be managed in accordance with the latest version of the Roads and Maritime document Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime, 2015).</td>
<td>AH7</td>
<td>During the project</td>
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**Landscape character and visual amenity**

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<tr>
<td>Avoid clearance of screening vegetation and clear only minimal vegetation where necessary to facilitate the works.</td>
<td>VL01</td>
<td>Site establishment</td>
<td></td>
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<tr>
<td>Maintain screening vegetation wherever possible.</td>
<td>VL02</td>
<td>During the project</td>
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<tr>
<td>Community updates and newsletters to nearby properties.</td>
<td>VL03</td>
<td>Pre-commencement, during the project</td>
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<tr>
<td>Stabilise/rehabilitate impacted/cleared areas as soon as practical following</td>
<td>VL04</td>
<td>Completion</td>
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<td>Impact activities</td>
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<tr>
<td>Visual impacts to residences along haulage routes</td>
<td>VL05</td>
<td>Spoil haulage to be confined to standard day time work hours.</td>
<td>During the project</td>
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<tr>
<td></td>
<td>VL06</td>
<td>Community updates and newsletters to nearby properties.</td>
<td>Pre-commencement, during the project</td>
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</table>

### Resources and waste

<table>
<thead>
<tr>
<th>Resource management</th>
<th>RW1</th>
<th>Construction material would be sourced from the Sydney region where feasible and reasonable.</th>
<th>Pre-commencement and during the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste management</td>
<td>RW2</td>
<td>A Waste Management Plan would be prepared as part of the CEMP detailing appropriate procedures for waste management.</td>
<td>All phases</td>
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<tr>
<td></td>
<td>RW3</td>
<td>Cleared site vegetation would be mulched for reuse in erosion and sediment control, rehabilitation and landscaping works, where feasible and reasonable.</td>
<td>All phases</td>
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<tr>
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<td>RW4</td>
<td>Topsoil generated during site preparation activities would be stockpiled for reuse in landscaping activities</td>
<td>All phases</td>
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<td></td>
<td>RW5</td>
<td>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.</td>
<td>All phases</td>
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<td>RW6</td>
<td>Worksites would be free of litter and good housekeeping would be maintained.</td>
<td>All phases</td>
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<td>RW7</td>
<td>Waste oil, other liquid wastes and spillages would be collected and stored in bunded areas.</td>
<td>All phases</td>
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<td>Wastewater</td>
<td>RW8</td>
<td>Feasible and reasonable opportunities for reusing wastewater for dust suppression of conveyor system and haulage roads would be investigated and pursued.</td>
<td>Pre-commencement, during the project</td>
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<td></td>
<td>RW9</td>
<td>Wastewater not used on-site would be discharged into Old Mans Creek in accordance with the conditions of the existing dewatering groundwater licence for the site, and any environment protection licence that may be issued for the project.</td>
<td>Pre-commencement and during the project</td>
</tr>
<tr>
<td>Contaminated soil</td>
<td>RW10</td>
<td>In the event of encountering previously unidentified area(s) of potentially contaminated material, all relevant work would cease in the vicinity of the material. Relevant works would not recommence until the need for, and scope of, remedial action(s), if required, are identified in accordance with the requirements of the CLM Act.</td>
<td>All phases</td>
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### Greenhouse gas and climate change

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<tr>
<th>General</th>
<th>GHG1</th>
<th>The emissions intensity of the construction materials specified in the design of the project would be assessed and, where feasible and in compliance with technical specifications, purchasing power would be used to drive the</th>
<th>Procurement</th>
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<tr>
<td></td>
<td></td>
<td>procurement and use of low emission construction materials where feasible and reasonable.</td>
<td></td>
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<tr>
<td>GHG2</td>
<td></td>
<td>The fuel efficiency of the construction plant and equipment would be assessed prior to selection and, where feasible and reasonable, equipment with the highest fuel efficiency or equipment which uses lower greenhouse gas intensive fuel such as biofuels (e.g. biodiesel, ethanol) would be considered for use.</td>
<td>Procurement / Pre-commencement</td>
</tr>
<tr>
<td>GHG3</td>
<td></td>
<td>Project planning would be undertaken to ensure that the site vehicle movements and construction activities have been planned efficiently and to avoid double handling of materials and additional fuel use.</td>
<td>Prior to commencement</td>
</tr>
<tr>
<td>GHG4</td>
<td></td>
<td>Locally produced goods and services would be procured where feasible and cost effective to reduce transport fuel emissions.</td>
<td>Procurement / Pre-commencement</td>
</tr>
</tbody>
</table>
The Department of Planning and Environment will, on behalf of the Minister for Planning, review the environmental impact statement and this submissions and preferred infrastructure report. Once the Department of Planning and Environment has completed its assessment, a draft assessment report will be prepared for the Secretary of the Department of Planning and Environment, which may include recommended conditions of approval.

The assessment report will then be provided to the Minister for Planning, who may then approve the project (with any conditions considered appropriate) or refuse to give approval.

The Minister for Planning’s determination and the Secretary’s report will be published on the Department of Planning and Environment’s website immediately following determination with a copy of the submissions and preferred infrastructure report.
References


OEH, 2014, Framework for Biodiversity Assessment, State Government of NSW.


