NSW GOVERNMENT | Planning & Environment

STATE SIGNIFICANT INFRASTRUCTURE ASSESSMENT:
Northern Beaches Hospital Connectivity and Network Enhancements (SSI 6434)
Concept Proposal and Stage 1

Secretary's Environmental Assessment Report
Section 115ZA of the
Environmental Planning and Assessment Act 1979

June 2015

Cover Photograph: *View of Warringah Road, Frenchs Forest (Source: Proponent's EIS).*

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ABBREVIATIONS

ARI	Average Recurrence Interval
BAR	Biodiversity Assessment Report
BOP	Biodiversity Offset Package
BOS	Biodiversity Offset Strategy
CCAFMP	Construction Compound and Ancillary Facilities Management Plan
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CSWMP	Construction Soil and Water Management Plan
CTAMP	Construction Traffic and Access Management Plan
DEC	Department of Education and Communities
DFEC	Duffy's Forest Ecological Community
DGR(s)	Director-General Requirement(s)
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Ecological Monitoring Program
EPA	Environment Protection Agency
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
ESU	Ecological Sampling Unit
HI	NSW Health Infrastructure
ICNG	*Interim Construction Noise Guidelines*
LCZ	Landscape Character Zone
LoS	Level of Service
NBH	Northern Beaches Hospital
NCA	Noise Catchment Area
NML	Noise Management Level
NOW	NSW Office of Water
OEH	Office of Environment Heritage
OTPR	Operational Traffic Performance Review
PIR	Preferred Infrastructure Report
RBL	Rating Background Level
RMS	Roads and Maritime Services
RNP	*Road Noise Policy*
RtS	Response to Submissions
SEAR(s)	Secretary's Environmental Assessment Requirement(s)
SEPP	State Environmental Planning Policy
SSI	State Significant Infrastructure
SWQMP	Surface Water Quality Monitoring Program
TSC Act	Threatened Species conservation Act 1995
USLE	Universal Soil Loss Equivalent
VAP	Visual Assessment Precinct
WMP	Water Management Plan

EXECUTIVE SUMMARY

The Proposal
Roads and Maritime Services (RMS) propose to construct and operate a suite of arterial and sub-arterial road network upgrades under a staged State significant infrastructure (SSI) application. The existing road network to be upgraded is known as Forest Way, Naree Road, Frenchs Forest Road West, Frenchs Forest Road East, Warringah Road and Wakehurst Parkway.

The Concept Proposal will provide access to the Northern Beaches Hospital (NBH) and will involve broader network enhancements through grade separation along Warringah Road amongst other provisions. The Concept Proposal splits works into two stages; Stage 1 Hospital Connectivity Works proposing to enhance connectivity to the NBH and Stage 2 Network Enhancement works proposing to improve the broader road network capacity.

This report provides an assessment for the Concept Proposal and Stage 1 Hospital Connectivity Works only. Stage 2 Network Enhancement Works are to be assessed and considered under a separate application.

Need and Justification
The existing road network experiences low average peak travel speeds, unreliable travel times and disruptions to traffic movements impacting both road users and the adjoining community. Warringah Road currently operates at or beyond capacity during peak periods and is expected to experience continued traffic growth in the future.

With the introduction of the NBH and without intervention conditions are expected to worsen. Therefore, the location requires a considerable increase in network capacity in order to maintain, if not improve on, the existing level of service.

The NBH will be a level 5 hospital attracting $10 billion of government funding over the next 10 years. The NBH is identified in the *NSW State Infrastructure Strategy 2012-2032* as important health infrastructure and is expected to become operational in 2018.

The strategic aim of the Concept Proposal is to provide an efficient road network surrounding the NBH. Additionally, the proposal will reinforce Warringah Road and Wakehurst Parkway as key arterial connections between the Northern Beaches, Chatswood and Sydney CBD. The proposal also aligns with a number of NSW Government policy documents including the *NSW Long Term Transport Master Plan, NSW 2021: A plan to make NSW number 1 (2011), NSW State Infrastructure Strategy 2012-2032, NSW State Infrastructure Strategy Update 2014,* and *A Plan for Growing Sydney 2014.*

Assessment and Approvals Process
The proposal is 'State Significant Infrastructure' and the Minister for Planning is the approval authority. The Executive Director, Infrastructure and Industry Assessments, may determine the application under delegated authority in accordance with the Minister's delegated powers, in effect from 16 February 2015.

The Environmental Impact Statement (EIS) was made publicly available for 31 days from Wednesday 22 October 2014 to Friday 21 November 2014. During this time a total of 45 submissions were received including 39 submissions from the public, 5 submissions from government agencies and one from Warringah Council. All agencies and Council indicated support for the project subject to recommendations.

Of the 39 public submissions received, 10 objected to the proposal, 4 supported the proposal and 25 did not object but raised concerns. Key concerns raised in public submissions included traffic

and transport impacts, biodiversity impacts and offset potential, community severance, changes to urban character, impacts to Forest Way Shopping Centre and The Forest High School, waterway health degradation, noise impacts and the strategic justification for the project.

Key Assessment Issues

Traffic and Transport

The Concept Proposal and Stage 1 Hospital Connectivity Works will result in improved network and intersection performance in the locality whilst providing for efficient access arrangements to the NBH and within the NBH Precinct. In addressing the foreseeable traffic impacts of the NBH development, the Concept Proposal and Stage 1 will also improve the pedestrian and cycling environments and will improve bus travel speeds and performance.

The Department has considered the consequences for the local and regional road networks under the 'Do Minimal' scenario (basic access arrangements to the NBH) where network and intersection performance has been shown to generally deteriorate. In doing so, the Department acknowledges that overall benefits associated with Stage 1 will be fully experienced and further enhanced when Stage 2 becomes operational.

The Department recognises construction impacts will be considerable, yet is satisfied that RMS's experience of road construction in similar road environments, coupled with the mitigation measures proposed and recommended conditions, will satisfactorily reduce the level of impacts experienced.

The Department is satisfied that the pedestrian and cyclist environment will be improved in comparison to the existing environment. Connectivity and safety will be enhanced and will result in an increased attractiveness of active transport. A portion of cyclist infrastructure required to complete connectivity across the Concept Proposal will be further addressed in Stage 2.

Overall, the Department is satisfied that the traffic and transport impacts are reasonable subject to the mitigation measures proposed and the recommended conditions of consent.

Noise and Vibration

The initial noise modelling undertaken by RMS predicts a total of 213 receivers will be eligible for architectural treatments as a result of the Stage 1 project, primarily as a result of existing acute noise levels forecast for 2018. Additional modelling found that a further two non-residential receivers (within The Forest High School) are also eligible for architectural treatment. This mitigation will generally improve the existing amenity of receivers.

The Department is satisfied the recommended conditions of approval will sufficiently mitigate predicted noise and vibration impacts and ensure an acceptable level of amenity will be maintained for sensitive receivers during both construction and operation of Stage 1.

Biodiversity

The Department is satisfied that the project has been designed in a manner that generally avoids biodiversity impacts where feasible. The Department is satisfied that the provision of a biodiversity offset package is acceptable for the predicted impacts to Duffy's Forest Ecological Community (DFEC) and the Red-crowned Toadlet.

The Department concludes that the removal of the vegetation and mitigated impacts upon fauna are acceptable when balanced with the provision of enhanced connectivity and access to the NBH. The mitigation measures committed to by RMS, and the recommended conditions of the Department, are considered to be adequate to address biodiversity impacts.

Surface Water Hydrology and Quality

The Department considers that there will be a net benefit to the local waterways in Middle Creek Catchment. The proposed redesign of the drainage system within the Stage 1 footprint will provide beneficial stormwater management and flood mitigation to a hydrologic standard of up to 10 year Average Recurrence Interval (ARI) across the corridor. The installation of pollution control devices in drainage lines will provide beneficial pollutant control to an area where pollutant control is relatively non-existent.

The Department notes the ecological and recreational values of the surrounding waterways and the increasing pressure associated with population growth in the region. In accordance with the recommended conditions of approval, catchment and waterway health will be addressed by RMS during construction and operation of Stage 1 of the Concept Proposal.

Urban Design and Visual Impact

While the Concept Proposal will have an impact on the character and visual appearance of the local area, the Department notes that the changes are in line with infrastructure expected of a major road works and a hospital. The Department is satisfied the visual appearance of the Concept Proposal can be appropriately addressed through the implementation of the urban design objectives, mitigation measures and the recommended conditions.

Social, Economic and Land Use

The Department considers the proposal will have significant benefits for local and regional road users. The Concept Proposal will improve through-traffic performance whilst maintaining connectivity and improving safety for pedestrians and cyclists.

The alignment of the Concept Proposal will result in the removal of the Bantry Bay Road shops; however the Department notes that other local neighbourhood centres in the area provide similar services.

The Department is satisfied that with upgrades to footpaths and signalised pedestrian crossings, the proposal would improve safety and connectivity for the local community. In addition, the provision of an alternative parking arrangement for the Skyline Shops would result in dedicated shop access for disabled persons and deliveries whilst also providing an increase in allocated spaces.

Other issues

Other issues assessed relate to heritage, groundwater, land contamination, waste management, air quality and utility adjustments. Impacts identified in the assessment can be readily managed through the implementation of mitigation measures and safeguards as proposed in the EIS and refined in the relevant management plans as well as through recommended conditions.

Conclusions

The Department considers the Concept Proposal and Stage 1 will meet the project's objectives of improving peak period travel speeds, reliability and network performance whilst supporting development and activation of the NBH precinct and providing efficient access to the NBH. The proposal will also assist in the provision of road based public transport whilst improving safety within the network and minimising impacts to the environment.

The Department is also satisfied that the design of Stage 1 works will address related amenity impacts and provide a high quality urban and landscape design outcome and is confident similar outcomes can be delivered for the remainder of the Concept Proposal.

The benefits to the community as a result of the proposal will include:

- increased average traffic speeds and reduced congestion;
- improved pedestrian and cyclist connectivity and safety;
- facilitation of efficient access to the NBH;
- improved through traffic performance along Warringah Road;
- an upgraded drainage system within Stage 1 to achieve a 10 year ARI; and
- availability of noise attenuation treatment for over 200 residences experiencing acute noise exceedances.

The potential environmental impacts associated with the construction and operation of the proposal would be acceptable subject to the implementation of appropriate mitigation measures. The proposal would satisfy the objects of the EP&A Act and the principles of Ecologically Sustainable Development (ESD).

The Department concludes, on balance, that the proposal's benefits outweigh the potential residual impacts which can be managed and would not, subject to the recommended conditions, result in any long term adverse or irreversible effects. It is therefore in the public interest that the proposal proceeds.

1. BACKGROUND

RMS proposes to upgrade the existing road network known as Forest Way, Naree Road, Frenchs Forest Road West, Frenchs Forest Road East, Warringah Road and Wakehurst Parkway in the vicinity of the site of the NBH at Frenchs Forest. The Concept Proposal divides these works into two stages with Stage 1 Hospital Connectivity Works enhancing connectivity to the NBH and Stage 2 Network Enhancement works improving the broader road network capacity.

The existing road network is an important transport link for movements to and from the Northern Beaches. The network currently experiences high levels of traffic congestion with several intersections, including Warringah Road and Wakehurst Parkway, operating at or over capacity. During peak traffic periods the road network is particularly prone to congestion as traffic converges from three major arterial roads into one.

Construction of the Stage 1 Hospital Connectivity Works will take 24 months and is scheduled to be completed by 2017. The Stage 2 Network Enhancement Works are to take 30 months with completion expected by 2018. The proposed road works within the Concept Proposal are expected to cost $400 million. Approximately $70 million of this is apportioned to Stage 1 and $330 million apportioned to Stage 2. Employment generation would fluctuate depending on the stage of construction and is expected to peak at 100 persons per day.

This report assesses the application for the Concept Proposal and Stage 1 Hospital Connectivity Works. The Stage 1 Hospital Connectivity Works are due to be completed in 2017 and prior to the completion of the NBH, which is currently under construction and due for completion in 2018. The location, alignment and main features of the Concept Proposal and Stage 1 Hospital Connectivity Works are shown in **Figure 1**.

Stage 2 Network Enhancement Works will improve the broader network through the widening and grade separation of Warringah Road. The resulting underpass will be in the middle of the road corridor from west of Forest Way to the east of Wakehurst Parkway. Pedestrian footbridges will be replaced and increased across the corridor. Sections of Wakehurst Parkway and Allambie Road are to be widened and several intersections upgraded. It is also proposed to extend Aquatic Drive to the Wakehurst Parkway. Stage 2 Network Enhancement Works are to be assessed and considered under a separate application. Subject to approval, these works are expected to be completed in 2018 and to coincide with the opening of the NBH.

Locality

The surrounding land uses are diverse and include low density residential, retail, commercial, light industrial warehousing, educational establishments, open space, bushland, utilities and recreational facilities. There are three business parks in the locality serving the local and sub-regional area. The Forestway shopping centre is the primary shopping centre, with local shops on Bantry Bay Road and Frenchs Forest Road East. The Forest High School is located between Frenchs Forest Road and Warringah Road adjacent to the NBH site.

The predominant form of public transport in the area is bus with key routes linking the Northern Beaches and the rail interchange at Chatswood. The heavy traffic conditions during peak travel periods frequently cause delays to bus services.

The topography of the area is characterised by an undulating landscape. The project area is located within the Sydney Basin Bioregion containing potential habitat for threatened flora and fauna species. The area has high biodiversity value with a portion of vegetation being endangered DFEC. The area also serves as a Priority 1 Wildlife Corridor, connecting Oxford Falls to Manly.

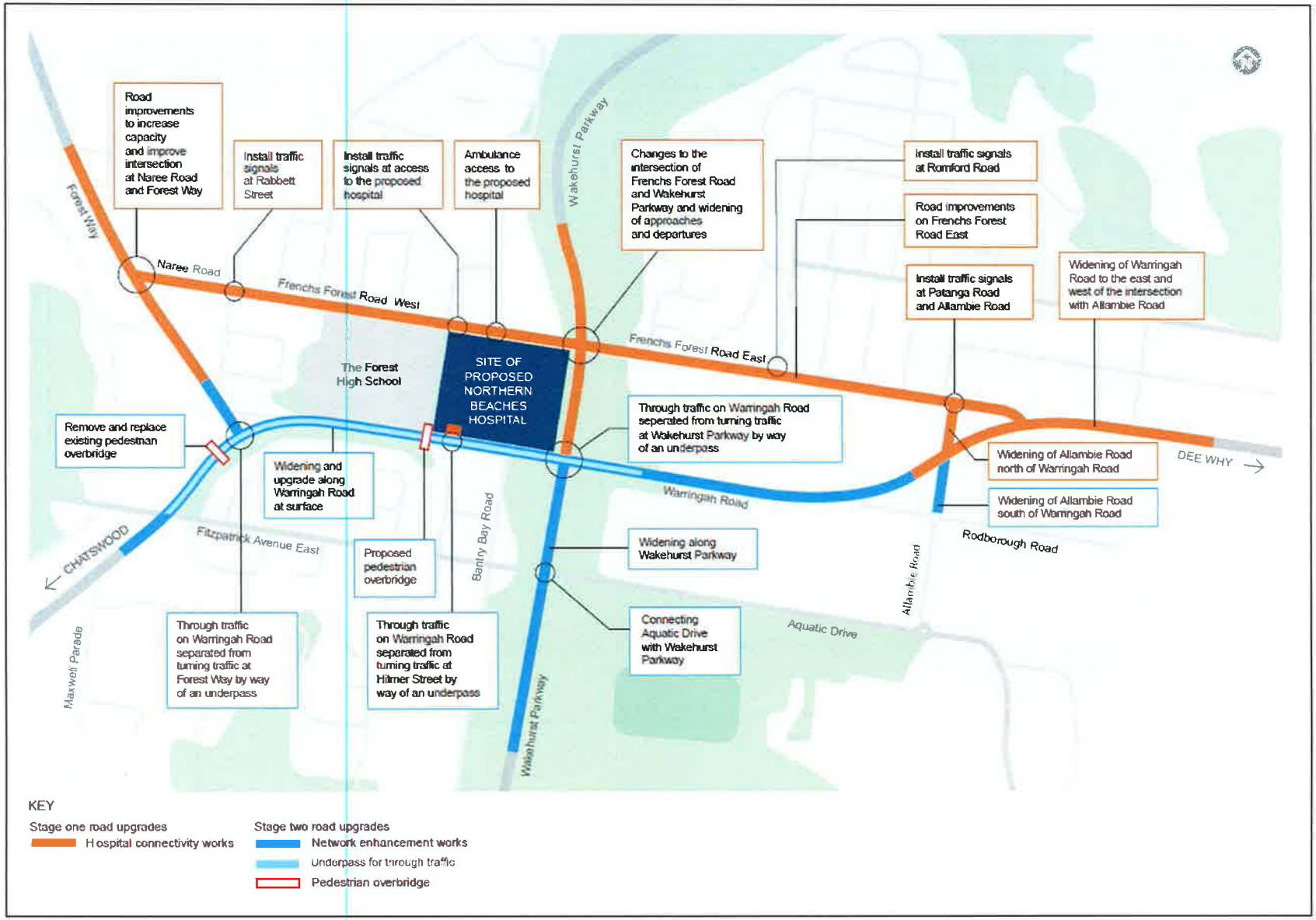


Figure 1. Proposal location, alignment and main features of the Concept Proposal and Stage 1 (Source: Proponent's EIS).

2. PROPOSED DEVELOPMENT

2.1. Description of the Proposal

The Concept Proposal proposes a suite of road works to relieve existing and forecast congestion, by enhancing the arterial and sub-arterial road network including Forest Way, Naree Road, Frenchs Forest Road West, Frenchs Forest Road East, Warringah Road and Wakehurst Parkway. The Concept Proposal also provides upgraded access to the NBH and the surrounding health precinct, while improving network and intersection conditions.

Grade separation will result in reduced traffic volumes on the surface road network and improve congestion at the Forest Way, Hilmer Street and Wakehurst Parkway intersections. Localised bus priority measures (eg. dedicated bus lanes) are expected to improve public transport performance. Therefore the construction of the project will result in continued benefit to not only road users but also to the wider community as overall transport network capacity increases.

Under the Concept Proposal, the project is to be constructed in two stages with Stage 1 involving essential works to enhance the connectivity to the NBH and Stage 2 involving broader network enhancements. Stage 1 Hospital Connectivity Works include:

- installation of five new signalised intersections along Frenchs Forest Road/Naree Road at the intersections with Forest Way, Rabbett Street, Romford Road, Allambie Road and at the main access to the NBH;
- widening of Naree Road and Frenchs Forest Road;
- widening of Allambie Road to the north of the intersection with Warringah Road;
- widening of the Wakehurst Parkway about 330 metres north of the intersection with Frenchs Forest Road to the intersection with Warringah Road;
- widening of Warringah Road from west of Allambie Road about 700 metres to the east of Courtley Road;
- upgrade of the Frenchs Forest Road and Wakehurst Parkway intersection (refer **Figure 2** and **Figure 3**);
- upgrade of the Forest Way and Naree Road intersection;
- changes to bus stops, bus priority measures, car parking, pedestrian crossings; and
- utility relocation, and ancillary works for construction of the Concept Proposal.

A key benefit from the proposal will be provision of essential access to the new NBH. Stage 1 works are expected to be completed in 2017, prior to the opening of the NBH. The proposal will also have ongoing operational benefits by relieving congestion on Warringah Road, Forest Way and Naree and Frenchs Forest Road. This will result in improvements to intersection performance and will decrease delays experienced by road users.

Stage 2 works are expected to be completed in 2018 and will include:

- widening of Warringah Road from west of Fitzpatrick Avenue to Allambie Road including:
  - subsurface east and west bound lanes in a slot through the centre of the Warringah Road corridor;
  - surface east and west bound lanes parallel to the slot; and
  - upgrades to intersections with Forest Way, Hilmer Street and Wakehurst Parkway at surface level.
- replacement and addition of pedestrian footbridges across Warringah Road;
- connection of Aquatic Drive with Wakehurst Parkway;
- widening of Allambie Road south of Warringah Road; and
- widening of Wakehurst Parkway.

This report provides an assessment for the Concept Proposal and Stage 1 Hospital Connectivity Works only. Stage 2 Network Enhancement Works are to be assessed and considered under a separate application.

Figure 2. Cross-section of road widening - Frenchs Forest Road West on approach to the intersection with Wakehurst Parkway (looking East) (Source: Proponent's EIS).

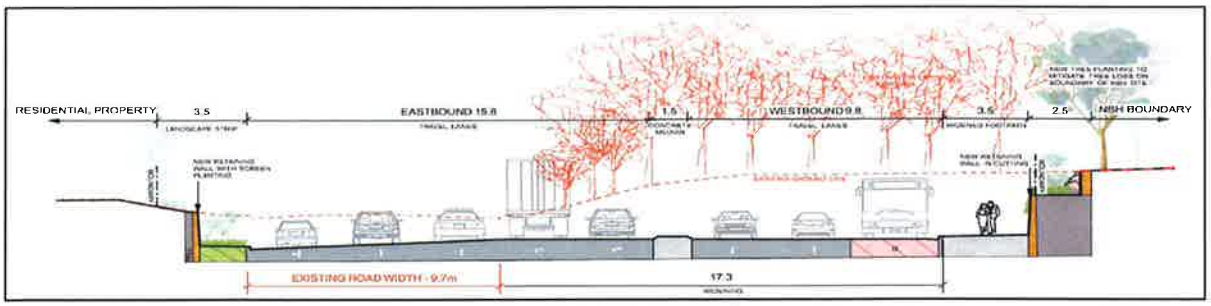
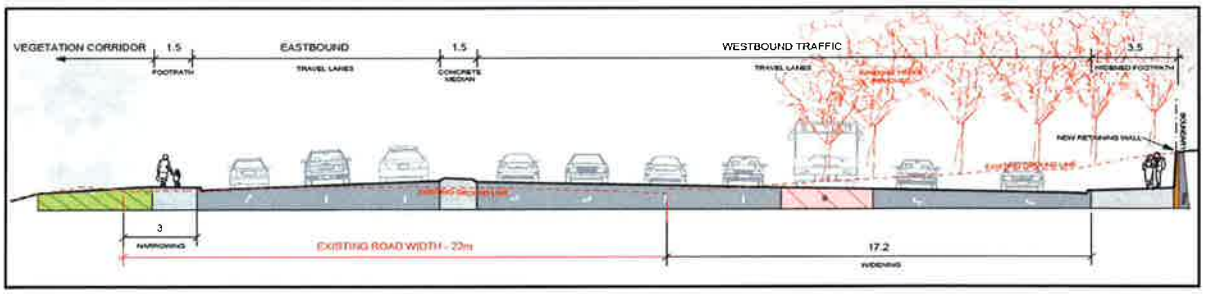


Figure 3. Cross-section of road widening - Frenchs Forest Road East on approach to the intersection with Wakehurst Parkway (looking East) (Source: Proponent's EIS).



2.2. Construction Infrastructure and Activity

Subject to approval, Construction of Stage 1 would begin in late 2015 and is expected to take approximately 24 months. Subject to approval, construction of Stage 2 would start in 2016 and is expected to take 30 months.

The proposed construction compound sites located near the Allambie Road and Aquatic Drive, and Warringah Road and Wakehurst Parkway intersections (refer **Figure 4**) are on land that is currently disused. The construction compounds are to be utilised for both Stages 1 and 2 and will contain temporary buildings for personnel use, parking areas, material lay down and storage areas. The compounds will be fenced to screen them from surrounding properties.

Designated access for haulage routes for the Concept Proposal will be via the arterial road network. Construction traffic movements for Stage 1 will predominately be between the construction compounds and work zones.

2.3. Preferred Infrastructure Report

Following exhibition of the EIS, RMS made a number of amendments to its proposal. Given the nature of the amendments a Preferred Infrastructure Report (PIR) was prepared. The PIR amends the proposal to include the following:

- all utility adjustments for Stage 1 and Stage 2 to be undertaken within Stage 1;
- additional ancillary facility located on the north eastern side of the Wakehurst Parkway and Warringah Road intersection to support construction activities;
- alternative car parking for the Skyline shops;
- a new signalised pedestrian crossing at The Forest High School; and
- upgrades of pedestrian and shared paths.

RMS also updated its Environmental Mitigation Measures in response to issues raised in submissions.

Figure 4. Stage 1 - Potential delivery scenario for work zones (Stage 1) (Source: Proponent's EIS).

2.4. Project Need and Justification

The strategic aim of the Concept Proposal is to provide an efficient road network surrounding the NBH. The proposal will reinforce Warringah Road and Wakehurst Parkway as key arterial connections between the Northern Beaches, Chatswood and Sydney CBD. Specifically, the project objectives are to:

- improve peak period travel speeds and reliability on Warringah Road following the development of the NBH and surrounding precinct;
- improve the network performance surrounding the NBH to support the development of the precinct;
- support the activation of the NBH Precinct by facilitating access connections to the proposed hospital;
- allow for road based public transport along and across the corridor;
- maintain or improve road safety in accordance with current standards;
- minimise impacts on the environment; and
- optimise the design to provide an urban design and landscape outcome that complements the surrounding environs.

Currently, the existing road network experiences low average peak travel speeds, unreliable travel times and disruptions to traffic movements impacting both road users and the adjoining community. Warringah Road currently operates at or beyond capacity during peak periods and is expected to experience continued traffic growth in the future.

In the evening peak period, the average travel speed on the road network is predicted to decrease by up to 50 percent (from 28 kilometres per hour in 2012 to 14 kilometres per hour in 2018) and the average delay per vehicle is predicted to increase by 150 percent (from 3.5 minutes in 2012 to over 9 minutes in 2018).

The NBH is currently under construction and is set to commence operation in 2018. The hospital is identified by the *NSW State Infrastructure Strategy 2012-2032* as important health infrastructure for the future of the Northern Beaches with investment by the NSW Government of $10 billion in the next 10 years. The hospital is a level 5 facility providing a greater range of medical and health services and complex care, reducing the need for community members to travel outside of the Northern Beaches region. Operation of the NBH will result in an additional 900 vehicles entering the road network during peak periods.

With the introduction of the NBH and without intervention, the road network performance will deteriorate. Therefore, the location requires a considerable increase in network capacity in order to maintain, if not improve on, the existing level of service.

Further to this, the project is strategically justified and is consistent with the following policy documents of government:

- Warringah Road is identified by the ***NSW Long Term Transport Master Plan*** as a strategic transport corridor with the potential to be expanded as part of the strategic transport network;
- the Concept Proposal and Stage 1 works are consistent with priority actions of ***NSW 2021: A plan to make NSW number one (2011)*** including enhancing and expanding capacity on roads corridors, improving safety and reducing congestion;
- the proposal is consistent with the ***NSW State Infrastructure Strategy 2012-2032*** and the ***State Infrastructure Strategy Update 2014***, as it aims to address congestion on key arterial routes in the Northern Beaches and will facilitate ease of access to the Northern Beaches Hospital and the health precinct; and
- the proposal is consistent with the 'Priorities for Strategic Centres' in the North Subregion as outlined in ***A Plan for Growing Sydney 2014*** by providing road improvements to support the Northern Beaches Hospital Precinct and by improving walking and cycling connections in the precinct.

2.5. Project Development and Alternatives

During project development, RMS listed four alternatives to be evaluated including a 'Do minimal' scenario, investment to improve public transport, demand management and the proposed project. Each of these alternatives was evaluated against the project's objectives and a preferred strategic alternative was determined.

'Do Minimal'

The 'Do minimal' alternative would involve the provision of basic access arrangements to the NBH including hospital entrances from Frenchs Forest Road West. Evaluation of this alternative showed that intersection performances would deteriorate, regional accessibility during peak periods would diminish and that NBH accessibility would not be facilitated. This alterative can be considered the base case.

Investment to Improve Public Transport

This alternative involved the improvement of the strategic bus corridor and provision of bus lanes within the road network without any road upgrades. In the absence of rail connections, the Department recognises the importance of bus services in the Northern Beaches. The Department notes that this alternative has been integrated into the Concept Proposal. The Department considers that the integration of these measures is critical in meeting Transport for NSW's *Sydney's Bus Future*.

While the Department notes the issues raised in public submissions concerning the need for further funding and focus on public transport, the Department does not consider the improvement of road conditions or public transport infrastructure to be mutually exclusive.

Demand Management

The demand management alternative involved reducing dependence on cars as a primary form of travel by limiting parking in key destination areas and changing land use policy. RMS noted that this would require significant changes to social attitudes and travel behaviour. It was concluded that on its own, demand management would not provide relief from congestion and would not adequately facilitate access to the NBH.

The Project

This option involved the upgrade of the wider regional road network and improved connectivity within the NBH Precinct. Upon evaluation, it was determined that this option, when supplemented with elements of improved public transport, was the most optimal approach in meeting the project objectives. The project alternative was considered to be within the public interest, cost effective and delivered the most favourable environmental outcomes. The final option developed included:

- hospital connectivity and minor network enhancements (Stage 1); and
- network enhancement through an underpass grade separation (Stage 2).

3. STATUTORY PLANNING REQUIREMENTS

3.1. State Significant Infrastructure

Section 115U(2) of the EP&A Act provides that a SEPP may declare any development, or any class or description of development to be SSI. Clause 1 of Schedule 3 of SEPP (State and Regional Development) 2011 identifies SSI to be an activity for which the proponent is the determining authority and would require an EIS to be obtained under Part 5 of the Act. The Concept Proposal is characterised as a 'road' or 'road infrastructure' by virtue of Clause 94 of the SEPP (Infrastructure) 2007. Pursuant to Section 115U of the EP&A Act and Clause 14 of SEPP (State and Regional Development) 2011, RMS formed the opinion that an EIS would be required for the proposal. The proposal is therefore SSI under Part 5.1 of the Act.

RMS is now seeking approval of the SSI application, in accordance with Section 115ZD Division 3 of the Act.

3.2. Permissibility

The proposal is characterised as development permitted without consent, in accordance with Clause 94 of SEPP (Infrastructure) 2007.

3.3. Delegation

On 16 February 2015, the former Minister for Planning, delegated powers and functions for the approval or disapproval of the carrying out of SSI under Section 115ZB of the EP&A Act to the Executive Director, Infrastructure and Industry Assessments, of the Department in cases where:

- the relevant local council has not made an objection, and
- a political disclosure statement has not been made, and
- there are less than 25 public submissions in the nature of objections.

The subject application complies with the above criteria. Consequently, the Executive Director, Infrastructure and Industry Assessments, may determine the application under delegated authority.

3.4. Environmental Planning Instruments

In accordance with Section 115ZF(2) of the EP&A Act, the only environmental planning instruments that apply to the proposal are SEPP (Infrastructure) 2007 (insofar as it relates to the declaration of development that does not require consent) and SEPP (State and Regional Development) 2011 (as it pertains to the declaration of infrastructure as SSI). There are no other environmental planning instruments that substantially govern the carrying out of the project.

3.5. Objects of the Act

Decisions made under the Act must have regard to the objects of the EP&A Act, as set out in Section 5 of the EP&A Act. The Department has given consideration to the objects of the EP&A Act including:

- how the proposal would impact on the management, development and conservation of the area, with reference to the management of traffic and transport, noise and vibration, water hydrology and quality, visual amenity and social and economic issues (see **Section 5 and 6**);
- the strategic justification of the proposal in terms of the orderly and economic use and development of land, and how the proposal would affect traffic and access throughout the region and beyond (see **Section 2.4**);
- protection of the environment by assessing the effectiveness of proposed management and mitigation measures (see **Sections 5** and **6**);
- the principles of ecologically sustainable development (see **Section 3.6**); and
- public involvement and participation in the assessment of the proposal by placing the proposal documents on exhibition at community locations in the local area and on the Department's website (see **Section 4**).

3.6. Ecologically Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental consideration in decision-making process and that ESD be achieved through the implementation of:

a) the precautionary principle;
b) inter-generational equity;
c) conservation of biological diversity and ecological integrity; and
d) improved valuation, pricing and incentive mechanisms.

The Department notes the project objectives developed by RMS to guide the delivery and operation of the proposal will contribute to the sustainability of the project and the meeting of ESD principles. In addition to the objectives, RMS has addressed the above principles directly in the EIS and has identified a broad range of mitigation measures to manage impacts associated with these issues.

RMS has noted the application of the precautionary principle throughout the EIS and the Department considers the assessment undertaken and the range of mitigation measures have incorporated the principle. The Department is also satisfied that the valuation and pricing of the environmental resources associated with the Concept Proposal and Stage 1 have been adequately undertaken and internalised through the proposal of RMS mitigation measures.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under Section 115Z(3) of the Act, the Department is required to make the EIS publicly available for at least 30 days. The Department exhibited the proposal from Wednesday 22 October 2014 to Friday 21 November 2014 (a total of 31 days) on the Department's website, and at the following exhibition locations:

- Department of Planning and Environment, Information Centre, Sydney;
- Nature Conservation Council, Newtown;
- Roads and Maritime Services (Head Office), North Sydney;
- Warringah Council, Dee Why;
- Dee Why Library, Dee Why;
- Belrose Library, Belrose;
- Forestville Library, Forestville; and
- Warringah Mall Library, Brookvale.

The Department also advertised the exhibition in the Sydney Morning Herald, the Daily Telegraph and the Manly Daily on Wednesday 22 October 2014 and notified State and relevant local government authorities directly in writing. The Department received 45 submissions during the exhibition period including 6 submissions from public authorities.

4.2. State and Local Government Agency Submissions

No public authority objected to the proposal; however, each raised issues for consideration. The issues raised in public authority submissions in order of frequency are summarised in **Table 1**. Details of the issues raised in submissions are provided below.

Department of Education and Communities (DEC) requested further information regarding the provision of a safe transport interchange environment for all travel modes for students, staff and visitors to The Forest High School. DEC also requested that noise mitigation for road noise exceedances should include acoustic treatment to school buildings. DEC noted that a continuation of The Forest High School Working Group will be important in managing construction noise, dust emissions, access arrangements, utilities impacts, operational issues, transport infrastructure changes and community consultation.

Environment Protection Authority (EPA) recommended further environmental impact assessment of off-road diesel emissions from construction vehicles and equipment and the development and implementation of an Air Quality Management Plan prior to the commencement of operation. The EPA also recommended dust emissions are minimised and requested further information on the duration of increased traffic exposure from traffic diversions from Warringah Road onto Frenchs Forest Road as a result of Stage 2 works.

The EPA recommended mitigation measures for highly noise affected receivers and the need for architectural treatments due to noise impacts be considered for multi-level buildings. The EPA also recommended that RMS not cause or permit any waters to be polluted and a Water Management Plan, including a Surface Water Quality Monitoring Program and Soil and Water Management Plan be prepared by experienced and suitably qualified persons.

NSW Health Infrastructure (HI) did not provide comments in its submission, however did note its ongoing relationship with RMS and that this relationship will provide for the management of issues arising from the construction phase.

Office of Environment and Heritage (OEH) requested updates to the flora surveys be conducted in ecological sampling units 5C and 12 and suggested that the assessment of significance be undertaken with the assumption that fauna may exist in the study area. OEH requested further information regarding fauna species crossing roads in the area and the frequency of events in order to assess the effectiveness of potential fauna crossings.

OEH requested early consultation regarding biobanking offset sites and advised that an assessment of any offset site's conservation values, management requirements and its compliance with the state wide conservation priorities would need to be undertaken. OEH noted the difficulty in securing suitable DFEC offsets and requested that offsets be secured as early as possible.

OEH commented that the issue of wildlife connectivity has not been adequately addressed and concluded there is insufficient data to comment on proposed wildlife connectivity measures. OEH recommended that a Wildlife Connectivity Strategy be developed in accordance with RMS's Connectivity Guidelines.

OEH also noted the presence of two Aboriginal cultural heritage sites within the Stage 1 area and indicated that, following detailed design, no impacts should occur to these sites and avoidance should be undertaken at all costs.

Department of Primary Industry (DPI) / NSW Office of Water (NOW) requested further information regarding in-line pollutant control devices so that pollution is treated outside of drainage lines and that stormwater runoff is treated before it discharges into local waterways.

NOW also requested further information regarding the predicted volume of groundwater that is likely to be intercepted and then discharged into local streams and recommended that mitigation measures be updated to include groundwater monitoring of the shallow water table. NOW requested the project to quantify and minimise the take of groundwater and that further assessment of impacts from discharge of groundwater into the local waterway be undertaken.

NOW recommended the incorporation of measures to prevent scour and bank instability along all watercourses (including those watercourses identified as Red-crowned Toadlet) and that the project should maintain, as close as practicable, the existing hydrologic regime of all local watercourses. NOW also recommended that proposed environmental measures be updated to include stockpile distances from drainage lines and creek channels.

Warringah Council raised a number of issues for consideration including urban design, cyclist and pedestrian connectivity, public transport and car parking, biodiversity, surface water and stormwater management, property acquisition and a number of other issues.

Specifically, Council identified the need for cyclist and pedestrian infrastructure along the project corridor to ensure connectivity and safety for these user groups. Council also emphasised the importance of the bus network and identified a number of existing bus stops that needed to be retained and upgraded to meet growing demand.

Council raised traffic impacts on local roads used as rat runs during construction and demand for on-street parking once parking on Naree Road is removed.

Council made a number of recommendations regarding land acquisition processes, traffic management along Patanga Road and design criteria of footpaths and roads. Council also requested the provision of high standard public domain infrastructure and the development of a way finding strategy and effective signage. Council requested that costs associated with changes to street lighting should be borne by the Proponent.

Council raised a number of issues relating to biodiversity. Council noted that there was the potential for vegetation attributable to the coastal Upland Swamp EEC to be located to the north of the site adjacent to the Wakehurst Parkway in contradiction with the EIS It was suggested this should be verified and any impacts accounted for. Council also identified a number of known roosting locations for the Powerful Owl which have not been accounted for in the EIS and will be cleared. Council also requested that the cumulative loss of the DFEC be accounted for in the offsetting measures proposed.

Council requested further information regarding stormwater management and the proposed pollutant control devices. It was also suggested that the stormwater designed for the road works and the hospital be considered in unison.

Council also requested that alternatives to the removal of the Skyline Shops parking be considered as well as the need for disabled access, loading and unloading areas and waste collection. Council also requested street tree replacements, and footpath and roadwork adjustments along property boundaries to meet Warringah Council's requirements.

4.3. Submissions from the Public, Businesses and Special Interest Groups

The Department received a total of 39 public submissions during the public exhibition period. Of these, 4 generally supported the proposal, 25 provided comments and 10 objected on various grounds. Special interest groups that made submissions included the Australian Plant Society, Garigal Landcare, HEAL, Bicycle Network, Save Manly Dam Catchment Committee, Belrose Rural Community Organisation and the Friends of Narrabeen Lagoon. Figure 5 summarises the sources of the submissions received.

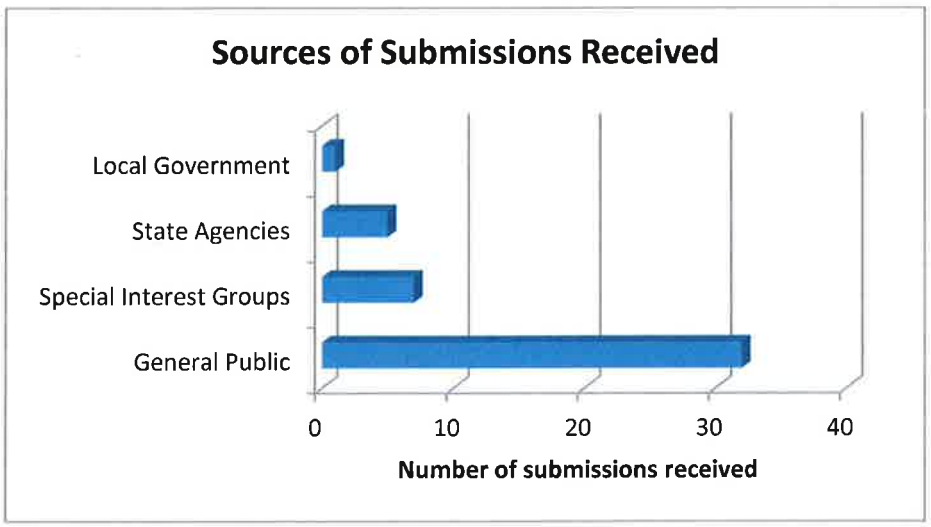


Figure 5. Submissions by source type.

Table 1. Summary of the representations from State and local government agencies.

Issue raised/Agency	DEC	EPA	Health Infrastructure	OEH	NOW	Warringah Council	Total
Minimisation of transport mode conflicts and need for specific cyclist and pedestrian infrastructure to enhance connectivity and safety	✓					✓	2
Noise mitigation to include multi- level buildings and The Forest High School	✓	✓					2
Ongoing liaison, consultation and working relationship			✓	✓			2
Further ecological sampling required and re-verified and potential location of EEC unaccounted for				✓		✓	2
Biodiversity assessment of significance reasoning clarification and fauna impacts unaccounted for				✓		✓	2
Offsets to be assessed, secured as early as possible and account for cumulative loss				✓		✓	2
Requests for clarification and assessment regarding surface water mitigation measures, including PCDs					✓	✓	2
Requests for further details rand assessment regarding predicted groundwater discharges into local waterways					✓	✓	2
Restriction to any pollution of waters and stormwater runoff to be treated prior to discharge		✓			✓		2
Provision of safe transport interchange environment for The Forest High School	✓						1
The Forest High School Working Group should continue	✓						1
Off road diesel equipment to be included in environmental impact assessment		✓					1
Air Quality Management Plan to be developed		✓					1
Dust emission minimisation		✓					1
Mitigation measure for highly noise affected receivers to include respite periods and alternative accommodation		✓					1
Surface Water Quality Monitoring Program and Soil and Water Management Plan to be developed		✓					1
Wildlife connectivity inadequately addressed, insufficient existing data to assess mitigation measures and need for connectivity strategy				✓			1
Avoidance of any impact to Aboriginal sites				✓			1
Maintenance of existing hydrological regime for Red-crowned Toadlet recommended					✓		1
Mitigation measures to be updated to include distances of stockpiles from drainage lines					✓		1
Clarification of discrepancies within EIS and appended reports						✓	1
Suggested alterations to project design to facilitate road network and intersection improvements						✓	1
Emphasised importance of current and future provision for bus networks through the area						✓	1
Consideration of increased demand on rat runs and on-street parking during construction and operation						✓	1
Proposed classification of local roads to be changed to state roads instead						✓	1
No support for on-street paid parking schemes and street lighting costs to be borne by Proponent						✓	1
Provision of high standard public domain infrastructure, way finding strategy and effective street signage						✓	1
Provision of information for landowners preparing development applications and referrals to Proponent for comment						✓	1
Need for Construction Traffic Management Plan						✓	1
Changes to street trees and vehicular access to private properties to meet design criteria						✓	1

4.4. Key Issues Raised in Submissions

Key issues raised in the submissions are summarised below and further addressed in **Section 5** and **6** of this report.

Traffic and Transport

- further consideration of road user safety including pedestrians;
- alternative pedestrian crossing locations and issues raised with proposed locations;
- scale of grade separation of Warringah Road;
- lane widening is excessive and out of character for the area;
- potentially excessive number of proposed lanes along Warringah Road;
- Warringah Road upgrade performance and capacity during operation;
- location and design of new signalised intersections;
- Wakehurst Parkway and Frenchs Forest Road intersection upgrade;
- operational intersection performances and proposal measures to improve these;
- requests for further integration of public transport and increased bus bay allocations;
- further details and provision requested relating to bus lanes;
- loss of parking at The Forest High School;
- removal of on-street parking from Naree Road and Skyline Shops;
- greater consideration of cyclist infrastructure provision;
- changes to access and egress of local roads onto Frenchs Forest Road;
- location of main access to the hospital from Frenchs Forest Road;
- design and accessibility of the hospital main access for ambulances;
- diversions and road closures during construction;
- traffic impacts associated with construction compound haulage route;
- adequacy of proposed construction traffic mitigation measures; and
- adequacy and accuracy of construction and operation traffic modelling and methodology.

Biodiversity

- general concerns raised regarding vegetation loss;
- opportunities to improve wildlife connectivity and reducing habitat fragmentation;
- concerns regarding cumulative impacts to Duffy's Forest;
- concerns that groundwater dependent ecosystems have not been accounted for or assessed;
- lack of opportunities to offset vegetation loss and lack of biodiversity mitigation adequacy;
- issues raised regarding survey and methodology adequacy;
- impacts to Red-crowned Toadlet resulting from habitat fragmentation, changed hydrological regimes, water quality and vegetation loss; and
- information requested regarding impacts from weeds and proposed weed management.

Social, economic and land use

- potential community severance resulting from road widening in Concept Proposal and Stage1;
- general community health concerns raised;
- call for further information and inclusion of some property acquisitions;
- issues raised regarding economic impacts on Forest Way Shopping Centre; and
- concerns regarding impacts to The Forest High School.

Urban design and visual amenity

- requests that landscaping and landscape character be considered in streetscape design;
- information requested regarding pedestrian bridges and their visual impacts; and
- concerns raised regarding adequacy of urban design and visual impact assessment methodology.

Ground and surface water

- waterway health, nutrient loads and runoff due to increased impervious surfaces; and
- requests for improved groundwater mitigation adequacy.

Noise and Vibration

- additional traffic during operation resulting in increased noise and vibration to receivers.

Other issues

- potential decreases in operational air quality due to increased vehicle capacity;
- issues raised regarding general EIS adequacy;
- the strategic need and justification of the proposal was questioned; and
- requests for further consideration of alternatives and alternative strategic designs.

4.5. Proponent's Response to Submissions

The Proponent provided a RtS and a PIR to the Department which was made publicly available on 28 April 2015. The PIR includes a response to all the issues raised in submissions from the general public, local government and public authorities.

5. ASSESSMENT OF KEY ISSUES

5.1. Traffic and Transport

Issue

The road network within the Concept Proposal area experiences congestion and delays during peak periods with key intersections performing poorly. Road congestion has also been identified as a leading cause of the majority of the 270 crashes that occurred between January 2010 and June 2013. **Table 2** summarises the major roads within the locality, their existing conditions and traffic volumes as of 2012.

Table 2. Summary of existing environment of major roads within the corridor of the proposal.

Road	Hierarchy	Direction through corridor	Reach	Avg. # Lanes	Avg. # Weekday Vehicles	Speed Limit through corridor
Warringah Road	State Road	East-West	Dee Why - Chatswood	6	70 - 80,000	70
Wakehurst Parkway	State Road	North-South	North Narrabeen - Seaforth	2 to 4	40 -50,000	70
Forest Way	State Road	North-South	Terrey Hills - Frenchs Forest	6	45,000	70
Naree Road/ Frenchs Forest Road	Local/Collector Road	East- West	Forestway Shopping Centre - Skyline Shops	2 (undivided, on-street parking present)	20,000	50 (School zone also present)
Allambie Road	Regional/Local Road	North-South	Frenchs Forest - North Manly	2	20,000	60

A key objective of the project is to address existing and forecast traffic congestion within the locality by increasing road capacity, efficiency and providing access to the NBH. The key traffic and transport issues associated with the project include network and intersection performance, on-street car parking, pedestrian and cyclist infrastructure, connectivity, public transport and construction traffic.

Network and Intersection Performance

Concept Proposal modelling indicated that once both stages of the project were operational in 2021, average speeds in the AM and PM peaks would increase by approximately 73% and 67% respectively.

The modelling undertaken for Stage 1 focused on comparisons between the 'Do Minimal' and Stage 1 scenarios for AM and PM peak periods. The Stage 1 model was undertaken in isolation of any Stage 2 works or operation and the summarised results of the key measurements are shown in **Table 3**. This was undertaken to demonstrate the performance of the Stage 1 works in the absence of Stage 2 works.

Table 3. Modelled network performance measures for Stage 1 vs 'Do Minimal' scenario in 2018 and 2028 during AM and PM Peaks.

Network Performance	2018				2028			
	Do Minimal		Stage 1		Do Minimal		Stage 1	
Measure	AM	PM	AM	PM	AM	PM	AM	PM
Total Traffic Demand (vehicles)	43,252	49,955	43,283	49,996	45,346	52,025	44,952	52,155
Unreleased Demand (Proportion of vehicles unable to enter the network)	14%	12%	9%	7%	10%	17%	6%	14%
Average speed (km/h)	17.1	20.0	21.6	23.2	15.4	16.9	20.4	19.0

The majority of intersections in the AM peak under a 'Do Minimal' scenario are expected to operate at a Level of Service (LoS) F with most of these expected to have average delay times in excess of 120 seconds. Under the Stage 1 scenario over half of the signalised intersections along Frenchs Forest Road are expected to operate at LoS A to E with the remainder operating at LoS F with average delay times between 60-90 seconds. This demonstrates a noticeable improvement over the 'Do Minimal' scenario.

LoS for intersections during the PM peaks under the 'Do Minimal' and the Stage 1 scenarios will operate at similar levels. However, a decrease in performance at the Forest Way and Naree Road intersection (LoS E) when compared to the same intersection in the 'Do Minimal' scenario is expected. This decrease is attributable to this intersection becoming signalised which will increase delays to through-traffic on Forest Way in order to reduce delays to motorists seeking to access Forest Way from Naree Road.

By 2028, the benefits from Stage 1 will be reduced in both the AM and PM peaks. However, the LoS at many of the intersections will still be operating more efficiently than those under the 'Do Minimal' scenario. In particular, the new signalised intersection at the main access to the NBH will operate at a LoS of A to D in 2018 and 2028 in the Stage 1 scenario, compared to LoS E under the 'Do Minimal' scenario. Notwithstanding, intersection performance across the local network will improve as Stage 2 becomes operational.

On-street Car Parking

The existing demand for on-street parking within the Stage 1 area is mainly focused on the western and eastern side of the corridor (refer **Table 4**). The Naree Road and Rabbett Street demand has been attributed to the informal commuter street parking used by patrons travelling by bus from Forest Way. The Patanga Road demand has been attributed to demand generation from the Skyline Business Park and Skyline Shops.

On-street parking availability will be impacted as a result of Stage 1 as Frenchs Forest Road will be widened and no parking will be permitted between Bluegum Crescent West and Wakehurst Parkway, Wakehurst Parkway and Skyline Place, Inverness Avenue and Warringah Road, and on Allambie Road between Frenchs Forest Road East and Warringah Road. Off-peak parking will be permissible along the sections of road outlined in **Table 5.**

Table 4. Car parking survey results where occupancy was in excess of 50%.

Road	Section	Side	Weekday	Weekend
Naree Road	Forest Way - Rabbett Street	South	60%	23%
Rabbett Street	Naree Road - Forest Way	West	83%	25%
	Naree Road - Forest Way	East	86%	18%
Newell Place	Nandi Avenue to end	West	42%	64%
Patanga Road	Frenchs Forest Road East - Dareen Street (1P)	East	57%	19%
	Frenchs Forest Road East - Dareen Street (unrestricted)	East	88%	27%

Table 5. Sections of road within Stage 1 that will have permissible parking during off peak periods.

Road	Section
Naree Road	Forest Way to Rabbett Street
Frenchs Forest Road West	Rabbett Street to Bluegum Crescent West
Frenchs Forest Road East	Skyline Place to Romford Road
	Romford Road to Inverness Avenue

Stakeholders impacted as a result of parking changes include The Forest High School, Skyline Shops, local residents and employees of the Skyline Business Park. On-street parking associated with Skyline Business Park will be prohibited west of Skyline Place and permissible during off-peak hours to the east of Skyline Place. Off-street parking is available for businesses within the Skyline Business Park. The impacts to The Forest High School include the relocation of kiss-and-ride facilities and the loss of on-street parking for staff. RMS has agreed to redesign off-street parking facilities for school staff and visitors that will enable off-street parking for approximately 120 cars, an increase of 60 car spaces from the previous facility on site.

The widening of Frenchs Forest Road East will also result in the existing 16 spaces that service the Skyline Shops to be removed. RMS will replace these spaces on the southern side of Frenchs Forest Road East, between Allambie Road and Warringah Road East.

Pedestrian and Cyclist Safety and Connectivity

The existing pedestrian infrastructure in the area is adequate to meet current demand but is of poor quality and does not promote pedestrian activity. The new and upgraded intersections included with Stage 1 will include new signalised pedestrian crossings. In addition, footpaths will be formalised and widened at key sections and shared paths implemented in other sections of the corridor. Safety risks to pedestrians are expected to decrease and connectivity improved as a result of these measures being implemented.

Cyclist infrastructure in the area is limited, however new facilities are planned in the Warringah Council Bike Plan. Pedestrian and cyclist infrastructure provision has been included in the Concept Proposal and will include shared paths and pedestrian footbridges. Works that will allow for the integration cyclist infrastructure will be detailed in Stage 2.

Public Transport

Buses are the primary source of public transport within the Concept Proposal area. Existing bus priority measures include a southbound bus lane on Wakehurst Parkway between Frenchs Forest Road and Warringah Road, bus queue jumps along the corridor and bus only sections partly along Rabbett Street and access from Warringah Road westbound onto Frenchs Forest Road East. The provision of bus services will increase by 2018 and remain constant until 2028, with bus frequencies, inbound and outbound, expected to increase with demand.

The Concept Proposal will have a positive impact on public transport with reduced traffic congestion and the provision of bus priority measures. These measures include changes to existing bus facility locations and dedicated bus lanes for the Wakehurst Parkway and Frenchs Forest Road intersection and the Warringah Road and Frenchs Forest Road East

intersection. However, average bus speeds are not expected to improve significantly until Stage 2 becomes operational.

Stage 1 has been designed to improve bus movements, with design elements including:

- extension of the Forestway Shopping Centre bus bay;
- changes to bus stop locations including the introduction of new stops; and
- provision of bus lanes and facilitating signalised bus turns.

Construction Traffic

Construction traffic impacts will result from road closures (partial or complete), delivery of construction material and plant, light and heavy vehicle movements and cumulative impacts associated with overlapping construction between Stages 1 and 2, the NBH and Mona Vale Road Upgrade. Specific impacts include:

- increased travel times;
- temporary road closures;
- temporary changes to bus routes and access arrangements;
- decrease in kerbside parking;
- access arrangements to residences and The Forest High School; and
- potential safety issues.

Bus stops, routes and access arrangements for public and school buses along Frenchs Forest Road will be temporarily relocated. Walking distances between bus stops will increase and waiting areas reduced in size. Potential timetable delays, temporary removal of bus priority arrangements and impacts to bus manoeuvres at the Forest Way and Naree Road intersections are also expected.

Loss of kerbside parking along Naree Road, Frenchs Forest Road West and Patanga Road is expected. Existing occupancy rates in surrounding streets demonstrate an ability to absorb the displaced parking. However, as Rabbett Street south of Naree Road is already near capacity, parking demand is expected to shift to Rabbett Street to the north of Naree Road. Kiss-and-ride opportunities for The Forest High School will be diminished during construction.

Connectivity and access arrangements for pedestrians and cyclists are also expected to be impacted with distances between crossing locations increased. Increased traffic volumes are anticipated along Iris Street, a designated cycle route. Alterations to footpath alignments and implementation of traffic diversions during construction may increase safety risks for pedestrians.

Submissions

More than a third of traffic and transport related public submissions raised concerns with the new signalised intersections (See Chapter **2.1**). Other concerns included changes to local road access, predicted network and intersection performance and the number of lanes being either inadequate or surplus to need.

A number of submissions identified the need for the provision of public transport infrastructure and bus lanes. Issues such as on-street parking, cyclist infrastructure, road user safety, pedestrian crossing locations, ambulance access arrangements, diversions and road closures during construction and the grade separation works proposed for Stage 2 were also raised.

DEC noted the importance of the continuation of The Forest High School Working Group during construction and operation to effectively manage temporary access arrangements and implementation procedures and timeframes for new transport infrastructure.

Warringah Council requested RMS to consider including upgrades of intersections outside of the proposed scope of Stage 1. Council outlined the need for enhanced pedestrian and cycle connectivity and safety. Council also emphasised the importance of the bus network and the need to ensure the widening of transport corridors is reserved to cater for this. A number of existing bus stops to be retained and upgraded to meet growing demand were also identified.

Warringah Council raised the increased demand on other local roads used as 'rat runs' during construction and also on side streets for on-street parking once Naree Road parking availability is removed or reduced.

Department's Consideration

Network and Intersection Performance

The Department has assessed key measurements presented in the results of the modelling undertaken by RMS; including unreleased demand and average speed. Unreleased demand indicates the proportion of vehicles that are unable to enter the network during a peak period.

Under Stage 1 in 2018, unreleased demand is expected to be 9% and 7% of total traffic demand in the AM and PM peak respectively. In comparison, the 'Do Minimal' scenario is predicted to be 14% and 12% respectively. This demonstrates that the Stage 1 works will provide a degree of congestion relief in 2018 and this trend will slightly improve by 2028.

Also during Stage 1 in 2018 average speeds of 21.6km/h and 23.2km/h, in the AM and PM peaks respectively, are predicted. These speeds represent increases of 4.5km/h and 3.2km/h, in the AM and PM peaks when compared to the 'Do Minimal' scenario. By 2028, the average speed under Stage 1 in the AM and PM peaks will be 20.4km/h and 19km/h representing increases of 5km/h and 2.1km/h when compared to the 'Do Minimal' scenario of the same year. The improvements to average speed also demonstrate the benefits to network performance in 2028 with improvements still experienced by 2028 in the absence of Stage 2.

It is important to note that the modelling identifies that the NBH cannot adequately function without the Stage 1 works. However, the predicted improvements will diminish by 2028 in the absence of Stage 2 becoming operational. Due to the complexity of inter-relationships between the Stage 1 and 2 road works and the NBH, the Department has recommended that the Proponent be required to undertake an Operational Traffic Performance Review (OTPR).

The OTPR will be undertaken within six months of the commencement of operation of Stage 1, and again during operation of the NBH. The OTPR will report on the traffic performance of Stage 1 and will ensure further mitigation measures are implemented to manage residual impacts. The Department has specifically recommended the OTPR require monitoring of Stage 1 road performance in relation to hospital traffic generation. Should it be found that the road upgrades are not adequately managing traffic generation then additional measures would need to be implemented to improve efficiency in consultation with Heath Infrastructure and Warringah Council.

Separate issues were raised in public submissions regarding the location of the NBH main access and ambulance access from Frenchs Forest Road West. The location of the access points is primarily a matter for the NBH proposal. Notwithstanding, the Department considers that the impacts to traffic performance if the primary entrance is located on Warringah Road or Wakehurst Parkway would be more difficult to mitigate than those generated by its placement on Frenchs Forest Road.

The Department also notes that negotiations between RMS and HI are continuing in regards to the location of the ambulance access to NBH. It is understood that Heath Infrastructure prefer the ambulance access to be located 120 metres to the east of the main access, whilst RMS prefer a distance of between 65 and 90 metres east of the main access. The

Department accepts that the final location of the access will be finalised during detail design. However, the Department has recommended that RMS take into consideration traffic performance during finalisation of the location of the ambulance access, including meeting performance levels identified in the EIS and PIR.

The Department acknowledges that a large number of submissions related to operational design and performance of the Concept Proposal and a large portion of these related to the proposed changes to Warringah Road. The Department agrees the proposed changes to Warringah Road will be significant, but acknowledges the proposal is critical to accommodate expected growth in the area and the flow of commuters and goods and services in the region. Based on the assessment on the Concept Proposal, the Department considers the indicative designs will provide improved traffic conditions, and will build upon improvements resulting from Stage 1.

A number of public submissions raised the issue of access to Frenchs Forest Road from local roads to the immediate north. In addition, the Department notes issues relating to potential 'rat running' through local roads and also notes that rat running is an existing issue. Whilst the Department considers the performance of local roads to be the responsibility of local councils, the Department considers congestion relief, coupled with new signalised intersections and eventual Stage 2 operational benefits, will allow for more opportune access and egress to the network from local roads and reduce the impetus for motorists to 'rat run'. Notwithstanding, the Department has considered the community's concerns regarding 'rat running' and has recommended that RMS be required to specifically address the issue within the OTPR. This review will require RMS to review and mitigate 'rat running' as a result of the proposal.

Overall, the Department considers the predicted improvements to the average speed and delay time to be considerable. The Department is satisfied that the indicative predictions and outcomes for network performance are acceptable and achievable, and will assist in ensuring access to the NBH is provided and maintained. The Department is also satisfied that traffic generated by the operation of the NBH has been adequately modelled as part of the proposed infrastructure upgrades within Stage 1 and that the recommended monitoring will address discrepancies or errors in the model, which may impact on forecast traffic performance.

The Department also notes the concerns raised by the public in regards to flooding on Wakehurst Parkway to the north of the Concept Proposal area and the impacts this may have on regional access, including to the NBH. This issue is outside of the scope of the Concept Proposal and is primarily a broader network matter. Notwithstanding, the Department notes RMS' response to community submissions stating that a separate project is being considered to address the issue of flooding on Wakehurst Parkway.

On-Street Car Parking

The increase in capacity of Frenchs Forest Road is an essential component of providing access to the NBH and improving network performance along the local road network. This increase in capacity within a limited road space requires a reduction or restriction of on-street parking availability along this road. The Department is satisfied that surrounding local streets have existing capacity to absorb the loss of parking along Frenchs Forest Road and notes that parking restrictions along certain sections of Frenchs Forest Road will allow off-peak parking. In addition, parking impacts associated with the operation of the NBH will be addressed in the assessment of that project.

The Department has considered the Council's and community's position on the impacts to the Skyline Shops kerbside parking as well as impacts to on-street parking provision for school staff and visitors to The Forest High School. The potential socio-economic impacts, including access to goods and services, loss of revenue and commercial viability for the

Skyline Shops could be significant if no alternative parking is provided. Impacts to parking availability for The Forest High School may also cause ongoing safety and accessibility issues.

The Department has considered the indicative parking arrangement for the Skyline Shops as proposed in the PIR and advice provided regarding potential parking arrangements for The Forest High School and considers such mitigation measures to be critical to both of these key stakeholders. As such, the Department has recommended that the alternative parking arrangements for both the Skyline Shops and The Forest High School are finalised, following consultation with the relevant stakeholders, and are operational prior to construction activity that may impact existing parking serving these two uses.

The Department has considered the potential relocation of the kiss-and-ride facility for The Forest High School. The RMS has provided plans detailing potential kiss-and-ride allocation and the Department is generally satisfied with the proposal. Further, the Road Safety Audit, as recommended by the Department, will ensure that detailed design is in accordance with relevant guidelines and standards. The Department has also recommended that such facilities be provided following consultation with DEC, The Forest High School Working Group and Council and that the OTPR include a provision to ensure performance of this facility is monitored and reviewed during operation of Stage 1 and the NBH.

Pedestrian and Cyclist Safety and Connectivity

The pedestrian and cyclist infrastructure proposed with the Concept Proposal and Stage 1 will provide a network of shared paths along the majority of the road corridors and will improve access to the NBH for road users other than motorists. The Concept Proposal and Stage 1 will also increase the quantity and quality of signalised intersections, and provide pedestrian footbridges across Warringah Road. The Department considers that the pedestrian and cycling environment should become more cohesive, safe and attractive and will assist in improving the modal share of active transport.

The Department has taken into account the submissions from Warringah Council and the community in regards to pedestrian and cyclist connectivity and acknowledges the requests for improved consideration of cyclists. The Department considers the existing environment to be unappealing to and unaccommodating for cyclists, and considers cyclist infrastructure provision across the network to be a benefit of the project.

The Department notes that the completion of cyclist connectivity will occur as a result of Stage 2. Taking into consideration both Council and the community's concerns over this issue, the Department issued supplementary SEARs for Stage 2 to include actions to be undertaken to assist in the delivery of a connected cycleway network within and adjoining the Concept Proposal area. The Department has also recommended a condition requiring the Proponent provide cycle facilities along Wakehurst Parkway, within the Stage 1 footprint, consistent with Warringah Council's bicycle plan.

The Department acknowledges the concerns raised in public submissions regarding the proposed new foot bridge across Warringah Road near Hilmer Street and the potential for parking impacts resulting from hospital patrons accessing the site from these streets. The Department is satisfied with the responses provided by RMS and that the matter will be assessed as part of Stage 2. The proposed footbridge will provide pedestrian access south of Warringah Road across to The Forest High School, the NBH and other key attractors in the vicinity. The Department considers the replacement of the existing footbridge and the addition of a new footbridge within the Concept Proposal to be appropriate.

The Department notes the concerns raised in public submissions regarding the safety and demand for pedestrian crossings across Forest Way to service the Forest Way Shopping Centre and existing bus stops. The Department also notes some limitations to crossings

along Frenchs Forest Road, particularly at its intersections with the NBH main access, Wakehurst Parkway and Allambie Road. In this regard, the Department considers the facilitation of safe and efficient pedestrian connectivity at these locations is important. As such, the Department has recommended that all signalised crossings and intersections within Stage 1, be monitored for performance and accessibility in accordance with the recommended OTPR. Where the monitoring results demonstrate a need for further changes, such as signalling changes or physical changes, steps are to be taken to improve and rectify pedestrian safety and connectivity at these locations.

Public Transport

The Department considers that improvements to bus services in the area will primarily result from the Stage 2 works. Consequently, the Department issued supplementary SEARs that requires RMS to demonstrate how bus services (including travel times) could be enhanced to meet increased demand. These SEARs have been further strengthened with a recommended condition requiring that the Concept Proposal facilitate improvements to public transport at a local and regional level, including consideration of increased public transport demand.

Average speeds for buses heading eastbound along Frenchs Forest Road will improve when compared to the 'Do Minimal' scenario. While the greatest benefits, in terms of travel speeds for bus users, will be achieved at Stage 2 of the proposal, the Department does acknowledge that RMS will implement a range of local bus priority measures during Stage 1, which will improve bus performance. To monitor the effectiveness of these measures during Stage 1, the Department has recommended that bus performance be monitored as part of the OTPR. This will ensure that public transport users will continue to benefit from the overall traffic performance gains.

Construction Traffic

Construction traffic associated with Stage 1 is expected to peak at 60 to 100 heavy vehicles and 100 light vehicle movements utilising the site per day. State roads within the network, as well as Allambie Road, will be used for haulage. Frenchs Forest Road will be used for construction traffic movements as a part of Stage 1.

The Department accepts the need for partial or complete road closures during construction and acknowledges the concerns raised in public submissions. The Department notes that Frenchs Forest Road has adequate width for partial closures whilst accommodating traffic flow under managed conditions. In addition, the Department accepts that there will be instances where complete road closures will be required to facilitate equipment delivery and other activities. However, the Department is also satisfied that surrounding arterial roads can absorb temporary induced traffic generation or diversion as a result of Stage 1 road works that require complete road closures. In this regard, the Department supports RMS's commitment to ensuring that road capacity is maintained during peak periods and that the staging of the construction programme reflects this.

In addition to RMS' commitments, the Department requires the preparation and implementation of a Construction Traffic and Access Management Plan (CTAMP) in consultation with key stakeholders. The CTAMP will include controls and procedures to appropriately manage a range of construction related traffic impacts, including traffic disruptions and impacts to bus stop access. The Department is satisfied that the required CTAMP, coupled with a Community Communication Strategy, will adequately manage traffic impacts associated with construction and inform the public and key stakeholders of required partial or complete road closures and changes to public transport arrangements.

The Department also agrees the staged construction programme will reduce the impacts to on-street parking availability and that surrounding streets can absorb the increased demand during construction. As Frenchs Forest Road and Naree Road are widened, it is inevitable

that supply of on-street parking will be impacted resulting in a reduction or restriction of kerbside parking, relocation of kiss-and-ride facilities for The Forest High School and access for the Frenchs Forest Police Station. The Department recommends that the CTAMP include provisions to ensure safe access arrangements, including temporary kiss and ride facilities for the school. The Department has also recommended access to all properties is maintained during construction unless otherwise agreed by the relevant property owner.

The Department notes that both construction compounds will be located on, or have relatively direct access to major roads ensuring haulage routes minimise the use of local roads. The proposed locations are within close proximity to the construction footprint, minimising necessary driving distances. As such, the Department considers the proposed locations of the construction compounds to be appropriate in regards to construction vehicle movements.

The Department has carefully considered cumulative impacts as the construction of Stage 1 potentially coincides with the construction of Stage 2, NBH and the Mona Vale Road Upgrade. The Department acknowledges that should the construction programmes between these major projects overlap, that an increased impact will likely be experienced by road users across the road network. To manage this, RMS is required to detail potential mitigation measures in its CTAMP, which shall be prepared in consultation with relevant stakeholders including Warringah Council and HI.

Conclusion and Key Recommendations

The Department notes the consequences for the local and regional road networks within the 'Do Minimal' scenario where only basic access arrangements to the NBH are provided. In this scenario network and intersection performance has been shown to deteriorate, demonstrating a need for more substantial upgrade works.

By comparison, the Department acknowledges that overall benefits associated with Stage 1 will be experienced and further enhanced when Stage 2 becomes operational. The Concept Proposal and Stage 1 Hospital Connectivity Works will also facilitate safe and efficient access to the NBH.

The Department is satisfied that the pedestrian and cyclist environment will be improved in comparison to the existing environment. Connectivity and safety will be enhanced and will result in the increased attractiveness of active transport. A portion of cyclist infrastructure required to complete connectivity across the Concept Proposal will be further addressed in Stage 2. The provision of local bus priority measures will also improve average bus speeds through in the area.

The Department recognises that traffic and transport impacts during construction will be considerable, yet is satisfied that that experience of RMS in road construction across the metropolitan area, coupled with the commitments and mitigation measures proposed, will ensure that impacts are adequately managed. The implementation of a CTAMP, prepared in consultation with Council, The Forest High School Working Group and other key stakeholders, will also make provision for adequate mitigation.

Overall, the Department is satisfied that the Concept Proposal and Stage 1 will relieve congestion on the regional and local road network and provide necessary access to the NBH. The Department considers the traffic and transport impacts are reasonable subject to the mitigation measures proposed and the following requirements stipulated in the recommended conditions of approval:

- implementation of a CTAMP in consultation with key stakeholders, to detail controls and procedures to be utilised in minimising traffic impacts during construction;
- alternative parking arrangement for the Skyline Shops and The Forest High School;
- inclusion of regional cycleways along Wakehurst Parkway;

- requirements to undertake design and road safety audits;
- undertaking an OTPR, six months after Stage 1 operation and again after commencement of NBH operations, to include monitoring and review of on-street parking demand, bus priority measures, kiss-and-ride facilities and pedestrian movements; and
- property access to be maintained during construction and operation.

5.2. Noise and Vibration

Issue

Traffic noise impacts have been assessed in accordance with the NSW Road Noise Policy (RNP) and the RMS Environmental Noise Management Manual. Construction noise and vibration impacts for Stage 1 have been assessed in accordance with the Interim Construction Noise Guideline (ICNG).

To quantify the existing ambient noise environment across the project area, RMS carried out baseline noise surveys in December 2013 (with additional monitoring undertaken in June 2014). Noise monitoring was undertaken at thirteen locations across the project area. The baseline noise surveys assisted in the determination of Rating Background Levels (RBLs) for the daytime, evening and night-time periods across the project area, and are summarised in **Table 6** below. The RBLs have been used to validate the operational noise model, and as a basis for assessing construction noise impacts.

Table 6. Locations and results of background noise surveys (Adapted from Proponent's EIS).

Noise Monitoring ID and Location	ICNG Time Periods			RNP Time Periods	
	Daytime RBL (dBA)	Evening RBL (dBA)	Night-time RBL (dBA)	Daytime LAeq (15 hour)	Night-time LAeq (9 hour)
NM1 – 605 Warringah Road	57	54	34	66	62
NM2 – 43 Forest Way	57	52	31	68	63
NM3 – 5 Naree Way	44	40	27	55	47
NM4 – 17 Forest Way	55	51	32	64	60
NM5 – 36 Holland Crescent	52	47	35	58	51
NM6 – 46 Epping Drive	48	46	30	56	48
NM7 – 126 Frenchs Forest Road	48	41	29	60	50
NM8 – 7 Bantry Bay Road	51	45	34	59	48
NM9 – East of 63 Bantry Bay Road	53	48	34	60	52
NM10 – Opposite 92 Bantry Bay Road	49	43	33	56	47
NM11 – 26 Frenchs Forest Road	50	42	30	62	54
NM12 – 266 Warringah Road	53	46	29	64	57
NM13 – The Forest High School	48	45	38	54	48

* ICNG Governing Periods – Day: 7:00am to 6:00pm Monday to Saturday, 8:00am to 6:00pm Sunday; Evening: 6:00pm to 10:00pm; Night: 10:00pm to 7:00am Monday to Saturday, 10:00pm to 8:00am Sunday.

* RNP Assessment Time Periods – Day: 7:00am to 10:00pm; Night: 10:00pm to 7:00am.

Submissions

The Department received two submissions from the public relating to noise and vibration. The concerns included the increase in operational noise as a result of additional traffic volumes and clarification of construction hours. DEC requested noise mitigation including acoustical treatment to school buildings in line with any recommendation from expert noise investigations and the EPA recommended mitigation measures for highly noise affected receivers and the need for architectural treatments for multi-level buildings.

Department's Consideration

Construction

The ICNG requires Noise Management Levels (NMLs) be established for impacted receivers during construction activities. In the event that construction noise levels are predicted above the NMLs, feasible and reasonable work practices are to be investigated to minimise construction noise emissions and impacts. Should the predicted construction noise levels continue to exceed NMLs, site specific construction noise management plans are to be prepared during the project's detailed design stage.

The project area has been divided into 19 Noise Catchment Areas (NCAs). Each NCA has been established on the basis of containing similar land uses. The individual NCAs are depicted in **Figure 6.**

RMS has established NMLs for residential receivers within each NCA, as well as determining the sleep disturbance criteria predicted during Stage 1 works. The NMLs and sleep disturbance criteria for NCAs containing residential receivers are outlined in **Table 7.**

Table 7. Noise Management Levels for Stage 1 Construction Works – Residential Receivers (Adapted from Proponent's EIS and PIR).

NCA No.	Standard Construction Hours (RBL +10dBA)	Out of Hours (RBL +5dBA)			Sleep Disturbance Criteria (RBL + 15)
	Daytime	Daytime	Evening	Night-time	
NCA01	67	62	59	39	49
NCA02	67	62	59	39	49
NCA04	67	62	57	36	46
NCA05	54	49	45	32	42
NCA06	54	49	45	32	42
NCA07	62	57	52	40	50
NCA08	59	54	48	38	48
NCA09	61	56	51	37	47
NCA12	56	51	44	32	42
NCA13	58	54	51	35	45
NCA14	59	53	48	38	48
NCA17	58	54	45	33	43
NCA18	61	56	49	32	42
NCA19	61	56	49	32	42

* Omitted NCAs 03, 10, 11, 15 and 16 do not contain any residential receivers

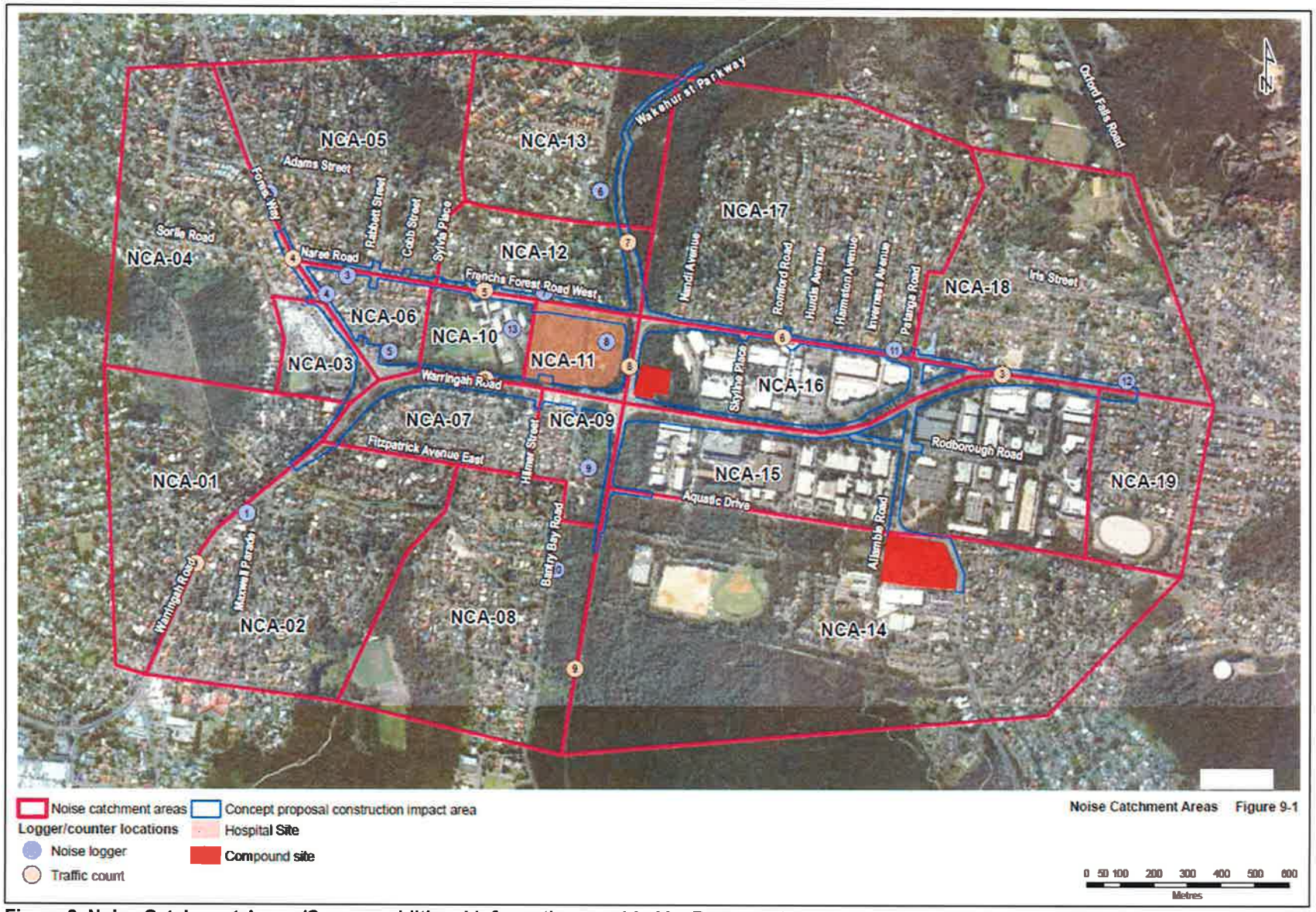


Figure 6. Noise Catchment Areas (Source: additional information provided by Proponent

The EIS predicts a worse-case exceedance of the NMLs of up to 42dBA during standard construction hours for a single residence located immediately adjoining the proposed car park construction works in NCA18. During out of hours work, exceedances of up to 58dBA are predicted for residences immediately adjacent to traffic signal works along both Frenchs Forest Road East and Frenchs Forest Road West. The main corridor works along Frenchs Forest Road East and Frenchs Forest Road West are anticipated to affect the greatest number of residential receivers with exceedances of up to 30dBA above the NMLs. The Department notes, however, that these works will progress in a linear manner, therefore only impacting on individual residences for a short period of time.

Commercial and other sensitive receivers within NCA 15 and NCA 16 are predicted to experience NML exceedances of up to 31dBA and 32dBA, respectively, during car park construction works. These works are isolated to the area in the vicinity of the Skyline Shops on Frenchs Forest Road East.

Receivers that are subjected to construction noise levels in excess of 75dBA (during standard hours) are considered to be 'highly noise-affected'. This represents the point at which there may be strong community reaction to noise. **Table 8** outlines the predicted number of highly noise-affected residential receivers within each NCA during Stage 1 construction works.

Table 8. Highly Noise-Affected Residential Receivers – Stage 1 Construction Works (Adapted from Proponent's EIS and PIR).

NCA No.	Main corridor works	Traffic signal works	Car park works	Site compounds	Ancillary works
NCA01	0	0	0	0	0
NCA02	0	0	0	0	0
NCA04	**7**	**3**	0	0	0
NCA05	**19**	**6**	0	0	**20**
NCA06	**21**	**7**	0	0	0
NCA07	0	0	0	0	0
NCA08	0	0	0	0	0
NCA09	0	0	0	0	0
NCA12	**15**	**3**	0	0	0
NCA13	0	0	0	0	0
NCA14	0	0	0	**1**	0
NCA17	**29**	**4**	0	0	**5**
NCA18	**15**	0	**6**	0	**14**
NCA19	0	0	0	0	0

* Omitted NCAs 03, 10, 11, 15 and 16 do not contain residential receivers

As indicated in **Table 8**, Stage 1 construction works are predicted to affect a number of residential receivers within several NCAs. The EPAs submission to the EIS advised that respite periods or alternative accommodation should be provided for those that are 'highly noise-affected.' The Response to Submissions notes that the provision of respite periods or similar mitigation is a usual requirement implemented for major infrastructure projects. Furthermore, feasible and reasonable mitigation measures will be considered in the development of a Construction Noise and Vibration Management Plan (CNVMP). This approach is consistent with other major road projects in urban areas where NMLs cannot be achieved.

The EIS notes that where possible, Stage 1 construction works will be completed during standard day time construction hours. However, the nature of the project means evening and night-time work (out-of-hours work) may be required. Out-of-hours works are only proposed for traffic signalling works, pavement construction, line marking and signposting. Out of hours

works will be managed through an Environmental Protection Licence (EPL) administered by the EPA.

The Department also acknowledges that there will be potential cumulative construction noise impacts associated with the future development of the NBH. Consequently, it has recommended these be considered in the CNVMP.

Throughout construction, the key activities likely to cause vibration related impacts include jackhammering associated with property adjustments and footpath construction, and the use of vibratory rollers associated with pavement construction. The RMS has concluded that separation distances between works and sensitive receivers will be generally sufficient; however, there will be instances where the operation of construction equipment occurs within recommended safe working distances. Those receivers likely to be affected during pavement construction will be within NCAs 03-06, 10, 12 and 15-19. In addition, the RMS anticipates instances of ground vibration levels exceeding the human comfort criteria; however exceedances are expected for short durations.

During construction, the RMS has proposed to undertake attended vibration monitoring and trials in situations where equipment is operated or works undertaken within safe working distances to sensitive receivers. The RMS has also proposed to undertake building condition surveys prior to, and following, construction works. This approach is consistent with the construction of other road infrastructure and the Department has therefore reinforced these commitments through the recommended environmental management framework and CNVMP.

Operation

Three primary design features were considered in assessing potential noise implications of the Concept Proposal on the surrounding receivers. This included road traffic noise associated with:

- the proposed widening of Frenchs Forest Road;
- the proposed additional Warringah Road at-grade westbound lanes; and
- the proposed Warringah Road underpass/slot lane.

Widening of Frenchs Forest Road

Due to the proposed widening of Frenchs Forest Road in Stage 1, traffic noise levels for receivers adjacent to Frenchs Forest Road are predicted to increase as vehicles use this road as an alternative route to Warringah Road which is often congested during peak periods. Upon the completion of proposed Stage 2, traffic noise levels for receivers adjacent to Frenchs Forest Road are expected to reduce as vehicles make use of an upgraded Warringah Road as the primary route option.

Additional Warringah Road Westbound Lanes

Additional at-grade westbound lanes on Warringah Road planned as part of Stage 2 are conceptually proposed to be approximately 10m from the rear boundaries of residential properties along Karingal Crescent, reduced from the existing typical distance of 35m. The reduced separation distance is predicted to result in noise level increases of up to 5 dB at Karingal Crescent properties immediately adjoining Warringah Road, increasing by an additional 0.5 dB when accounting for traffic growth of 8% between 2018 and 2028. The EIS notes that the horizontal alignment of Warringah Road surface lanes may be subject to refinement, and that the predicted 5 dB increase represents a worst case scenario.

Warringah Road Underpass / Slot Lane

The Concept Proposal aims to mitigate congestion through the provision of grade-separated intersections, including the signalised intersections of Forest Way and Warringah Road and Wakehurst Parkway and Warringah Road. Traffic noise levels for receivers adjacent to where congestion is currently experienced at these intersections may therefore be marginally increased due to the free flowing nature of traffic conditions. However, the Concept Proposal has the potential to reduce noise levels for receivers adjoining Warringah Road as a

significant proportion of vehicles will likely make use of the planned slot road. The EIS predicts that should 50% of vehicles using Warringah Road make use of the proposed slot road, there would be up to a 3dB decrease in noise levels at locations adjacent to where the slot road is located below grade surface.

The RMS has advised that a quantitative assessment of noise and vibration impacts associated with Stage 2 will be provided as part of the Stage 2 EIS. This will detail whether the predicted noise levels from Stage 1 will change as a result of Stage 2, and also confirm the total number of sensitive receivers eligible for mitigation. Furthermore, the Department has issued SEARs for Stage 2 of the project which requires RMS to provide a detailed assessment of operational noise impacts, including demonstrated consistency with the RNP.

Operational noise impacts for Stage 1 have been assessed within 13 NCAs directly adjoining the proposed Stage 1 project area. Noise levels within NCAs 01, 02, 07, 08, 09 and 14 (located adjacent to Warringah Road and the southern section of Wakehurst Parkway) will change following the completion of Stage 2 and will therefore be assessed in greater detail as part of the assessment of Stage 2. Notwithstanding, the Department is satisfied, through its assessment of other major road projects, that predicted noise increases would be able to be managed through standard noise mitigation measures such as noise walls and at property treatments.

Operational noise impacts have been assessed against criteria outlined in the RNP which aim to protect amenity inside and immediately around permanent residences, schools, hospitals and other sensitive land uses. The RNP requires road traffic noise levels for the road infrastructure projects to be assessed at the following two points in time:

1. within one year of changed traffic conditions; and
2. for a design year (typically ten years) after changed traffic conditions.

For each timeframe above, the RNP requires a comparison to be made between:

- road traffic noise levels should the project proceed; and
- the corresponding road traffic noise levels, due to general traffic growth, that would otherwise occur should the project not proceed.

RMS subsequently undertook noise modelling of the project and general background traffic growth scenarios for both the year of opening (2018) and ten years after opening (2028). Where existing noise levels are above the noise assessment criteria, the RNP's primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. The second objective is to protect against excessive decreases in amenity as the result of a project.

In considering reasonable and feasible noise mitigation measures to impacted receivers, the RNP lists the following measures for consideration (in order of priority) should the project result in predicted exceedances of the base criteria:

1. road design and traffic management;
2. quieter pavement surfaces;
3. in-corridor noise barriers/mounds; and/or
4. at-property treatments or localised barriers/mounds.

Road redesign options within Stage 1 are inherently limited due to the urbanised nature of the locality. The EIS has discounted the use of low noise road pavements as the relatively low speed environment throughout Stage 1 will provide little benefit in terms of reduced road traffic noise. In addition, constructed noise barriers are considered incompatible across Stage 1 due to the need for access arrangements to adjacent receivers to be maintained.

To address the Stage 1 operational noise impacts, RMS considers at-property architectural treatments as the only feasible mitigation measure given the limitations in adopting the

RNP's alternative management measures listed above. RMS considers it reasonable to consider noise mitigation in the form of at-property architectural treatments where:

- the predicted noise level exceeds the RNP base criteria for redeveloped roads and the noise level increase due to the project is greater than 2 dB; or
- the predicted noise levels are acute (>65 dBA LAeq(15hour) or >60 dBA LAeq(9hour)) regardless of the incremental impact of the project.

The EIS identified 213 receivers likely to be eligible for noise mitigation. Of these, two are predicted to result in noise level increases greater than 2dB between the project and general growth scenarios. This is due to the proposed widening of the Frenchs Forest Road corridor directly opposite both receivers at 2 Bluegum Crescent and 22 Frenchs Forest Road East. The remaining 211 receivers are expected to experience acute noise impacts in the event of the general growth scenario, and therefore stand to benefit from architectural mitigation measures to be provided as a result of the project.

In terms of noise impacts at the Forest High School, the EIS notes that the predicted noise levels indicate a range of exceedances of the RNP criteria. The change in noise levels as a result of Stage 1 is, however, typically less than 2dB at the majority of the school. The highest noise levels are predicted to be acute at D Block (ground and first floor); the Hall (first floor) and the Gym (ground and first floor). These buildings are eligible for consideration of mitigation in accordance with RMS' Environmental Directive No. 24. All other buildings are not predicted to experience acute noise levels and would therefore not be considered for noise mitigation.

The EPA's submission recommended RMS consider architectural treatment to all floors of residential buildings (including multi-unit buildings) once the need for architectural treatment has been established from modelling of road noise impacts. The RMS advised that its policy only requires consideration of architectural treatment options to the ground floor and first floor of multi-level residential buildings. Notwithstanding, the Department has recommended that the RMS undertake a comprehensive review of noise mitigation measures consistent with the Road Noise Policy, which does not include this limitation, and which will be subject to the Secretary's approval.

Noise modelling of the cumulative noise impact of both operation of the NBH and the proposed Stage 1 works occurring concurrently, was also provided. The modelling determined that traffic noise levels were marginally lower (between 0dB and 0.2dB) across the study area when excluding the NBH generated traffic from the baseline noise model. The resultant decrease in baseline road traffic noise is negligible due to the project area already containing a high volume of traffic, even without the Northern Beaches Hospital in operation. The modelling determined there would be no change to the total number of residential receivers eligible for noise mitigation. However, two additional non-residential receivers, both buildings within the grounds of The Forest High School, were identified as eligible for noise mitigation and would be addressed as part of the recommended noise review.

Conclusion and Key Recommendations

The noise modelling undertaken by RMS predicts a total of 213 receivers will be eligible for architectural treatments as a result the Stage 1 project. Many of these receivers are already experiencing traffic noise levels above the standard RNP criteria, and therefore stand to benefit from mitigation provided as a result of the Stage 1 project. This mitigation will generally improve the amenity of existing receivers.

To address the anticipated noise and vibration impacts associated with Stage 1, the Department recommends the following key conditions of approval:

- a Construction Noise and Vibration Management Plan is to detail how construction noise and vibration impacts will be minimised and managed. The Construction Noise and Vibration Management Plan is to include identification of sensitive receivers and

relevant feasible and reasonable measures to be implemented to minimise and manage construction noise and vibration impacts (including construction traffic noise). It is to also include consideration of cumulative impacts associated with the Northern Beaches Hospital proposal;

- The Forest High School shall be consulted to ensure noise generating construction works in the vicinity of affected buildings are not timetabled during examination periods (where practicable), unless other reasonable arrangements are made; and
- the preparation of an Operational Noise Review including a review of operational noise mitigation measures to be undertaken by a suitably qualified acoustic specialist, to be approved by the Secretary.

The Department is satisfied the recommended conditions of approval will sufficiently mitigate predicted noise and vibration impacts and will ensure an acceptable level of amenity is maintained for sensitive receivers during both construction and operation of Stage 1.

The Department notes that a further detailed, quantitative assessment of noise and vibration impacts associated with the Concept Proposal (Stage 2) will be provided as part of the Stage 2 EIS, which will provide a detailed analysis of the expected noise implications and mitigation measures for Stage 2.

5.3. Biodiversity

Issue

The Concept Proposal area is heavily urbanised and contains fragmented components of high value ecological communities, fauna habitat and fauna populations. The area contains the Duffys Forest Ecological Community (DFEC), which is an endangered ecological community under the *Threatened Species Conservation Act 1995* (TSC Act).

Flora and fauna field surveys were undertaken throughout autumn, winter and spring in 2013 and in April 2014. To facilitate these surveys the corridor was divided into 16 ecological sampling units comprised of sub-units as illustrated in **Figure** 7. No threatened flora species were identified in the surveys but evidence of three native plant communities including Sydney Ironstone Bloodwood, Coastal Shale-Sandstone Forest and Coastal Sandstone Gully Forest was found.

Within the ecological sampling units, the Proponent identified 77 fauna species, 6 of which were threatened or migratory including the:

- Red-crowned Toadlet (*Pseudophryne australis);*
- Powerful Owl *(Ninox strenua)*;
- Swift Parrot *(Lathamus discolour)*;
- Eastern Bentwing Bat *(Miniopterus schreibersii oceanensis)*;
- Grey-headed Flying-fox *(Pteropus poliocephalus)*; and
- White-bellied Sea-eagle *(Haliaeetus leucogaster).*

In assessing the Concept Proposal and Stage 1, the Department has considered the key biodiversity impacts to include removal of DFEC and cumulative impacts associated with the NBH, removal of other vegetation, impacts to the Red-crowned Toadlet and its habitat, fragmentation of the wildlife corridor and potential increases in road mortality and injury rates.

Figure 7. Ecological Sampling Units (ESU) as defined for biodiversity surveys in the concept proposal area (Source: Proponent's EIS).

Submissions

A number of public submissions discussed the difficulties of offsetting DFEC and questioned the adequacy of such a mitigation measure. A number of submissions also questioned the conclusions of the assessment of significance relating to wildlife connectivity, noting that the underpass proposed for Stage 2 would be a significant barrier to fauna movement. The Red-crowned Toadlet and the threats to its habitat and groundwater regime were also raised, as were concerns for further weed invasion in the area.

OEH identified the need for further surveys and questioned assumptions used in the assessment of significance. OEH requested that the investigation of offsets for DFEC be undertaken through an Offset Strategy prepared in consultation with OEH and that offsets be secured as soon as possible. OEH stated that the efficacy of fauna crossing measures will be dependent on adequate baseline data and requested that the Proponent prepare a Wildlife Connectivity Strategy in consultation with OEH.

EPA recommended a number of conditions relating to surface water and soil management to prevent and mitigate pollution of waterways and maintain waterway health. NOW also provided commentary on pollution control and recommended surface water be managed to prevent scour and bank instability along all local watercourses (including those watercourses identified as habitat for the Red-crowned Toadlet) and to maintain the existing hydrologic regime of all water courses.

Warringah Council identified the location of a potential Coastal Upland Swamp Endangered Ecological Community adjacent to the Wakehurst Parkway to the north and requested this be verified and an assessment undertaken to determine the impact that reductions in flows will have on this community. Council requested that the Proponent account for the cumulative impact to DFEC given the number of developments in the area. Council also noted that there were known Powerful Owl roost sites in the area and identified the importance of hollow bearing trees.

Department's Consideration

In considering the impacts and mitigation measures proposed, the Department has taken into account the Biobanking Assessment Report (BAR) undertaken for the significant impacts to both DFEC and the Red-crowned Toadlet. The results of the Report are shown in **Table 9** and the Department understands these are indicative and may change during the detailed design phase.

Table 9. Indicative results of the Biobanking Assessment Report regarding impacts to Duffys Forest Ecological Community and the Red-crowned Toadlet for both the concept proposal and Stage 1 (Adapted from Proponent's EIS).

Stage	Community or Species	Indicative Offsets Credits	Area (ha)
Concept Proposal	Duffy's Forest Ecological Community	176	19
	Red-crowned Toadlet	36	5
Stage 1	Duffy's Forest Ecological Community	54	6
	Red-crowned Toadlet	7	1

Duffy's Forest Ecological Community

It is estimated that 240 hectares (16%) of DFEC remain of what was estimated as an original extent of 1450ha. Within a 10 kilometre inclusive radius around the Concept Proposal, there currently exists 34 hectares of DFEC remaining. The Department also notes that works associated with the construction of the NBH have removed approximately 5 hectares further diminishing the remaining DFEC area. RMS is seeking approval for the removal of approximately 7.3 hectares of vegetation, including 5.1ha of DFEC, during works associated with the Concept Proposal.

The Department acknowledges that the loss of 5.1 hectares of DFEC is significant and should be assessed in the context that, cumulatively, it will result in the loss of 10.1 hectares of the community within the immediate area from both the Concept Proposal and the construction of the NBH. The Department also acknowledges that a Biodiversity Offset Strategy (BOS) that has been prepared for the EIS as required by the then Director General's Requirements issued for the project. The BOS provides broad options, including offset sites, biobank credits and supplementary measures, for the offsetting of significant impacts on threatened species including DFEC and the Red-crowned Toadlet, consistent with the NSW offset principles for major projects.

The Department is satisfied that RMS has made efforts to avoid and minimise impacts to DFEC and is limited by site constraints such as road geometry and adjoining urban development. Consequently, the Department has recommended that a final Biodiversity Offset Package (BOP) be prepared and implemented prior to the commencement of construction to account for all vegetation loss to DFEC within Stage 1 of the proposal. This BOP is to take into account the location and scale of the DFEC offsets for the NBH and those of other developments within the area. In addition, the package is to ensure that adequate offsets can be made available for those impacts to DFEC anticipated as a result of Stage 2 works.

The Department is satisfied with RMS's commitment to not remove DFEC vegetation at the construction compound sites located near the intersection of Allambie Road and Aquatic Drive and Wakehurst Parkway and Warringah Road. The mitigation measures requiring the establishment of exclusion zones in this location will be sufficient in managing any potential impacts to this ecological community.

Plant Pathogens and Weeds

RMS has identified the plant pathogen *Phytophthora cinnamomi* within the Concept Proposal area. Also, the pathogen myrtle rust is potentially present. These two plant pathogens present direct and indirect risks to the native vegetation, and subsequent resident fauna, in the area unless managed adequately.

The Department notes the risk of the identified noxious weeds spreading. Of particular concern is the presence of highly dense populations of Lantana in ecological sample unit 6b and the potential for spread of other noxious weeds including Blackberry, Asparagus Fern and others. The damage to native flora and fauna as a result been taken into account and the Department concludes that such risks can be managed. The Department notes the proposed mitigation measures and recommends the implementation of a Pathogen and Weed Management Plan (PWMP) as a component of the Construction Flora and Fauna Management Plan (CFFMP).

Red-crowned Toadlet and Other Fauna

RMS undertook assessments of significance for the threatened and migratory species identified in the ecological sample units throughout the Concept Proposal area. As shown in **Table 10**, none of these species, except for the Red-crowned Toadlet, were assessed as likely to be significantly impacted.

The Red-crowned Toadlet is listed as vulnerable under the TSC Act. An assessment of significance of the impacts to this species, whilst applying the precautionary approach, demonstrated that the impacts would be minimal for the species located within ecological sample unit 5. However, the impacts associated with Stage 2 could have an adverse effect on the life cycle of the species population within ecological sample unit 8. In addition, the habitat for the species in ecological sample unit 8 was considered important to the long term survival of the Red-crowned Toadlet and that the population at this location may be impacted by the development of Stage 2. The Proponent has committed to undertake further quantified assessment as a part of the EIS for Stage 2 works.

Table 10. Results of assessments of significance for identified threatened species within concept proposal area (Adapted from Proponent's EIS).

Threatened Species	*Likely Significant Impact?*
Red-crowned Toadlet (*Pseudophryne australis)*	Yes
Powerful Owl *(Ninox strenua)*	No
Swift Parrot *(Lathamus discolour)*	No
Eastern Bentwing Bat *(Miniopterus schreibersii oceanensis)*	No
Grey-headed Flying-fox *(Pteropus poliocephalus)*	No
White-bellied Sea-eagle *(Haliaeetus leucogaster)*	No

The results of the BAR calculated the required biobanking offsets for the Red-crowned Toadlet to be 36 and seven species credits for the Concept Proposal and Stage 1 respectively. The BAR was undertaken in accordance with the Biobanking Assessment Methodology (BBAM) and the securing of credits will need to be clearly demonstrated in the recommended BOP, which will be approved by the Department.

In addition, the Department recommends that the Red-crowned Toadlet population known to exist within ecological sample unit 5 be monitored during construction and operation of Stage 1 of the project to determine if further mitigation is required. The Department has recommended the inclusion of the Red-crowned Toadlet within the proposed Ecological Monitoring Program (EMP). The recommended Surface Water Quality Monitoring Program (SWQMP) will also be used to verify water quality impacts on the Red-crowned Toadlet.

The Department also notes issues raised by OEH and Council in relation to the assessment of the Powerful Owl. Whilst the results did not result in any likely significant impact to the species, the Department notes that sightings did occur in the area and that OEH has previously marked the known locations of the species. In addition, the Department understands that the vegetation in certain areas of the project corridor are ideal for Powerful Owl habitat, providing opportunities for foraging, breeding and sheltering. To address and minimise potential impacts, the Department has recommended that habitat tree and hollow bearing tree management measures be implemented as part of a CFFMP.

Wildlife Connectivity and Road Mortality and Injury

A Priority 1 Wildlife Corridor extends from Oxford Falls to the north of the Concept Proposal area to Manly Dam to the south. This wildlife corridor is the last such corridor in the region providing vegetative connection between these two remnant native vegetation areas. However, the corridor is heavily impacted and fragmented by the existing road network. The widening of the road network, the resulting increase in volume of vehicle movements and the construction of an underpass along Warringah Road will further impact on wildlife movement along the north-south corridor.

Stage 1 will result in the widening of an existing barrier to wildlife movement around the Frenchs Forest Road and Wakehurst Parkway intersection in a north to south direction primarily between ecological sample units 5 and 6. There is evidence of the Long-nosed Bandicoot utilising the roads to move through the corridor and the assessment did not rule out other small mammals using this corridor as well. RMS has committed to undertaking further investigations of options to facilitate wildlife movement and improve connectivity. Whilst these measures primarily relate to Stage 2, measures to be progressed as part of Stage 1 include minimising vegetation clearing and revegetation. The Department accepts this approach by recognising the relatively minor impacts of Stage 1, particularly in relation to threatened species.

In relation to Stage 2, the Department has issued supplementary SEARs that require the preparation of a Wildlife Connectivity Strategy, with the aim of improving fauna connectivity and minimising risks to fauna.

Conclusions and Key Recommendations

The Department notes the existing urban constraints of the Concept Proposal area and is satisfied that the project has been designed in a manner that generally avoids biodiversity impacts where feasible. The Department concludes that there are a number of biodiversity issues that can be further addressed and managed through the recommended conditions, including:

- Biodiversity Offset Package;
- Pathogen and Weed Management Plan within a Flora and Fauna Management Plan;
- Ecological Monitoring Program;
- hollow bearing tree management measures within a FFMP; and
- Wildlife Connectivity and Road Risk Minimisation Strategy (Stage 2 environmental assessment requirements).

The Department is satisfied that the provision of a BOP is acceptable for the predicted impacts to DFEC and the Red-crowned Toadlet. The Department has recommended that a BOP be implemented in consultation with OEH. The biobanking calculations undertaken by RMS provide an indication of the credits required once detailed design is complete. The Department supports the biobanking method as a mechanism for offsetting and concludes that offset credits of these values are acceptable for the impacts to DFEC and the Red-crowned Toadlet if all other mitigation measures have been exhausted.

The Department concludes that with the mitigation measures committed to by RMS and the Department's recommended conditions, the removal of the vegetation and impacts upon fauna are acceptable when balanced with the necessity of the provision of enhanced connectivity throughout the project area and to the NBH.

5.4. Surface Water Hydrology and Quality

Issue

The Concept Proposal area is generally located on a ridge line with land sloping down to the north from Frenchs Forest Road and then to the south from Warringah Road. The area is within the Middle Creek, Bantry Bay and Curl Curl Creek Catchments. This footprint intersects six drainage lines, including creeks or tributaries, and 21 sub-catchments which drain to Narrabeen Lagoon, Bantry Bay and Manly Dam.

Table 11 details the catchments and their associated drainage lines, the dominant land uses and waterways that each drains to.

The key elements of the project that will potentially have the greatest impacts to surface water hydrology and quality during construction and operation will be:

- increases to impervious areas as a result of road widening and intersection upgrades;
- alteration to local drainage systems;
- alteration to road level heights; and
- increases in vehicle traffic.

Table 11. Surface water characteristics within and adjacent to the project corridor.

Catchment	Sub-Catchment	Drainage Lines	Dominant land Uses	Drains to
Middle Creek	1A	1 (Middle Creek) 2 (Trefoil Creek) 3 (Tributary of Middle Creek)	Residential, commercial, industrial	Narrabeen Lagoon
	1B			
	1C			
	1D			
	2A			
	2B			
	2C			
	2D			
	2E			
	3A			
	3B			
	3C			
	3D			
	3E			
	3F			
Bantry Bay	4A	4 (Unnamed) 5 (Unnamed)	Education, residential, commercial	Bantry Bay
	4B			
	5A			
Curl Curl Creek	6A	6 (Tributary of Curl Curl Creek)	Skyline Business Park, commercial, industrial, recreation, residential	Manly Creek, Manly Dam
	6B			
	6C			
	6D			

Submissions

The Department received nine submissions from the public relating to surface water hydrology and quality. The submissions raised concerns regarding waterway and catchment health and alteration of natural flow regimes. Of particular concern were the health of Manly Dam and the reliance of local fauna on consistent natural flows. Submissions also raised concerns regarding pollutant runoff and the impact on local creeks and waterways.

NOW requested information regarding in-line pollutant control devices. It also recommended that pollutants be treated outside of drainage lines in accordance with the *Guidelines for Riparian Corridors on Waterfront Land,* and that measures to prevent scour and bank instability be provided and that existing hydrologic regimes of watercourses be maintained.

EPA noted the sensitivity of the receiving environment and recommended conditions in relation to water management and monitoring.

Warringah Council requested clarification regarding the maintenance responsibilities and ease of access for proposed pollution control devices. Council also recommended that pollution control device 3 be relocated to the end of Winslea Road to improve maintenance and surface water treatment and that stormwater management designs be assessed in consideration of the NBH EIS's to ensure consistency.

Department's Consideration

The Department has reviewed the assessment methodology and modelling and accepts the use of qualitative analysis for the Concept Proposal assessment as quantitative assessment will be undertaken during the Stage 2 assessment. The Department is also satisfied with the quantitative analysis undertaken for Stage 1 and with the use of the DRAINS and MUSIC model to assess water flow and pollutant load impacts. The Department notes that NOW and EPA did not raise any issues relating to surface water methodology. The Department has taken into account the following guidelines and studies during its assessment:

- *Australian and New Zealand Environment Conservation Guidelines for Fresh and Marine Water Quality* (ANZECC 2000);
- *Warringah Council Creek Management Study (MWH, 2004)*;
- *Middle Creek Management Plan 2009*; and
- *Office of Water Guidelines for Riparian Corridors on Waterfront Land.*

Surface Water Hydrology

The Bantry Bay and Curl Curl Creek catchments contain some drainage deficiencies that result in localised ponding of run off and excessive gutter flow events in excess of 2 year ARI. The existing infrastructure is noted as being limited in inlet capacity. The key surface water hydrology impacts resulting from the works associated with the Concept Proposal, unless mitigated, include:

- changes to surface water hydrology;
- scouring and bank instability of drainage lines;
- increase in peak flows beyond the current 5 year ARI; and
- flooding in the Middle Creek, Bantry Bay and Curl Curl Creek catchments.

Key surface water hydrology impacts resulting from the construction and operation of Stage 1 will include:

- increases to concentrated flows;
- increase scour potential near stormwater outlets along Drainage Line 1 and 2;
- increase in runoff to Drainage Lines 1, 2 and 3;
- adverse flooding conditions and increased peak flows for a number of residential properties.

RMS has prepared an Operational Phase Surface Water Management Strategy including a redesign and diversion of the drainage system within the road corridor to drainage lines 1 to 3. This redesign will provide significant benefit to the local community by improving the hydrologic standard from the existing 1-2 year ARI to a 10 year ARI across almost the entire Stage 1 corridor.

Construction of Stage 1 will result in impacts associated with flooding risk and bank and scour instability. The Department notes the mitigation measures proposed, including temporary scour protection, and considers these to be sufficient in managing construction related impacts to surface water hydrology in the area. To reinforce these commitments the Department has recommended a Construction Soil and Water Management Plan (CSWMP) be prepared prior to the commencement of construction and in consultation with NOW and Warringah Council.

Flooding and Peak Flows

The Department acknowledges that the increase in impervious areas and the changes in levels along sections of the Concept Proposal works will result in changes to surface water flows. This will also be the case for the proposed underpass along Warringah Road in Stage 2. RMS has indicated it may progress the installation of concrete storage tanks under the road infrastructure for Stage 2 to address this issue. In addition, RMS will seek to redesign the existing drainage system within the road corridor to better manage peak flows in the area. This will be further addressed during the Stage 2 assessment.

The assessment indicates that without mitigation, peak flows and flooding risks will increase as a result of Stage 1. In response the RMS has developed a surface water management strategy that involves the redesign and redirection of the existing drainage system within the road corridor to drain into Council's existing drainage system. This upgrade will result in the drainage systems having an improved 10 year ARI hydrologic standard with the exception of the low point in catchment 1C on Frenchs Forest Road west. A 900mm pipe at this location will only achieve a 2 year ARI unless upgraded.

The Department considers that a 10 year ARI hydrologic standard of design across the corridor would be a measurable improvement to the existing conditions. The Department has therefore recommended a condition requiring RMS to ensure all drainage design associated with Stage 1 achieve the 10 year ARI target (including in catchment 1C), where feasible and reasonable. To further protect the local community and road users, the Department has recommended that existing flooding is not worsened as a result of Stage 1 and that all relevant information be provided to Warringah Council and the NSW State Emergency Service to assist in the preparation of flood related documentation.

Scour and Bank Instability

The changes in peak flows and hydrologic regimes within the drainage lines have the potential to contribute to scour and bank instability. RMS has committed to upgrading the existing drainage system in the Concept Proposal road corridor with reinforced concrete pipe and outlet headwalls to mitigate scouring. The Department considers that scour within drainage lines associated with Stage 2 will require mitigation in order to ensure the integrity of Red-crowned Toadlet habitat and waterway connection leading to Manly Dam. The Department acknowledges that further assessment and subsequent mitigation measures will be outlined in the Stage 2 EIS.

The Department notes the commitment to consider scour protection during detailed design of the Stage 1, however given the presence of the Red-crowned Toadlet the Department believes this approach can be strengthened by incorporating recommendations provided by NOW and EPA, including the preparation and implementation of a Water Management Plan (WMP). This Plan will outline measures to mitigate impacts arising from changes to surface water hydrology that may result in soil erosion, bank instability and scouring.

The Department acknowledges that RMS is exempt from obtaining a controlled activity approval for works within riparian corridors, by virtue of Section 115ZG(1)(g) of the EP&A Act. However, the Department considers the *Guidelines for Riparian Corridors on Waterfront Land* to be an appropriate guideline in the context of the drainage lines in Stage 1. These drainage lines should be managed in accordance with the objectives provided in these guidelines whilst maintaining the recommended vegetated riparian zone widths where feasible and reasonable.

Natural Flow and Hydrologic Regimes

A number of concerns were raised in relation to the potential alteration of natural flow and hydrologic regimes in the surrounding waterways and catchments. Of particular concern was the impact on local flora and fauna that may be dependent on consistent flows. RMS responded to these issues noting that designs of Stages 1 and 2 would ensure existing flows are maintained downstream and that issues associated with Manly Dam will be addressed in the Stage 2 EIS.

The Stage 1 works will result in increased peak flows along drainage line 2, which flows through Ecological Sample Unit (ESU) 5, resulting in a predicted 6% reduction of surface water flows into this area. ESU 5 contains the identified Red-crowned Toadlet which is dependent on the continuity of natural flows. Whilst noting that the change in water flow is not excessive, the Department has recommended as part of the WMP that RMS investigates options in consultation with NOW and Warringah Council to ensure natural flows within waterways are maintained. In addition, the recommended EMP will be an effective measure in monitoring any impact from hydrological changes on the Red-crowned Toadlet in ESU 5 and will require contingency mitigation measures be employed if an impact becomes evident.

Surface Water Quality

The surface water quality assessment referenced the *Warringah Council Creek Management Study 2004.* It was found that total nitrogen exceeded ANZECC trigger levels at all sampling locations and total phosphorous exceeded ANZECC trigger levels in drainage line 3. Overall, high pollutant load levels running off into the drainage lines across the catchments were identified.

The upper reaches of Middle Creek are characterised in the Study as containing relatively high concentrations of suspended solids and as having total and dissolved nitrogen higher than the recommended guidelines. The elevated pollutant levels in these drainage lines were attributed to runoff from urban development in Frenchs Forest and Oxford Falls.

The key surface water quality impacts resulting from the construction and operation of works associated with the Concept Proposal will include:

- increases in volume of sediment deposited and turbidity of stormwater runoff;
- potential mobilisation of pollutants into drainage lines;
- waterway degradation due to increase sediment load and organic matter;
- risks to water quality associated with fuel and chemical spillages or leakages; and
- risks to ecosystem, use and aesthetic values of waterways resulting from increases in pollutants, nuisance plant growth, oxygen depletion, sedimentation and light reduction.

The key surface water quality impacts resulting from the construction and operation of Stage 1 works, without mitigation will include:

- increases in gross pollutants with the highest increase in drainage line 1 of 42%;
- increases in total suspended solids with the highest increase in drainage line 1 of 11%;
- increases in total phosphorous with the highest increase in drainage line 1 of 10%;
- increases in total nitrogen with the highest increase in drainage line 1 of 7%; and
- decreases to gross pollutants, total suspended soils, total phosphorous and total nitrogen in drainage line 2 between Frenchs Forest Road and its intersection with Wakehurst Parkway due to proposed surface water diversion works.

The increases in pollutant loads listed above are percentage increases in stormwater attributable to the road network within Stage 1 and are not representative of a proportion of catchment-wide loads. RMS has identified short and long term objectives for each of the parameters listed above as detailed in the *Northern Beaches Stormwater Management Plan.* These objectives are detailed in **Table 12**. RMS has indicated that as a result of the constrained nature of the corridor and difficulty in treating the stormwater in isolation of the broader catchment, the objectives cannot be fully achieved.

Table 12. Stormwater pollution reduction short and long term objectives as prescribed in PBP, 1999 (Adapted from Proponent's EIS).

Stormwater Pollutant	Short term Objectives (from PBP, 1999)	Long term Objectives (from PBP, 1999)
Gross Pollutants (GP)	100% retention of litter and coarse sediment up to 3 month ARI peak flow	70% reduction in gross solid loads in creeks and streams
Total Suspended Solids (TSS)	50% reduction in TSS loads	Achieve TSS loads which protect ecosystems and maintain natural creek bed regime
Total Phosphorous (TP)	45% reduction in nutrient loads	30% reduction in nutrient loads
Total Nitrogen (TN)	45% reduction in nutrient loads	30% reduction in nutrient loads
Oil and Grease	No visible oils up to 3 month ARI peak flow	No visible oils on all waterways

However, RMS has committed to the installation and maintenance of in-line pollutant control devices at the headwater of each drainage line to manage increases in pollutant loads. These will generally be in the form of gross pollutant traps and will manage pollutant loads in runoff during operation. This will result in GP being reduced by upto 71%, TSS being reduced by upto 38%, and TP being reduced upto 16%.

Sedimentation and Pollution Loading

Community submissions raised the issues of waterway and catchment health, particularly in regards to Manly Dam. The Department notes that potential impacts associated with both stages of the Concept Proposal include waterway degradation as a result of increases in sediment loads and organic matter. This degradation may result in nuisance plant growth, oxygen depletion, light reduction and general impacts to aesthetic and use values of the different waterways.

The Department acknowledges the direct impact that the Concept Proposal works will have on surface water quality. The increase in the capacity of the road network will lead to an increase in traffic volumes leading to an increase in pollutant loads becoming mobilised through runoff. The link between toxicity in urban runoff and roads has been documented in the *Warringah Council Creek Management Study 2004* and acknowledged by RMS.

RMS has outlined a number of management measures at a conceptual level that will be further investigated in relation to Stage 2 sedimentation and erosion impacts. These include the installation of localised sumps within the slot to temporarily store runoff and the installation of sediment retention basins along the south side of Warringah Road.

The Department considers the impacts to catchments and waterways in the region should be minimised as much as is practicable for Stage 2. To reflect this, the SEARs for Stage 2 require RMS to undertake an assessment of the likely water quality impacts and to propose mitigation measures to contain pollutants and minimise leachate and sediment mobilisation. The Department is satisfied that the SEARs for Stage 2 remain adequate and will provide further information on the proposed impacts and mitigation measures of Stage 2 for the Department to consider.

Stage 1

In assessing the water quality impacts associated with Stage 1, the Department has taken into account the ecological and aesthetic values of Trefoil and Middle Creek, and Narrabeen Lagoon; and impacts of untreated runoff on the Red-crowned Toadlet community known to exist along Trefoil Creek, drainage line 2. The Department also acknowledges the highly urbanised nature of the area and the existing pollutant load levels within runoff as outlined in the EIS and in the *Warringah Council Creek Management Study 2004*.

The Department notes that no pollutant control measures are in place in the existing drainage lines except for the sediment retention basin in Rabbett Reserve. As such, the measures proposed will provide benefits to the local ecosystem within the Middle Creek catchment. The proposed mitigation measures are predicted to reduce the loads of gross pollutants and total suspended solids within runoff entering the catchment.

However, the pollution control devices will not mitigate predicted increases in total phosphorous and nitrogen. RMS has concluded that the installation and maintenance of retention systems within the project corridor to manage total phosphorous and nitrogen in runoff would be unfeasible due to the minimal road space and urbanised nature of the area. Whilst the Department would prefer mitigation of these pollutants it does accept the identified limitations, and notes that the percentage increases attributable to Stage 1 will represent a practically imperceptible impact to Middle Creek when considering the existing road and drainage network within the total catchment area.

Notwithstanding the above, and due to the important ecological and recreational value of receiving waters, the Department has recommended a Surface Water Quality Monitoring

Program be implemented, which will require ongoing monitoring of waterway health and integrity throughout construction and the first three years of operation. This monitoring program will provide further and up to date baseline data for the waterways associated with Stage 1 and will allow for mitigation measures to be adapted if requied.

The Department acknowledges that the key to managing water quality is through "preventing fine particulates from entering waterways" and mitigation measures such as gross pollutant traps and sediment basins are "largely ineffective" as stated in the *Warringah Council Creek Management Study 2004*. The Department has also considered RMS's view that the limited road space, and the road environment, limits opportunities for mitigation other than the proposed pollutant control devices. However, the Department is not satisfied that all Water Sensitive Urban Design (WSUD) principles have been investigated or exhausted. A key recommendation of the Middle Creek Study in the *Warringah Council Creek Management Study 2004* was that developments should incorporate WSUD principles, especially in the upper reaches of the catchment. As such, the Department recommends that the detailed design of the drainage system and pollutant load mitigation measures incorporate WSUD principles where feasible and reasonable and in consultation with NOW and Warringah Council.

In addition, the WMP will incorporate the management measures and objectives provided in the *Office of Water Guidelines for Riparian Corridors on Waterfront Land.* The WMP will also require that management measures proposed during operation of Stage 1 integrate with those currently used or planned to be used by Warringah Council. Of particular importance will be the consideration of the *Middle Creek Management Plan 2009* with the WMP to ensure this alignment takes place where.

Construction

Water quality impacts during construction of Stage 1 works will predominantly relate to earthworks, sedimentation and risk of spill from vehicles and plant. The hydrological assessment indicated that across the construction footprint the predicted Universal Soil Loss Equivalent (USLE) would exceed the threshold value of 150 cubic metres cumulatively, with particular exceedances at the Wakehurst Parkway and Frenchs Forest Road intersection. The Department notes the erosion and sediment control measures proposed to manage this impact and notes that despite the exceedance in this location, no sedimentation basin will be implemented as otherwise recommended in the *Soils and Construction – Managing Urban Stormwater* (Landcom 2004). The justification provided for such an approach is that the steep topography, nature of construction works and proximity to existing developments, makes it unfeasible for the installation of appropriately sized sediment basins.

The Department acknowledges these constraints but has recommended a condition requiring the preparation of a Construction Soil and Water Management Plan which will include a provision to implement and monitor sedimentation and erosion controls to adequately manage any soil loss from the works at the Wakehurst Parkway and Frenchs Forest Road intersection.

Conclusion and Key Recommendations

The Department considers that there will be a net benefit to the local waterway in Middle Creek catchment. The proposed redesign of the drainage system within the Stage 1 footprint will provide beneficial stormwater management and flood mitigation to a hydrologic standard of up to 10 year ARI across almost the entire corridor. The installation of the proposed pollution control devices in drainage lines 1, 2 and 3 will provide beneficial pollutant control to an area where pollutant control is relatively non-existent. Detailed assessment of the Bantry Bay and Curl Curl catchments will be undertaken during Stage 2.

The Department notes the ecological and recreational values of these waterways and the increasing pressure associated with population growth in the region. Through the recommended conditions of approval, it is considered that the wider catchment and

waterway health will be addressed by RMS during construction and operation of Stage 1 of the Concept Proposal.

To achieve adequate management of surface water impacts, in addition to RMS commitments, the Department has recommended the following conditions be incorporated into the instrument of approval to further mitigate and monitor surface water hydrology and quality impacts associated with the proposal:

- preparation of a Water Management Plan;
- achievement of a hydrologic standard of a 10 year ARI across Stage 1;
- preparation of a Construction Soil and Water Management Plan; and
- implementation of a Surface Water Quality Monitoring Program.

5.5. Urban Design and Visual Amenity

Issue

The Concept Proposal works are located within a highly urbanised and well vegetated area of metropolitan Sydney. The topography of the area is undulating with major roads generally following ridgelines and vistas occurring at high points and plateaus. Residential and commercial development is the dominant built form with stretches of remnant native vegetation and street trees heavily influencing the visual character of the area. The strong topographic form of the area and established urban form has resulted in vertical and horizontal design challenges in relation to the location of the road, design responses and available mitigation measures.

RMS has undertaken a landscape character and visual impact assessment providing impact ratings by considering the magnitude of change and sensitivity of an area to change. The assessment divided the project into seven landscape character zones (LCZs) and Stage 1 into seven visual assessment precincts (VAPs), as shown at **Figures 8** and **9** respectively. The assessment considered the visual impacts to both road users and road viewers. The result of the landscape character and visual impact assessment are presented in **Table 13** and **Table 14.**

Table 13. Landscape character zone (LCZ) assessment for areas within the Concept Proposal and Stage 1 (Adapted from Proponent's EIS).

Landscape Character Zone (LCZ)	Landscape Character Impact Rating
LCZ 1 Frenchs Forest Road East	Moderate
LCZ 2 Frenchs Forest Road West	High to Moderate
LCZ 3 Wakehurst Parkway	Moderate
LCZ 4 Warringah Road East	Moderate
LCZ 5 Forest Way (and Warringah Road West)	Low
LCZ 6 Karigal Crescent/Bantry Bay Road	High
LCZ 7 Aquatic Drive/Allambie Road (South)	Moderate

Table 14.Visual assessment precinct (VAP) assessment for areas within Stage 1 (Adapted from Proponent's EIS).

Visual Assessment Precinct (VAP)	Visual Impact Rating	Road User Visual Impact Rating
VAP 1 Skyline Shops	Moderate	Moderate
VAP 2 Frenchs Forest Road East	Moderate to Low	Moderate to Low
VAP 3 Wakehurst Parkway North	High to Moderate	Moderate
VAP 4 Frenchs Forest Road West	High to Moderate	High to Moderate
VAP 5 Naree Road	High	High
VAP 6 Forest Way North	Moderate to Low	Moderate to Low
VAP 7 Warringah Road East	Moderate to Low	Moderate to Low
Allambie Road Construction Compound	Moderate to Low	Moderate

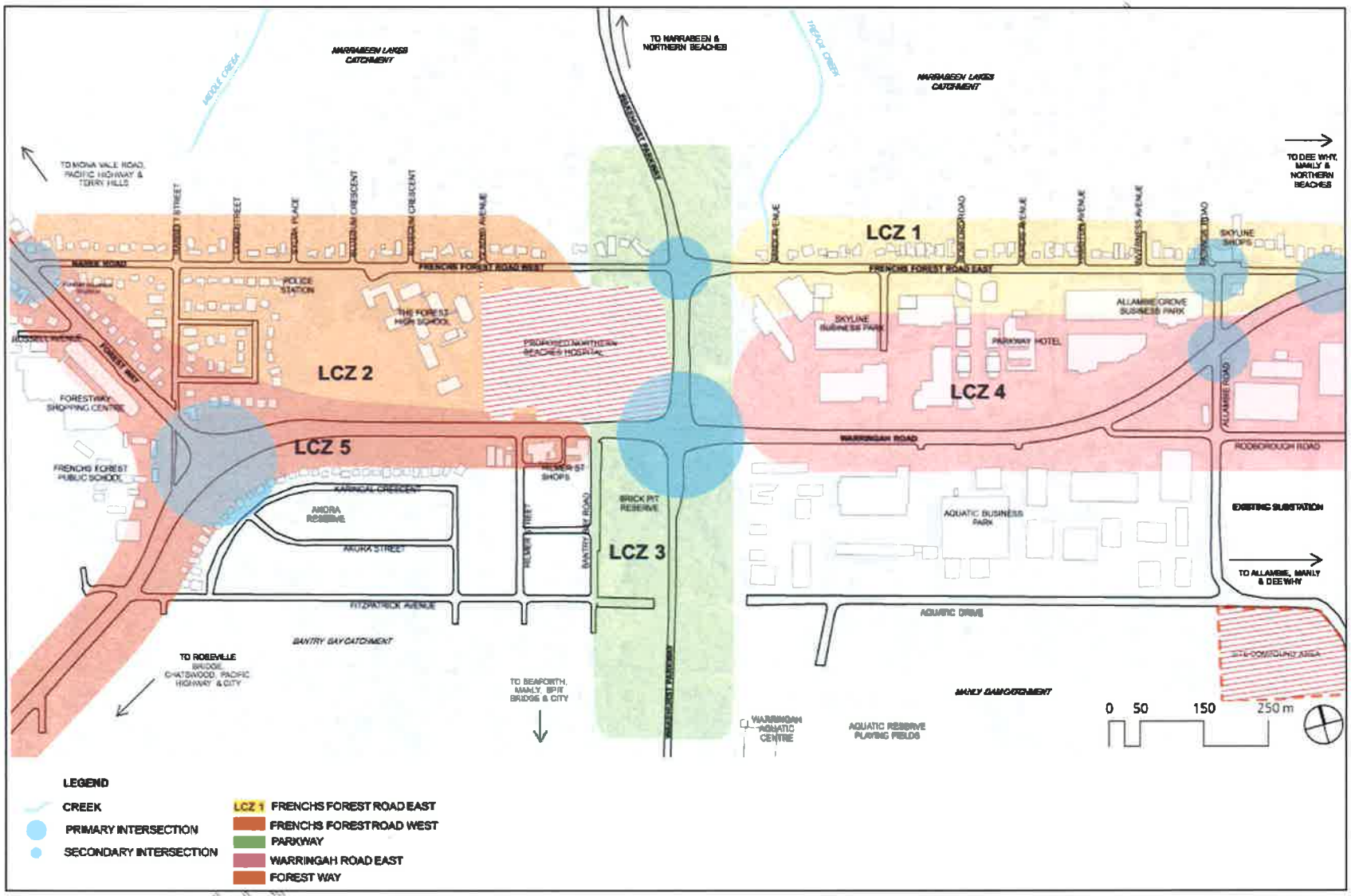


Figure 8. Location and scope of Landscape Character Zones (Source: Proponent's EIS)

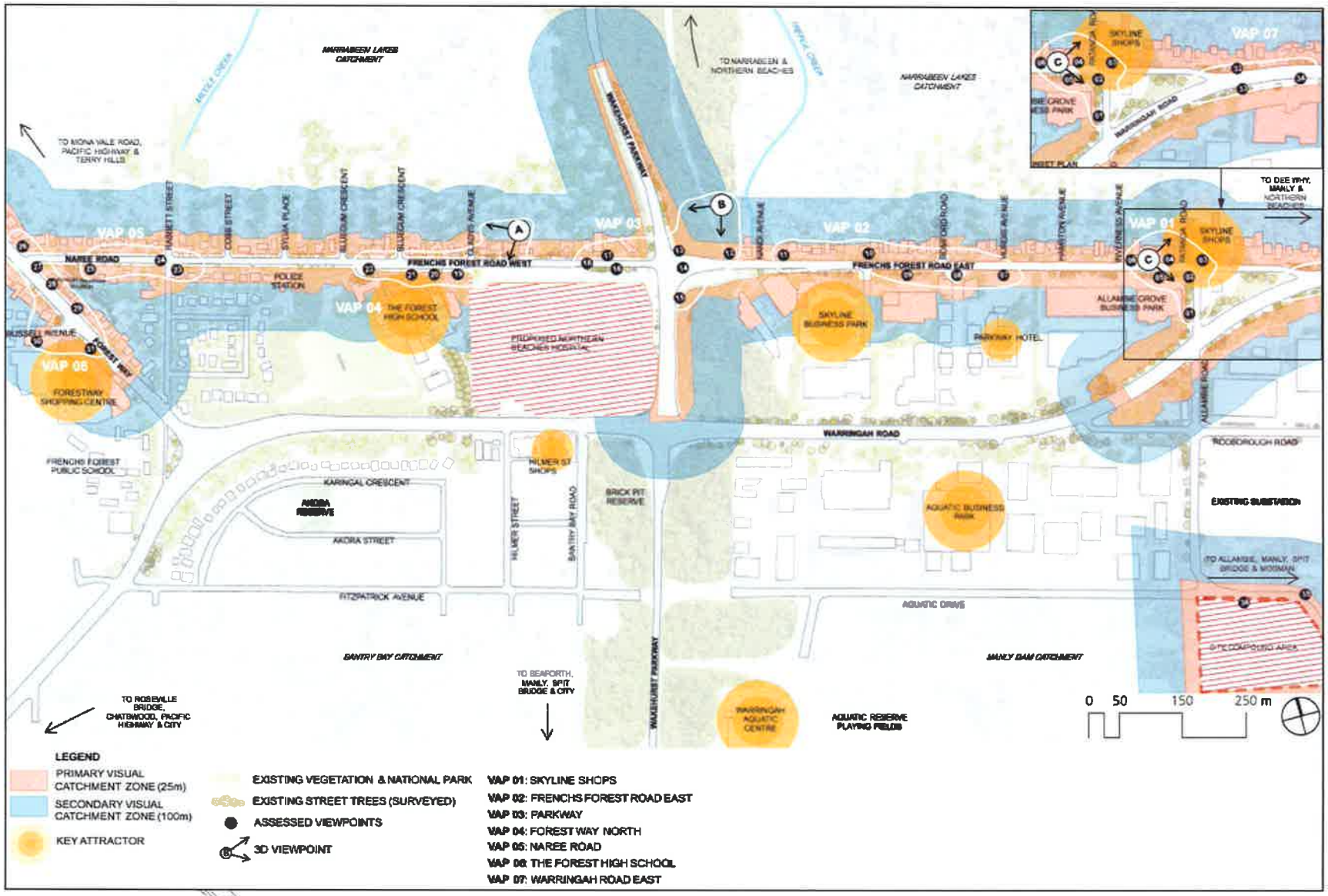


Figure 9. Location and scope of Visual Assessment Precincts (Source: Proponent's EIS)

Submissions

The Department received five submissions from the public relating to urban design and visual amenity. The issues raised in these submissions included landscape design, streetscape and character preservation, visual impacts associated with the new pedestrian bridges and changes to visual amenity as a result of the project in general.

Warringah Council requested the provision of high standard public domain infrastructure and the development of a way finding strategy and effective signage. Council requested that costs associated with changes to street lighting be borne by the Proponent and that street tree replacement, footpath and roadwork adjustments meet Warringah Council's requirements.

Department's Consideration

At a concept level, the greatest impacts to character and visual amenity relate to Stage 2 and the Warringah Road corridor. This corridor, whilst highly urbanised, is visually dominated by native vegetation and street trees associated with verge planting, and open spaces associated with The Forest High School. Impacts on road users and road viewers are therefore associated with:

- widening of road pavement;
- introduction and widening of signalised intersections;
- introduction of an open slot underpass of Forest Way, Warringah Road and Hilmer Street;
- two new footbridges (one replaced);
- new built form and landscape treatments; and
- footpath widening.

The Department's assessment of the Concept Proposal identified the potential for a high level of visual impacts of Stage 2. This is reflected in the Karigal Crescent/Bantry Bay Road Landscape Character Zone having a high impact rating. In this regard, the Department considers there is scope to reduce the visual impact of the Concept Proposal by requiring RMS to reduce the loss of the road reserve and to demonstrate in detail how the built design will minimise the associated impacts.

The Department considers that the urban design and visual amenity impacts that would result from the underpass along Warringah Road, including retaining structures, loss of verge and pedestrian overpasses, are equivalent to those experienced at other key underpasses in urbanised environments within the Sydney region. Based on this experience, and noting the existing nature of the established road corridor, the Department is satisfied that such impacts from the underpass can be minimised and managed through detailed design and ongoing consultation with the community.

The Department also recognises that each stage of the project will perform different functions and cater to a different mix and volume of traffic. However, continuity in urban design and landscaping is considered important in an area that will be anchored by the NBH and eventually evolve into a health precinct. To ensure a level of appropriate urban design continuity, the Department has recommended the incorporation of the design principles outlined in the EIS into the detailed design of both Stages 1 and 2.

Stage 1 works are located within a suburban setting with the following key characteristics:

- low density residential development on the northern side of Frenchs Forest Road;
- one to two story commercial development and business parks along the southern side of Frenchs Forest Road West;
- the Northern Beaches Hospital site and The Forest High School on the southern side of Frenchs Forest Road East;
- low density residential development on both sides of Naree Road;

- a strong vegetated character on both sides of Frenchs Forest Road while Wakehurst Parkway is adjoined predominantly by native bushland with virtually no development; and
- the three story Forestway Shopping Centre on Forest Way.

Construction

The greatest visual impacts during construction would occur following the removal of vegetation and prior to landscaping works. Vegetation would be retained where possible and cleared areas would be progressively landscaped to mitigate visual impacts. The Department supports this approach and has recommended that, where practicable, local community groups and residents are involved in this process.

The Department considers the visual impact from the Wakehurst Parkway/Warringah Road and Allambie Road construction compounds to be minor and temporary in nature. The northern and eastern boundaries of the Wakehurst Parkway/Warringah Road site will be screened by existing vegetation and the western and southern boundaries are bordered by the existing road network. The nearest residents are over 200 metres from the site and the road user views are not expected to be heavily impacted. The Allambie Road compound site is to be carefully planned with temporary offices, plant material and laydown areas suitably placed to avoid light spill and visual impacts.

Operation

Frenchs Forest Road West and Naree Road would experience the greatest impact to landscape character and visual amenity from Stage 1. The project would require road widening on both sides with wider pedestrian paths, bus lanes and a new signalised intersection introduced to service the new NBH (refer **Figure 10**). Removal of vegetation on both sides of the road would impact on the character of the area. To mitigate this, RMS has committed to the replacement of street trees.

The southern side of Frenchs Forest Road West and Naree Road would include a 3.5 metre wide footpath to provide pedestrian connection between the Northern Beaches Hospital and Forest Way shopping centre. This would result in the removal of street trees located within the existing verge. The provision of the wider footpath precludes the planting of replacement street trees; however to mitigate the loss of street trees, replacement tree planting within private property is proposed. The Department acknowledges the removal of street trees along one side of Frenchs Forest Road West will have an impact to the character of the area; however the benefit of a wider footpath at this location would result in improved safety for an increased pedestrian demand.

The construction of retaining walls is required along both sides of Naree Road which will change the look of the area for both road viewers, with walls facing residential properties along the north side of Naree Road, and road users, who will face walls along the southern side of the road. Retaining walls at these locations vary in height and are expected to be less than one metre (**Figure 10**); however some retaining walls at other locations for Stage 1 would be up to three metres in height (**Figure 11**). RMS has committed to mitigate impacts by providing retaining walls with high quality stone finishes in keeping with an urban bushland setting.

The upgraded intersection of Wakehurst Parkway and Frenchs Forest Road will require substantial widening to accommodate additional turning lanes and new westbound lanes resulting in vegetation removal, particularly along Frenchs Forest Road West as shown in **Figure 11**. A relatively significant cut at this intersection would be required and retaining walls would be introduced to reduce the extent of physical impacts.

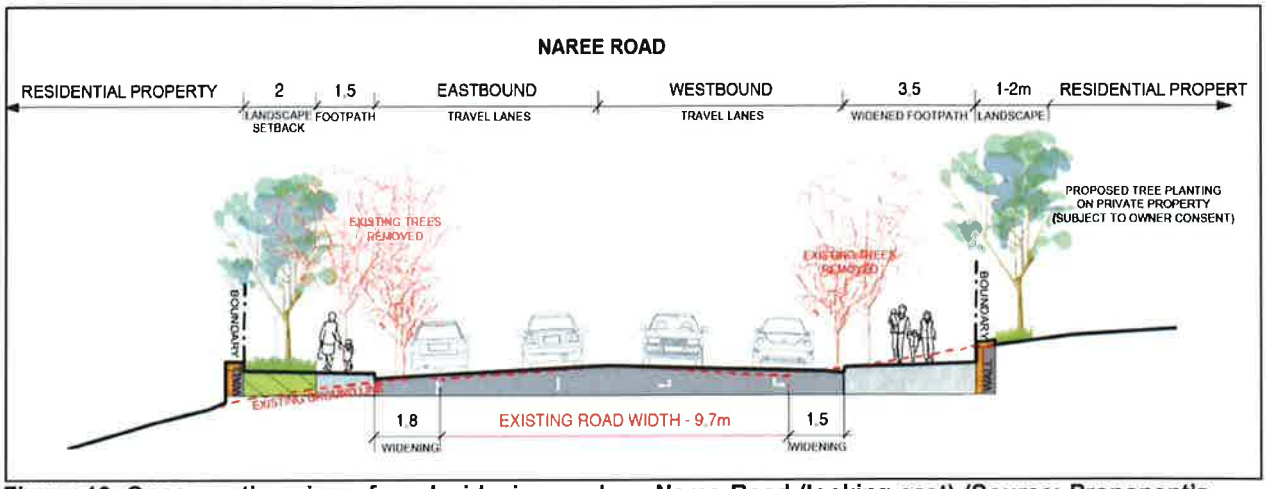


Figure 10. Cross-section view of road widening works – Naree Road (looking east) (Source: Proponent's EIS).

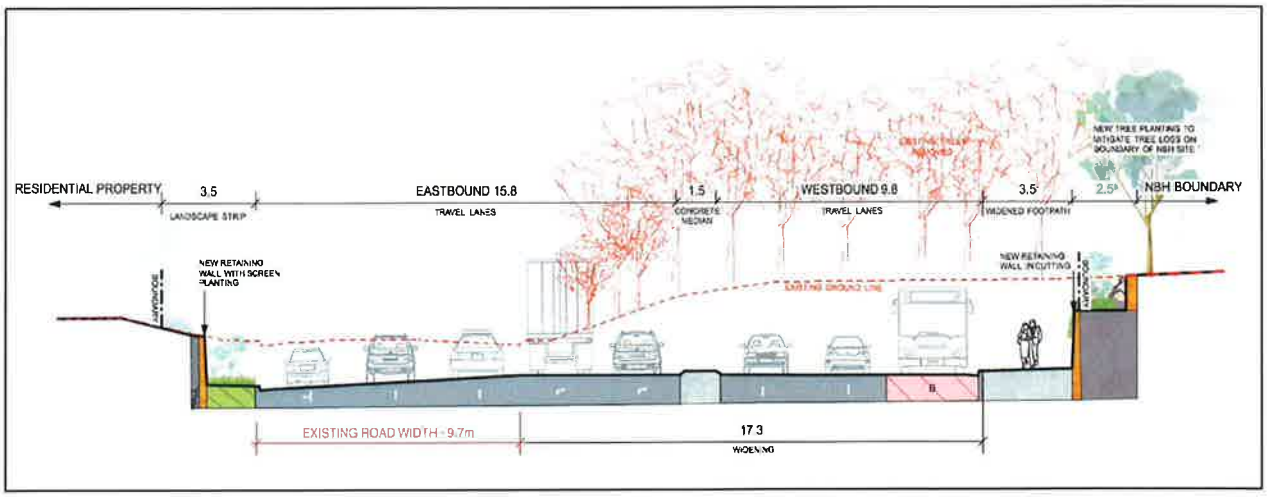


Figure 11.Cross-section view of road widening works – Frenchs Forest Road West (looking east) (Source: Proponent's EIS).

To address these impacts, RMS has committed to the preparation of a landscape plan which is to detail the urban design and landscape character direction for the project. Informing this, are seven urban design and landscape objectives including to:

- retain and reinforce the parkway character of Warringah Road and Wakehurst Parkway and distinguish the ecological character of Wakehurst Parkway from the more formal and urbanised parkland character of Warringah Road;
- reinforce the lush and green character of the area and express the bushland character;
- deliver an integrated approach to traffic (including pedestrian and cycle), public transport and land use;
- retain the privacy and amenity of residents in the local streets in the immediate area, and provide opportunities for urban restructuring and redevelopment;
- define the address of the hospital locality as well as expressing the area as a gateway to the Northern Beaches;
- create a clear structural framework for streetscapes that enhances the legibility, way-finding and functioning of the precinct; and
- design integrated urban infrastructure/landscape design elements that allow the landscape to dominate built forms to recede.

The Department considers the urban design objectives and principles to be appropriate. Whilst RMS has committed to the preparation of a landscape plan, the Department considers that in order to holistically address residual visual impacts, that the commitment be

strengthened through the preparation of an Urban Design and Landscape Plan undertaken in consultation with the community.

Conclusion and Key Recommendations
Whilst the Concept Proposal works and in particular Stage 2 works will have an impact on the character and visual appearance of the local area, the Department notes that the changes are in line and consistent with infrastructure associated with a major hospital precinct.

The Department is also satisfied that the visual appearance of the Concept Proposal works can be appropriately addressed through the implementation of the identified urban design objectives and principles. In addition, the Department has issued supplementary SEARs for Stage 2 requiring the Proponent to reduce the loss of the existing reserve to the greatest extent possible and to demonstrate the built form of the project will minimise impacts.

The Department also acknowledges that the character of the streetscape will change as a result of the Stage 1 works but considers the proposed mitigation measures and the development of a comprehensive Urban Design and Landscape Plan will assist in balancing the existing and future character of the area as a supporting road network for the NBH.

5.6. Social, Economic and Land Use

Issue
Construction and operational impacts associated with the Concept Proposal and Stage 1 include noise, vibration, traffic, potential loss of car parking and disrupted access to property, educational establishments, public transport and retail outlets. Construction activities are also likely to result in amenity impacts to sensitive land uses, including residential dwellings, loss of local businesses and acquisition of properties.

RMS has committed to implement measures to manage and mitigate construction and operational impacts to businesses, pedestrians and cyclists, and sensitive receivers. Such measures include ongoing consultation, provision of noise mitigation, landscape and urban design, maintaining connectivity to community services, pedestrian and cyclist facilities.

Land acquisition may be required for Stage 2 and is likely to include Council owned land on Warringah Road, Crown land on Aquatic Drive, and the Bantry Bay Road shops. The land acquisition requirements of Stage 2 would be detailed in the EIS for that proposal.

RMS has minimised land acquisition for Stage 1 by locating road widening within the existing road reserve as far as possible. Notwithstanding, partial acquisition of land from 34 parcels, totalling approximately 1.07 hectares is likely to be required. These include 15 parcels along Forest Way, land on the Northern Beaches Hospital site on Frenchs Forest Road West, 5 parcels of land on Frenchs Forest Road East and Allambie Street and Council owned land on Warringah Road.

Submissions
The Department received 9 submissions during the exhibition period relating to social, economic and land use issues associated with the proposal. The most frequently raised issues related to the potential for increased community severance in the area and the impact on community health and quality of life. Other issues included reduced access to Forestway Shopping Centre, impacts to small businesses and impacts to The Forest High School.

Warringah Council commented on the acquisition process for council owned land, provision of parking for Skyline Shops, pedestrian and cyclist connectivity and location of footpaths. Council requested that a signage strategy be developed and that details of the Concept Proposal be available to prospective developers of the area.

Department's Consideration

Land uses within the Concept Proposal area comprise residential, retail, commercial/light industrial and open space and bushland reserves. Retail uses include the Forestway Shopping Centre, the Skyline Shops and Bantry Bay Road shopping strip. The range of goods and services currently available within these key retail centres consist mainly of neighbourhood shopping uses such as newsagencies, pharmacies, postal services and medical services. Forestway Shopping Centre provides a greater variety of services including government services, banking, child care and travel agency.

Commercial and light industrial uses are contained in three distinct business park precincts, bounded by Frenchs Forest Road East/Warringah Road, Rodborough Road (eastern end), Aquatic Drive/Allambie Road and Wakehurst Parkway. These precincts are characterised by two to three storey office buildings, many of which are attached to high ceiling warehouses. A number of schools, medical centres, churches and recreation/open space are also located in these areas.

Acquisition

Stage 1 requires the partial acquisition of 34 parcels of land zoned residential, business park and/or public recreation. The requirements for Stage 2 are expected to include partial linear acquisition (also known as strip acquisition) of Council owned land and the acquisition of the Bantry Bay Shops. Concerns have been raised regarding the amenity impacts on residential properties and impacts on the operation of businesses, timing of acquisition and impacts to property access arrangements. Land would be acquired through negotiation where possible, otherwise land would be compulsorily acquired under the *Land Acquisition (Just Terms Compensation) Act 1991*. Once acquired, services, public utilities and fences will be adjusted at RMS's expense.

The Concept Proposal works will cause impacts to a range of land uses and users across the area. The most significant socio-economic impact that may result from Stage 2 will be the removal of the Bantry Bay Road Shops as confirmed in the Options Development and Selection Report produced by the Proponent in December 2014. The Department notes that the impacts to the business owners as a result of this removal will be unavoidable and will require compensation as a consequence of land acquisition.

The Department also notes that the local community will lose access to a limited range of goods and services provided in this location. Whilst this is not a desirable outcome, the nearby Forest Way Shopping Centre and Skyline Shops provide similar goods and services. In addition, the Department notes the presence of other nearby major retail centres including Warringah Mall, Dee Why, Chatswood and Forestville. Notwithstanding, the Department issued supplementary Secretary's Environmental Assessment Requirements for Stage 2 that require RMS to assess the significance of the social impacts resulting from the loss of these shops.

The Department is satisfied that RMS will minimise required acquisitions during design and that this will contribute to minimising social impacts. Notwithstanding, it is acknowledged that anxiety, stress and other impacts to social wellbeing have the potential to arise during acquisition processes. The Department is satisfied that the provision of compensation, in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*, the preference by RMS for negotiated outcomes with landowners and the requirement for ongoing consultation with stakeholders within the recommended conditions, will adequately mitigate social and economic impacts resulting from property acquisitions.

Construction

Construction would result in potentially disruptive impacts to local businesses, primarily pedestrian and vehicular access to shops, offices and warehouses and loss of on-street parking in Frenchs Forest Road East and West. The disruption would be temporary and would be reduced or eliminated following completion of work. RMS is to provide temporary or alternative access to properties as well as signage to explain new access arrangements.

The amenity of residences and schools could be affected by construction activities. The impacts include noise, vibration and dust generated by construction plant and equipment, noise from increased traffic and out of hours activities, and visual impacts of construction machinery, compounds and works. RMS has committed to carry out ongoing communication with residents and businesses about the duration, location, timing and potential impacts of construction. A draft Community Consultation Framework has been prepared to guide engagement and consultation with stakeholders as well as a process to gather and manage feedback and information about the construction of the proposal. In addition, the Department requires construction mitigation measures to be implemented through the recommended CEMP.

Operation

Concerns raised within public submissions, for both the Concept Proposal and Stage 1, were the severance of the community from schools, recreation and retail uses by the widening of roads (Frenchs Forest Road, Forest Way and Warringah Road). Of particular concern were the changes and impacts to connectivity and accessibility to The Forest High School and the Forestway Shopping Centre.

RMS has acknowledged that pedestrian arrangements will change and the existing non-signalised pedestrian crossing on Frenchs Forest Road West in front of the school would be relocated to a signalised crossing at the intersection of the proposed hospital access road, Gladys Avenue and Frenchs Forest Road West. Pedestrian access to the Forestway Shopping Centre may also be changed given the road widening and lengthening of the bus bay in Forest Way. The Department notes that the existing footbridge near Forest Way spanning Warringah Road will be replaced and an additional footbridge will be provided from the Hilmer Street entrance to the secondary NBH access.

The Department acknowledges the concerns raised by the community in relation to community severance and accessibility, but notes that the existing road network already significantly reduces connectivity and accessibility. Furthermore, the Department considers that the design features under this proposal will address and enhance connectivity through the provision of improved pedestrian and cycle facilities. Safety will also be improved by separating pedestrian, cyclist and vehicular traffic. The Department has also recommended an independent safety audit of the detailed design.

The removal of on-street parking in Frenchs Forest Road East was raised in public submissions and by Council. Restrictions to on-street parking during peak traffic periods are necessary to improve traffic flow. RMS acknowledges that the loss of parking in front of the Skyline Shops would have a negative impact on the businesses. As a consequence the RMS will provide alternative parking, including the provision of a loading bay and one disabled parking spot on the northern side of Frenchs Forest Road East, and 20 parking bays, approximately 50 metres to the east on the southern side of Frenchs Forest Road East between Allambie and Warringah Road.

Conclusion and Key Recommendations

The Department considers the proposal has significant benefits to local and regional road users. The broader network upgrade proposed under the Concept Proposal will improve through-traffic performance whilst improving connectivity and safety for pedestrians and cyclists. The alignment of the Concept Proposal will result in the removal of the Bantry Bay Road Shops; however the Department considers that other local neighbourhood centres could provide similar services.

The Stage 1 proposal would deliver improved access to the NBH and improve east-west movements between Warringah Road and Forest Way.

The Department is also satisfied that pedestrian access to the proposed hospital and schools would be improved in relation to safety and connectivity for the local community. In addition, the provision of an alternative parking arrangement for the Skyline Shops will address the loss of parking in this location.

6. ASSESSMENT OF OTHER ISSUES

Aboriginal Heritage

RMS undertook a comprehensive assessment of Aboriginal heritage including archaeological field surveys, stakeholder consultation with Aboriginal communities, literature reviews, and heritage database searches. The surrounding area includes a variety of site types and features, reflecting a diverse physical environment and a range of Aboriginal landscape uses and activities.

Two archaeological sites were identified within the vicinity of the Stage 1 area, including:

- a rockshelter with art located approximately 25m east of Wakehurst Parkway, north of Frenchs Forest Road. The site was assessed as displaying high archaeological and cultural significance (Trefoil Creek 1); and
- a rockshelter with potential archaeological deposits (PAD) located approximately 60m south-east of Trefoil Creek 1 and 35m east of Wakehurst Parkway. The PAD has been assessed as displaying moderate archaeological potential (Trefoil Creek 2).

Whilst the proposed Stage 1 works are in the vicinity of the above sites, no impacts are expected if appropriately managed. No impacts to Aboriginal Heritage are expected as part of Stage 2. OEH stated that no impact to these sites should occur as a result of the project.

The Department notes that the RMS has identified the avoidance of these sites as a design objective, and is satisfied that the identified Aboriginal archaeological sites will not be disturbed by Stage 1 and has recommended a condition to this effect.

Non-Aboriginal Heritage

There is one local heritage item listed under the Warringah Local Environmental Plan, identified as the former Holland's Orchid and Commemorative Grove that is impacted by the Concept Proposal. This consists of a single pear tree located on the road verge adjacent to Warringah Road, and a number of pear trees located on the grounds of The Forest High School which were propagated from the remnant pear tree in 2005.

All utility adjustments required for Stages 1 and 2 are included in the Stage 1 proposal. The submitted Statement of Heritage Impact concluded that the Former Holland's Orchard and Commemorative Grove will be impacted during these utility relocations. It was also concluded that the tree is in an incongruous setting and that relocation would be preferable pending arborist confirmation that the tree could survive relocation.

The Former Methodist Church building at 21A Forest Way (corner of Naree Road), also a locally listed heritage item, was initially considered for modification or demolition as a result of proposed road widening on both sides of Forest Way and other Stage 1 construction works. Through project design refinements, the widening on the eastern side of Forest Way is no longer required and as a result, the modification or demolition of the Former Methodist Church building is no longer proposed.

The Former Hews Brick Pit, a potential heritage item, adjacent to the corner of Warringah Road and Wakehurst Parkway, is described as one of the first industries in Frenchs Forest and was part of a larger brick works complex owned and operated by William Hews. The Brick Pit is now overgrown and has mountain bike tracks and dumped rubbish across the site. A heritage assessment concluded that the site is considered to be of local, associative and representative significance; however, is not considered to have aesthetic, social or research significance, and is not considered rare. Any impacts resulting from the project will be addressed and considered as a part of Stage 2.

The Department considers the impacts to non-Aboriginal heritage items will be low given the scale of works and that the only direct impact will be to the pear tree within the Former Holland's Orchard and Commemorative Grove. The Department considers relocation of the pear tree may result in an improved heritage outcome, as it is currently in an incongruous setting and is satisfied that the mitigation measures will be adequate in managing impacts.

Groundwater

Groundwater was found to be present between three and seven metres below the ground surface rising to a shallow point between 0.3 to 2.8 metres south of Warringah Road. Two water tables are present at the NBH site which flow to the south east. Investigations revealed existing groundwater was slightly acidic and brackish and hydrocarbons were detected to the south of Warringah Road near the service station site.

Ground water impacts resulting from the Concept Proposal include interception of groundwater flows, groundwater drawdown and seepage. These impacts could affect frog and other groundwater dependent species within and outside project area, and the potential for permanent localised impact to groundwater flows into the Curl Curl Creek Catchment.

Whilst RMS did not identify any groundwater dependent ecosystems, wetlands or swamps within the Concept Proposal area, it did acknowledge the importance of groundwater flow and seepage for the Red-crowned Toadlet.

Due to the nature of works associated with Stage 1, impacts to groundwater quality and hydrology are expected to be minor. The most likely source of groundwater impacts will be cuttings associated with the upgrade to the Wakehurst Parkway and Frenchs Forest Road upgrade.

Groundwater impacts resulting from Stage 1 works include:

- potential interception and connection with shallow groundwater and associated minor and temporary drawdown of the shallow water table until water levels equilibrate;
- potential for contaminants to move into deeper soils or into perched groundwater; and
- potential impacts to Red-crowned Toadlet habitat near Trefoil Creek.

In its submission, NOW raised the potential of the shallow water table being intercepted during the upgrade of the Wakehurst Parkway and Frenchs Forest Road intersection. RMS's response stated that the intersection will be lowered by up to 1.5m whereas the shallow water table lies at a depth of 3m resulting in interception being highly unlikely. NOW noted the exemption for RMS to acquire groundwater licenses, however requested that groundwater take be minimised and suggested that management measures specify that

groundwater monitoring include pre-construction and ongoing monitoring of the shallow water table.

The Department accepts that groundwater interception is highly unlikely and that impacts to water table levels and recharge would be temporary due to the relatively limited nature of the works. As such, the Department considers that impacts to groundwater, as a result of Stage 1, will be minor and temporary and therefore acceptable. Further, it is considered that the safeguards and mitigation measures, facilitated by specialist technical investigations, have been developed to avoid, mitigate and manage the identified impacts.

It is expected that the majority of groundwater impacts will occur as a result of Stage 2. Stage 2 will include the excavation of an underpass along Warringah Road which has the potential to result in groundwater interception and recharge. The Department is satisfied that further detailed impact assessment will be undertaken for Stage 2 works.

Air Quality

Receivers considered sensitive to direct air quality impacts are generally located within the footprint of the project and include:

- the Forest High School;
- Frenchs Forest Primary School;
- child care centre (Making a Difference child care);
- the Forest Alliance Church;
- commercial, retail and business areas located along and adjacent to the project;
- residential properties located along the roads to be upgraded; and
- the proposed Northern Beaches Hospital.

While increases in the capacity of the road network within the Concept Proposal and Stage 1 areas will contribute to emissions, the relief of congestion across the road network, including along Frenchs Forest Road, will reduce the number of idling vehicles resulting in potential localised air quality improvements. The Department concurs with the assessment that the area is already impacted by vehicle emissions, but also acknowledges that vehicle emissions are influenced not only by the project but by broader vehicle emission initiatives of government, such as improving emission standards.

Construction related air quality impacts would predominantly result from the generation of dust during earthworks, stockpiling and other construction activities. The Proponent has proposed a range of established construction air quality management measures which will be documented in a CEMP including maintaining construction plant and equipment in good working order and where practicable, vehicles will be fitted with pollution reduction devices.

In its submission, the EPA raised the issue of off road diesel emissions during construction and the need to ensure dust emissions are minimised through appropriate measures. In addition the EPA recommended an Air Quality Management Plan be developed and implemented. RMS has committed to ensuring relevant off-road diesel emissions guidelines are integrated with procurement documents and that contractors will be required to report on the use and performance of off-road diesel plant and equipment. RMS has also stated that an Air Quality Management Plan will be prepared within a CEMP. The Department considers this to be an acceptable response to these matters.

The Department has also considered the possible overlapping of construction activities for the Stage 1 Project, Stage 2 Project and construction of the hospital. Although the hospital construction activities would generally be limited to the hospital site on Frenchs Forest Road West, there is potential for cumulative construction air quality impacts from numerous sources to occur to nearby sensitive receivers.

The anticipated cumulative air quality impacts are primarily related to dust. RMS has outlined a number of mitigation measures to be incorporated in the Construction Air Quality Management Plan, which the Department supports. These include:

- air quality and dust management objectives consistent with the DECCW guidelines;
- potential sources and impacts of dust, identifying all dust-sensitive receptors;
- mitigation measures to minimise dust impacts to sensitive receivers and to the environment;
- a monitoring program to assess compliance with the identified objectives; and
- contingency plans to be implemented in the event of non-compliances and/or complaints about dust.

The Department is satisfied that the proposed measures are appropriate in managing air quality related impacts during construction. To further refine the approach being taken, the Department has recommended that a CEMP be prepared to report, manage and monitor air quality impacts during construction.

Contamination

There is potential for contaminated land to occur due to existing and previous potentially contaminating land uses located within the vicinity of the construction area. These include uncontrolled fill sites, service stations and historic brickworks. A phase 1 preliminary site assessment identified potential contaminants of concern including metals, asbestos, coal tar, tetrachloroethenes, pesticides and others.

RMS has committed to the preparation of a Phase 2 contaminated land assessment prior to construction of the Stage 2 project, with outcomes and management measures identified to be incorporated into the EIS and CEMP for Stage 2. The Department considers such an approach only to be acceptable if activities carried out within Stage 1 do not result in the disturbance of contaminated land.

As detailed locations of proposed utility adjustments for Stage 1 have not been presented, the Department has recommended that a Phase 2 assessment be undertaken prior to the commencement of site preparation and excavation activities in areas identified as medium to high risk within the Phase 1 Contamination Assessment. A Soil Contamination Report will be produced addressing suitable management and remediation options to be incorporated into the CEMP.

Waste

The types and quantities of wastes that would be generated from the Concept Proposal and Stage 1 were identified by RMS and were used as the basis for the preliminary classification in accordance with the *NSW Waste Classification Guidelines* (DECCW 2009).

Waste generated during construction would primarily be from civil works associated with site preparation, relocation of utilities, and construction of road infrastructure and landscaping. Waste streams attributable to both the Concept Proposal and Stage 1 would also include non-reusable surplus soil from bulk earthworks, contaminated soils requiring offsite disposal, material from demolition works, surplus construction and packaging material, vegetation waste, plant and vehicle maintenance waste, general office wastes and sewage waste.

The estimated excavated material from Stage 2, predominantly from the construction of the underpass, is not yet known and would be determined during further detailed design for the preparation of a Stage 2 Environmental Impact Statement. The Department expects that the majority of excavated material will be generated at this stage of the project. The Department is satisfied that waste generation, reuse and disposal will be appropriately assessed within the Stage 2 EIS as has been required in the issued SEARs.

It is predicted that about 34,000 cubic metres of material would be excavated, and 4,300 cubic metres of fill would be required for Stage 1. To manage waste, RMS has committed to

transport these materials for beneficial re-use off-site in accordance with a relevant EPA resource recovery exemption or disposed of at a licensed waste facility. The Department notes that final cut and fill volumes would be confirmed during detailed design and that waste classification will be undertaken to determine appropriate soil management and disposal methods.

The Department is satisfied with the mitigation measures proposed in relation to waste management and has reinforced these with recommended conditions that ensure no waste generated offsite are received at the project site, reuse and recycling of waste is maximised, liquid and non-liquid waste is appropriately assessed in accordance with the *Waste Classification Guidelines (2009),* and that all waste removed from the site is received by a lawfully permitted waste management facility or premises.

Utility Adjustments

A number of utilities have been identified (refer **Table 15**) within the Concept Proposal area that require protection, relocation or adjustment.

Table 15. Utilities and their potential relocation locations within the Concept Proposal area (Adapted from Proponent's PIR).

Utility Type	Description	Potential locations for relocations and adjustments
Gas	• High pressure mains for Northern Beaches regional supply.	• Wakehurst Parkway, Warringah Road, Forest Way, Frenchs Forest Road West, Fitzpatrick Avenue East, Hilmer Street, Acquatic Drive, Primrose Avenue and Bantry Bay Road.
Water and Sewer	• Reservoir supply main for Sydney City and Northern Beaches; • Trunk supply main for Warringah regional and local supply; and • Gravity sewer mains connections from the NBH site and Skyline Business Park.	• Wakehurst Parkway, Warringah Road, Forest Way, Frenchs Forest Road West and East, Hilmer Street, Fitzpatrick Avenue East, Bantry Bay Road, Aquatic Drive and Allambie Road; • new sewer connection point for the NBH site either via Bantry Bay Road and Warringah Road, or Wakehurst Parkway north of Frenchs Forest Road West.
Electricity	• 132kV pilot cable; • 33kV overhead regional and local supply; and • 11kV overhead and underground local supply.	• Rabbett Street, Frenchs Forest Road West and East, Warringah Road, Bantry Bay Road, Aquatic Drive, Wakehurst Parkway, Fitzpatrick Avenue East, Romford Road and Patanga Road.
Communications	• International ocean crossing fibre optic cable and dual terrestrial connections; • Nationally significant fibre optic cable; • National Broadband Network future upgrade; and • Localised fibre optic cable assets.	• Forest Way, Frenchs Forest Road West and East and Warringah Road; and • potential joint telecommunication trenches for multiple services within the same corridor.

As a result of the required configuration of various networks, some local roads such as Aquatic Drive, Allambie Road, Rodborough Road, Rabbet Street, Fitzpatrick Avenue East and Bantry Bay Road may also be subject to utility adjustments. However, the locations and alignment of the utility adjustments will be finalised during detailed design in consultation with utility owners.

The majority of the proposed utility relocation works would be contained within the footpath reservation. Further, there may be instances where utilities may require road crossings and there is the possibility for utilities to be relocated outside of the Concept Proposal area.

As identified in the PIR, in order to minimise environmental, community and road user impacts associated with the utility construction works, RMS has proposed to undertake utility service adjustments concurrently for the entire Concept Proposal prior to key road

construction activities of Stage 1 commencing. The Department supports this approach, which is anticipated to reduce impacts by reducing construction timeframes and associated amenity and traffic related impacts.

The main impacts associated with utility adjustments include noise and vibration, traffic, visual impacts, erosion and sedimentation risks, access and minor tree removal/trimming. Traffic impacts will result from temporary partial or complete road closures needed to ensure occupational health and safety in the carrying out of utility adjustment works. Such impacts will be temporary in nature and are considered to be manageable through road occupancy licenses.

Exceedances of construction noise management levels for residential, commercial and other sensitive receivers are anticipated as a result of utility adjustment works. It is considered these relatively low exceedances can be managed through the implementation of the environmental management measures provided for in the CNVMP. The Department also acknowledges that there may be requirements for utility adjustment works outside of the standard construction hours to minimise disruption to traffic and disturbance to surrounding land owners and businesses.

Trenching within the footpaths along Warringah Road to facilitate utility adjustments will result in removal of and indirect impacts on DFEC. Further, minor tree removal and/or trimming may also be required. RMS has indicated disturbances will be minimised through detailed utility design and in consultation with the respective utility owner and shall be undertaken in accordance with relevant biodiversity and ecological guidelines. The Department considers that biodiversity impacts, as outlined in Chapter **5.3**, can be offset and that such provision has been made by RMS in the proposed BOS.

The Department is satisfied that the recommended conditions and the relevant construction environmental management sub-plans will be adequate in managing the impacts associated with the proposed utility adjustments.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Need and Justification

The existing road network within Frenchs Forest frequently becomes heavily congested causing extensive delays for both local residents and motorists moving through the area along the vital Warringah Road connecting the Northern Beaches with Chatswood and the Sydney CBD. Background population and employment growth in the region and within Frenchs Forest will place further pressure on this network.

The development of the NBH, consisting of 488 beds, 1430 on site car parking spaces and generating up to 900 vehicle movements per hour in peak periods, will be a catalyst for change in Frenchs Forest culminating in a specialised health precinct. With the NBH, the road user experience would further diminish exacerbating delays, reducing average travel speeds and increasing unreliable travel times resulting in social, economic and environmental impacts. To mitigate the traffic and access impacts of the NBH, and to provide congestion relief in the locality, road upgrade works will be required.

The Concept Proposal will provide key infrastructure improvements to the road network by increasing capacity and reducing congestion, a key objective of the NSW Government's transport policies. Stage 1 is critical in providing access and connectivity with NBH and in supporting the activation of the NBH Precinct. As such, Stage 1 is critical in achieving the NSW Government's policies for strategic centres in the Northeast Subregion and in accommodating the traffic generated by the NBH.

The Concept Proposal and Stage 1 are also consistent with the strategies and policies within the *NSW Long Term Transport Master Plan*, *NSW 2021: A plan to make NSW number one (2011)*, *NSW State Infrastructure Strategy 2012-2032*, *State Significant Strategy Update 2014*, and *A Plan for Growing Sydney 2014*.

7.2. Conclusions

The Department considers the Concept Proposal and Stage 1 works will meet the project's objectives of improving peak period travel speeds, reliability and network performance whilst supporting development and activation of the NBH precinct. The proposal will also assist in the provision of road based public transport whilst improving safety within the network and minimising impacts to the environment. The Department is also satisfied that the design for Stage 1 will address related amenity impacts and provide a high quality urban and landscape design outcome and is confident similar outcomes can be delivered for the remainder of the Concept Proposal.

The benefits to the community as a result of the proposal will include increased average speeds and reduced congestion, efficient access to the NBH, and improved through-traffic performance along Warringah Road. In addition the proposal will improve pedestrian and cyclist connectivity and safety, provide an upgraded drainage system within Stage 1 to achieve a 10 year ARI. Noise attenuation treatment will also be available to over 200 residences experiencing acute noise exceedances and project related noise impacts in 2018. The potential environmental impacts associated with the construction and operation of the proposal would be acceptable subject to the implementation of appropriate mitigation measures. The proposal would comply with the objects of the EP&A Act and with the principles of ESD.

The Department concludes, on balance, that the proposal's benefits outweigh the potential residual impacts which can be managed and would not, subject to the recommended conditions, result in any long term adverse or irreversible effects. It is therefore in the public interest that the proposal proceeds.

7.3. Recommendations

The Department is satisfied that the proposal will improve the safety of the motorist, pedestrian and cyclist environment by easing traffic congestion in the local road network. The Department is also satisfied that access to the NBH has been adequately addressed and that the proposal will assist in mitigating traffic generated impacts resulting from the NBH. In addition, noise impacts can be effectively managed and surface water management in the locality will also improve.

It is recommended that the proposal be approved subject to the recommended conditions of approval. The key recommendations are:

- preparation and implementation of a rigorous construction environmental management plan and associated sub plans which will include key management procedures during construction;
- alternative parking arrangement for the Skyline Shops and The Forest High School are to be operational prior to removal of existing parking used by these stakeholders;
- the delivery of regional cycleways along Wakehurst Parkway and cyclist infrastructure across the proposal;
- Operation Traffic Performance Review, to include monitoring and review of measures such as on-street parking demand, bus priority measures, kiss-and-ride facilities, 'rat running' and pedestrian movements;
- consultation with The Forest High School Working Group to ensure impacts are adequately managed to minimise disruption and nuisance throughout construction;
- preparation and implementation of a Biodiversity Offset Package and an Ecological Monitoring Program;
- preparation and implementation of a Water Management Plan and Surface Water Quality Monitoring Program;
- achievement of a hydrologic standard of a 10 year ARI across Stage 1; and
- preparation and implementation of an Urban Design and Landscape Plan.

Karen Jones
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Daniel Keary
A/Executive Director
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29/6/15

Appendix A Accompanying Documents and Submissions

The following documents are available on the Department's website at http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6434:

- Environmental Impact Statement;
- submissions to the EIS;
- Proponent's Response to Submissions; and
- Proponent's Preferred Infrastructure Report.

Appendix B Recommended Conditions of Approval

See the Department's website at:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6434