CRITICAL STATE SIGNIFICANT INFRASTRUCTURE ASSESSMENT: The Northern Road Upgrade Project SSI 7127

Environmental Assessment Report under
Section 5.19 of the
Environmental Planning and Assessment Act 1979

May 2018

Cover Photograph: Example of upgraded intersection and u-turn bay for The Northern Road Upgrade

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Published May 2018
NSW Department of Planning & Environment
www.planning.nsw.gov.au

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ABBREVIATIONS

ADT	Average Daily Traffic
ARI	Average Recurrence Interval
AWT	Average Weekday Traffic
CEEC	Critical Endangered Ecological Community
CNVMP	Construction Noise and Vibration Management Plan
CSSI	Critical State Significant Infrastructure
DEOH	Defence Establishment Orchard Hills
Department	Department of Planning and Environment
DoEE	Commonwealth Department of the Environment and Energy
DPI (Water)	Department of Primary Industries – Water
EEC	Endangered Ecological Community
EIS	Environmental Impact Assessment
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
HCV	Heavy Commercial Vehicle
ICNG	Interim Construction Noise Guideline
INP	NSW Industrial Noise Policy
LGA	Local Government Area
LoS	Level of Service
Minister	Minister for Planning
NCA	Noise Catchment Areas
NML	Noise Management Level
NSW Health	NSW Ministry of Health
OEH	NSW Office of Environment and Heritage
PMF	Probable Maximum Flood
Proponent	Roads and Maritime Services
RMS	Roads and Maritime Services
RNP	NSW Road Noise Policy
SEARs	Secretary's Environmental Assessment Requirements
Secretary	Secretary of the Department of Planning and Environment
SPIR	Submissions and Preferred Infrastructure Report
TSC Act	Threatened Species Act 1995

EXECUTIVE SUMMARY

The Proposal

Roads and Maritime Services (the Proponent), proposes to upgrade 16 kilometres of The Northern Road, a north-south arterial road connecting Windsor, Penrith and Campbelltown, approximately 45 kilometres west of Sydney's central business district.

The Northern Road Upgrade project comprises:

- eight kilometres of new, realigned road between Mersey Road, Bringelly and Elizabeth Drive, Luddenham, including a bypass of Luddenham and the planned western Sydney airport; and
- eight kilometres of upgraded and widened road between Elizabeth Drive and about 100 metres south of Glenmore Parkway, Glenmore Park.

The Northern Road and its intersections will be upgraded to ultimately provide a six-lane divided road (containing two general traffic lanes and a dedicated kerbside bus lane in each), with an eight-lane section north of Bradley Street, Glenmore Park (three general traffic lanes and a kerbside bus lane in each direction). A central median will separate the carriageways and provide future capacity for additional lanes. A shared pedestrian and cycle path is also proposed on the western side of The Northern Road, with a new footpath on the eastern side.

The project is critical State significant infrastructure under Schedule 5, Clause 6 of the *State Environmental Planning Policy (State and Regional Development) 2011*. The Minister for Planning is the approval authority for the project.

The proposal is a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). As the proposal falls on Commonwealth land, the NSW Assessment Bilateral agreement does not apply and it will be assessed under the EPBC Act separately by the Commonwealth Department of the Environment and Energy.

Need and Justification

The Greater Sydney Commission's *Greater Sydney Region Plan – A Metropolis of Three Cities* (2018) envisages the emerging Western Sydney region and the Western Parkland City as part of the three cities vision for the Greater Sydney area, in conjunction with the developing Central River City and established Eastern Harbour City.

Key planned developments of the Western Parkland City include the western Sydney airport (scheduled to open in 2026) and Aerotropolis at Badgerys Creek, and the surrounding employment and residential growth areas. As a result, the region is predicted to experience significant growth over the next 40 years, with an estimated population increase of nearly one million people.

The Northern Road will play a major role in connecting traffic to and from these developments, and the projected growth will exceed The Northern Road's existing capacity, particularly at major intersections along the corridor. A section of the existing road passes through airport land, therefore a realignment of The Northern Road is needed.

The Northern Road Upgrade is part of the joint NSW and Commonwealth Government's $3.6 billion *Western Sydney Infrastructure Plan* to upgrade road infrastructure in western Sydney over the next 10 years.

Consultation

The Environmental Impact Statement for the project was publicly exhibited from 21 June to 2 August 2017. The Department received 38 submissions, including 9 submissions from public authorities and submissions from Penrith City Council, Liverpool City Council and

Campbelltown City Council, none of which object to the project. Of the 26 public and special interest group submissions, 16 did not state a position and 10 objected to the proposal.

The key issues raised in the submissions include construction noise and vibration, construction air quality and dust management, impacts on heritage, impacts on farm dams which supply water and provide habitat for turtles, traffic and landscaping.

The Proponent prepared a Submissions and Preferred Infrastructure Report (SPIR) which responds to the issues raised in the submissions and proposes design refinements to the project. The key changes to the project include staging and delivery and various design changes, including to some intersections.

Key Assessment Issues

Traffic and Transport
Approximately 22,000 vehicles currently use this part of The Northern Road each day, up to 19 percent of which are heavy vehicles. Dedicated cyclist and pedestrian infrastructure is limited to a 550 metre section in Luddenham and one bus route operates twice a day between Penrith and Luddenham during weekday peak hours.

The Department is satisfied that the project has been adequately designed to meet the future traffic and transport objectives for the region. Some of the road safety improvements include:

- an improved alignment and a divided carriageway to remove the need for opposing-lane overtaking and the associated risk of head-on crashes;
- upgraded intersections to reduce congestion and the likelihood of crashes;
- a bypass of Luddenham to remove through traffic, particularly heavy vehicles; and
- new heavy vehicle inspection areas.

Because of the dual carriageway design, access to and from The Northern Road will be restricted to left-in/left-out movements, with a new service road, U-turn bays and roundabouts to maintain access to properties along the road. The project will increase vehicle travel distances to residences by up to 4.9 kilometres, and vacant properties on the realigned section around the airport site by up to 8.8 kilometres. Notwithstanding, the Department is satisfied the impacts of additional travel distance are countered by the improved safety and reduced travel time along the corridor.

The project will be initially built to comprise two general traffic lanes in each direction with bus priority lanes at intersections. Once the demand for public transport increases with the growth of the region, the road will be widened to provide dedicated bus lanes. Pedestrian and cyclist accessibility will improve, with new shared paths and formal crossing facilities provided at all intersections. The Department is satisfied the staged approach is appropriate, given the low frequency of existing bus services.

Construction related traffic impacts include temporary road and lane closures, reduced speed limits and changed access arrangements to properties. While this has the potential to disrupt traffic flows, the Department's assessment concludes these impacts can be adequately managed through traffic controls, night-time works where road closures are required, and by maintaining access arrangements in consultation with the affected residents and businesses.

Noise and Vibration
The key noise and vibration issues for the project include those generated during construction activities and the changed noise conditions once the project is operational, with increased traffic volumes and the realigned sections around the western Sydney airport and Luddenham bypass.

Up to 1,349 receivers are potentially impacted by noise from the project, including three schools and four places of worship. Land uses along the project corridor are mostly semi-rural residential properties plus the suburban areas in Glenmore Park and Luddenham Village. Noise during standard daytime construction hours will exceed the relevant noise objectives at up to 201 receivers. Night time construction activities are predicted to cause sleep disturbance at up to 435 receivers.

The Department is satisfied with the proposed construction noise mitigation measures, which include:

- restricting works to standard construction hours as far as practicable, and if works outside standard construction hours are required, planning the noisier works to occur in the earlier part of the evening or night-time;
- scheduling activities outside times of heightened sensitivity (e.g. school hours); and
- use of physical barriers (such as acoustic fencing, enclosing work areas and use of existing structures) to screen noise intensive activities.

Once the project is operational, receivers near the upgraded road will experience increased traffic noise, with the greatest increase occurring at semi-rural receivers near the new bypass alignment. The Proponent applied its Noise Mitigation Guideline and the EPA's Road Noise Policy, which found that operational road noise will be high enough at 78 locations (75 residences and 3 classroom buildings at Luddenham Public School) to warrant at-property treatment measures to reduce internal noise levels.

The use of noise barriers was discounted by the Proponent because the affected properties are not close to eachother. Therefore the Proponent will provide at-property treatment for these receivers and the Department has recommended conditions requiring the implementation of these mitigation measures early during construction, to also reduce construction noise impacts.

<u>Biodiversity</u>
The project requires the clearing of approximately 40.78 hectares of vegetation, of which 30.87 hectares are Critically Endangered Ecological Communities (CEECs) listed under the *Threatened Species Conservation Act 1995*. These CEECs include the Grey-Box-Forest Gum grassy woodland and Derived Grasslands on Shale Hills of the Cumberland Plain. The project would also remove 6 *Pultenaea parviflora* shrubs and 31 *Marsdenia viriflora* plants.

The *NSW Biodiversity Offsets Policy for Major Projects* was used to calculate the number of ecosystem and species credits required to offset the residual impacts of the project, with the Proponent actively seeking like-for-like credits, where possible. The Biodiversity Offset Strategy will be finalised after the offset investigations have been completed. The final offset requirement will be determined following detailed design and confirmation of the project footprint. The Proponent is also working with the Office of Environment and Heritage with respect to additional offsets in the form of a supplementary measures package with a focus on landscape scale measures in the local area.

The Department is satisfied that biodiversity impacts will be effectively mitigated by the implementation of proposed management measures and residual impacts compensated through the proposed offsets.

<u>Land Use and Socio-Economic Impacts</u>
The project will require the acquisition of up to 186 hectares of privately-owned land, including the full acquisition of seven lots with direct impacts on 20 businesses (12 non-agricultural and eight agricultural). The ongoing operation of eight of these businesses will be affected due to loss of productive land, impact on farm infrastructure, severance of properties and changes in property access. Businesses in Luddenham may also be impacted by the loss of through traffic, and amenity impacts would also occur during construction.

Overall the Department is satisfied the Proponent has appropriately minimised the land use impacts of the project, and that the project itself will not result in significant land use change. The Department also considers the Proponent has appropriately addressed additional impacts through measures including property assessments, potential relocation and compensation if required, provision of way-finding signage and recommended construction management plans and strategies.

The Department is satisfied the project's social benefits outweigh the residual localised social impacts. The road network upgrades and the preparation of plans to re-vitalise the Luddenham town centre would provide significant benefits to the local and regional community and help support the growth and development of the region.

Other issues
The assessment concludes that relevant impacts of other issues such as flooding and drainage, Aboriginal heritage, Non-Aboriginal heritage, air quality, urban design and visual impact, climate change and greenhouse gas can be appropriately managed through the implementation of mitigation measures and safeguards, and conditions recommended by the Department.

Conclusions and Recommendations
The project forms part of a program to upgrade transport links between Narellan and Penrith and is a critical component to achieving the Government's transport policy and objectives for western Sydney.

The Northern Road upgrade will improve the operation of the road network and increase the capacity of the road to enable it to operate at an acceptable level of service into the future. The project is designed to cater for future traffic volumes associated with population growth in the region, western Sydney airport and the planned M12 motorway. Reduced travel times of up to 25 minutes between Mersey Road and Glenmore Parkway are expected, with intersections operating satisfactorily under the modelled future traffic scenarios.

Whilst some residual impacts are expected, the Department has recommended conditions that enhance the Proponents mitigation measures and provide improved community and amenity outcomes, including:

- the preparation of plans in consultation with Liverpool City Council to re-vitalise Luddenham town centre and implementation of a signage strategy to encourage patronage of local businesses;
- biodiversity offsets for impacts to threatened species and ecological communities, plus an increase in tree coverage and landscape character, with two trees to be planted for the removal of each tree not covered by the biodiversity offset strategy, in consultation with the relevant councils;
- protection of farm dams and water supply;
- the early implementation of operational noise mitigation measures to mitigate construction noise impacts; and
- maintaining access to private properties during construction as raised in community submissions.

On balance, the proposal's benefits outweigh its potential impacts and the Department is satisfied the residual impacts can be managed and would not result in long-term adverse effects, subject to the recommended conditions. The proposal would comply with the objects of the EP&A Act and with the principles of Ecologically Sustainable Development.

The Department's assessment concludes that project is in the public interest and recommends that the proposal proceeds.

1. BACKGROUND

The Northern Road is a north-south arterial road connecting Windsor, Penrith and Campbelltown, approximately 45 kilometres west of the Sydney central business district (see **Figure 1**). It is the primary north-south road west of the M7 Motorway for passenger, commercial and freight vehicles.

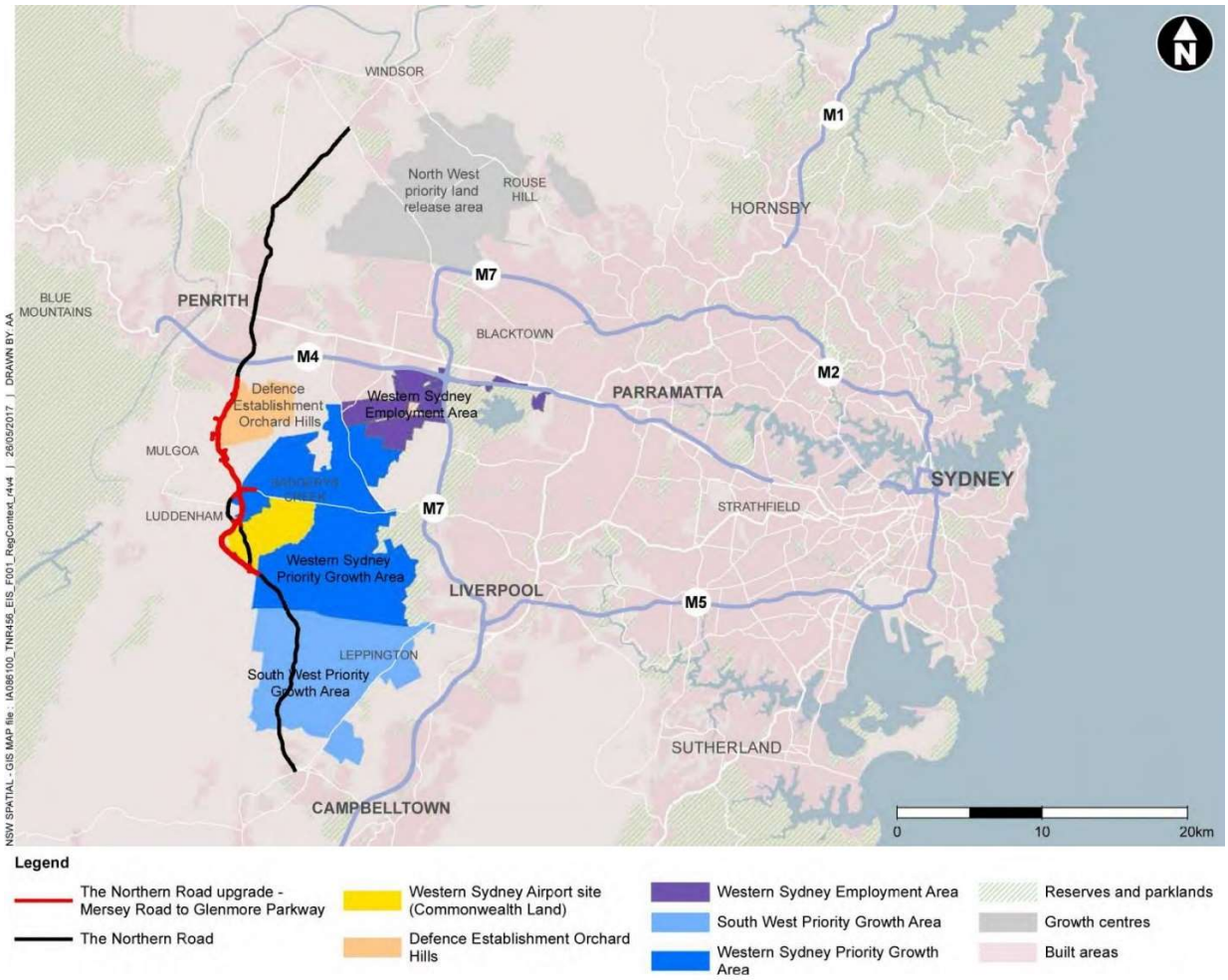

Figure 1: The Northern Road – regional context (Source: RMS, EIS)

The Greater Sydney Commission's *Greater Sydney Region Plan – A Metropolis of Three Cities* (2018) envisages the emerging Western Sydney region and the Western Parkland City as part of the three cities vision for the Greater Sydney area, in conjunction with the developing Central River City and established Eastern Harbour City.

Key planned developments of the Western Parkland City include the western Sydney airport (scheduled to open in 2026) and Aerotropolis at Badgerys Creek, and the surrounding growth areas. As a result, the region is predicted to experience significant growth over the next 40 years, with an estimated population increase of nearly one million people.

The Department is currently working with Liverpool City Council and Penrith City Council to prepare an interim Land Use and Infrastructure Implementation Plan for the region. This will guide new infrastructure investment, ensure new developments don't impact on the operation of the western Sydney Airport, identify locations for new homes and jobs close to transport, and coordinate services in the area. The Northern Road will play a major role in connecting traffic to and from these developments, and the projected growth will exceed The Northern Road's existing capacity, particularly at major intersections along the corridor.

The Roads and Maritime Services NSW (RMS) is currently planning and implementing a program of works to upgrade 34 kilometres of The Northern Road between Narellan and Penrith. These upgrades form part of the joint NSW and Commonwealth Government's $3.6 billion Western Sydney Infrastructure Plan to upgrade road infrastructure in western Sydney over the next 10 years.

As part of this program, RMS proposes to upgrade 16 kilometres of The Northern Road between Glenmore Parkway, Glenmore Park and Mersey Road, Bringelly. Most of this section is currently a two-lane road on a single carriageway.

Land uses near the project corridor include:
- large lot and low density residential areas at Glenmore Park, Luddenham and Bringelly;
- rural landscape areas and village at Luddenham;
- primary production areas generally west of The Northern Road at Luddenham, Greendale and Bringelly and small lot primary production around Luddenham and at Bringelly;
- Commonwealth Land including the Defence Establishment Orchard Hills (DEOH) and the site of the planned airport;
- water supply pipelines between Warragamba Dam and Prospect Reservoir;
- environmental conservation areas, surrounding the DEOH and along Cosgroves Creek north of Elizabeth Drive;
- the Mulgoa Nature Reserve west of The Northern Road; and
- public and private recreation areas at Glenmore Park and Luddenham.

2. PROPOSED PROJECT

2.1. Project Description

The Northern Road Upgrade Project involves upgrading 16 kilometres of The Northern Road between approximately 100 metres south of Glenmore Parkway, Glenmore Park and Mersey Road, Bringelly (see **Figure 2** and **Figure 3**).

The proposed upgrade is generally comprised of two sections, and traverses the local government areas of Liverpool in the south and Penrith in the north. The section south of Elizabeth Drive will comprise a new road alignment to bypass the planned western Sydney airport and Luddenham. The section north of Elizabeth Drive will involve widening and upgrading the existing road.

The project comprises:
- about eight kilometres of new road between Mersey Road, Bringelly and just south of Elizabeth Drive, Luddenham. This new section of road will bypass Luddenham and replace the existing section of The Northern Road that crosses the planned western Sydney airport site; and
- about eight kilometres of upgraded and widened road between the existing Elizabeth Drive, Luddenham and about 100 metres south of Glenmore Parkway, Glenmore Park.

The width of the new and upgraded road would generally consist of a six-lane divided road (containing two general traffic lanes and a kerbside bus lane in each) and shared cyclist/pedestrian paths, with an eight-lane section north of Bradley Street, Glenmore Park (three general traffic lanes and a kerbside bus lane in each direction).

The initial configuration of the project will comprise two general traffic lanes with bus priority lanes at intersections. Once the demand for public transport increases to warrant more frequent services, dedicated bus lanes will be established.

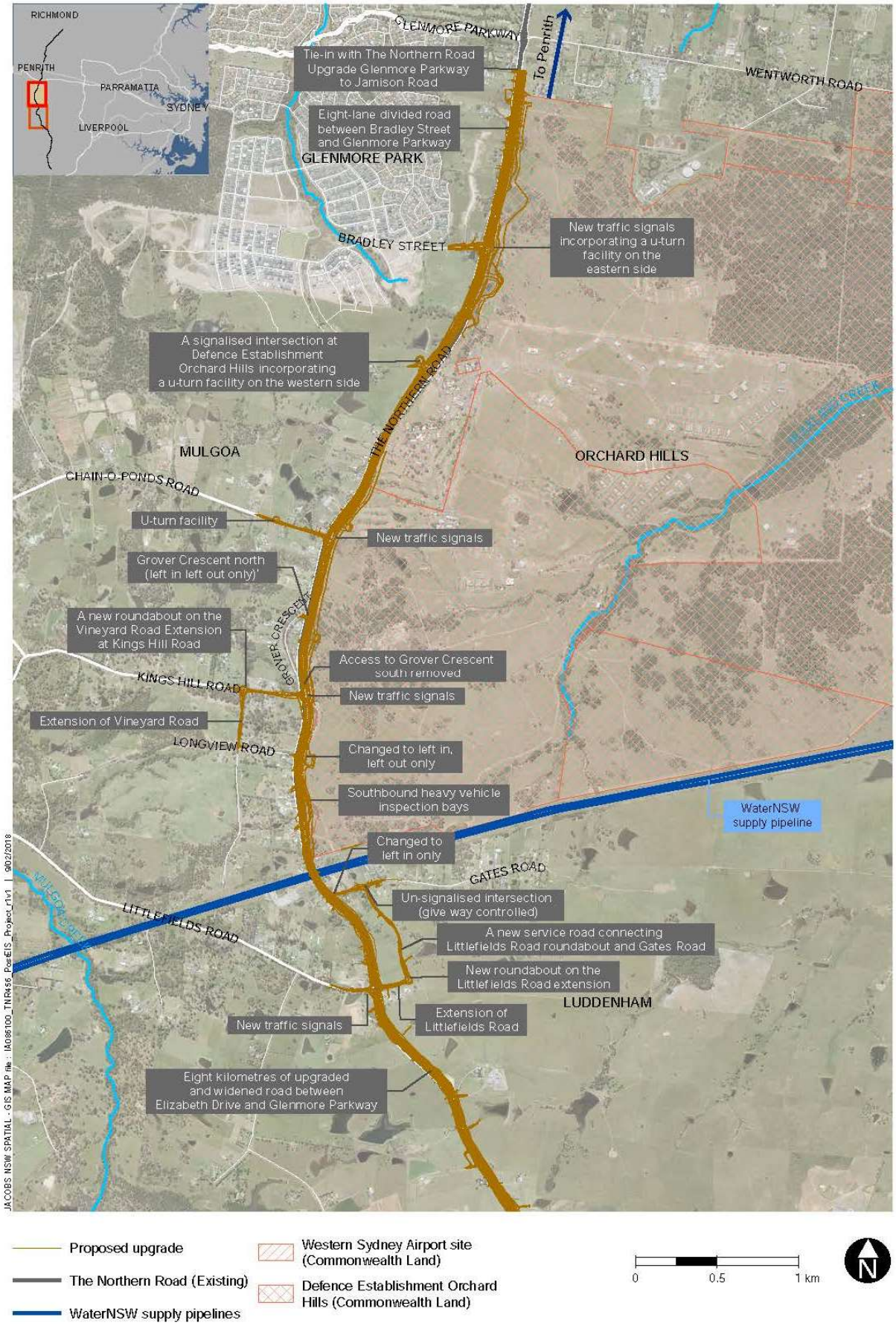

Figure 2: Project overview – northern section (Source: SPIR)

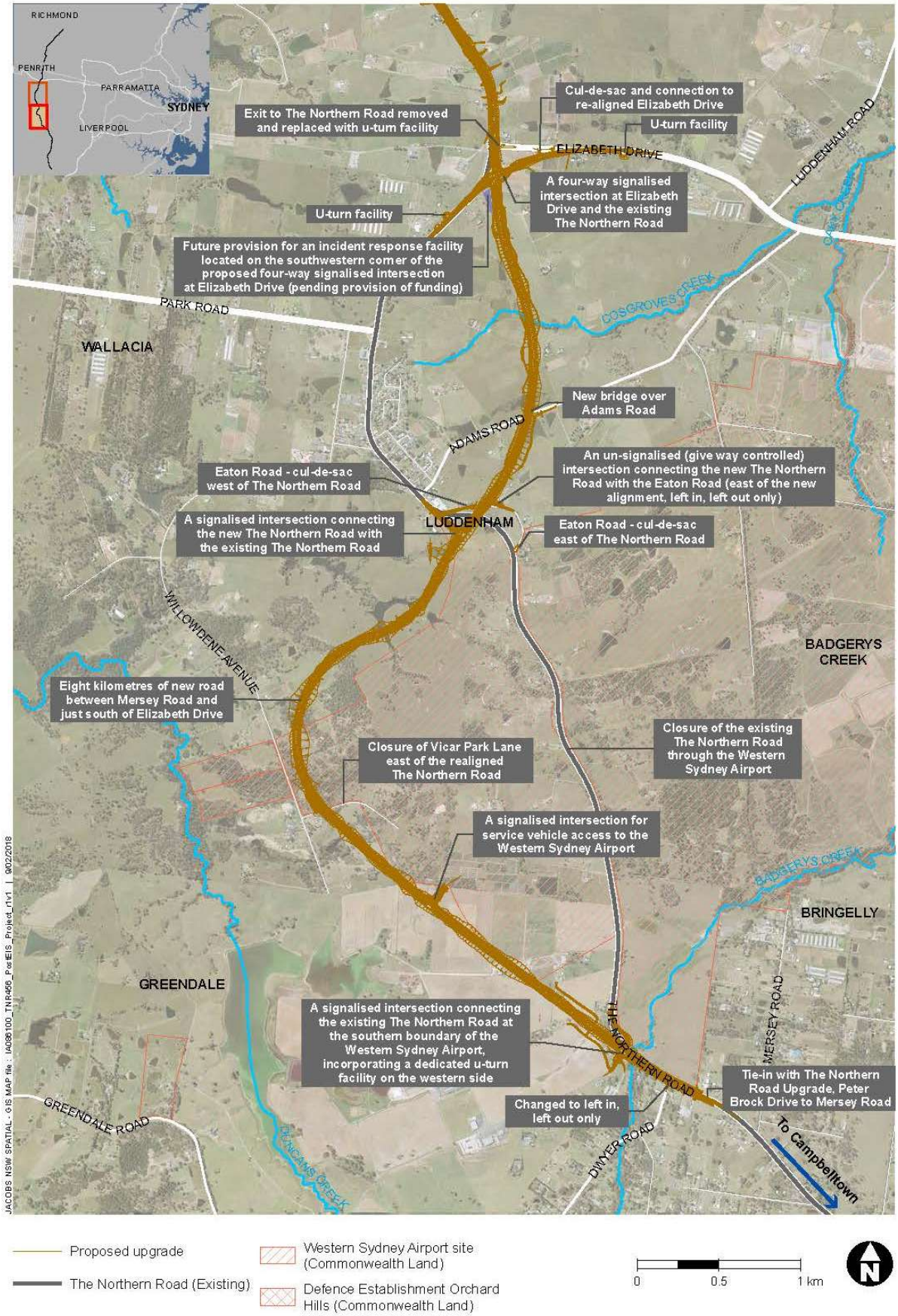

Figure 3: Project overview - southern section (Source: SPIR)

Six new intersections and 3 dedicated U-turn facilities will also be provided, as well as local road changes and upgrades, new shared pedestrian/cycle path and incident response facility (see **Table 1** for a breakdown of the key components and operational features of the project).

Table 1: Key project components – The Northern Road Upgrade

Aspect	***Description***
Key elements	• A six-lane divided carriageway between Mersey Road, Bringelly and Bradley Street, Glenmore Park (two general traffic lanes and a kerbside bus lane in each). A wide central median would allow for an additional future lane in each direction (on top of what is proposed), if required • An eight-lane divided road between Bradley Street, Glenmore Park and about 100 m south of Glenmore Parkway, Glenmore Park (three general traffic lanes and a kerbside bus lane in each direction separated by a median) • Closure of the existing section of The Northern Road through the planned western Sydney airport site • A new shared cyclist/pedestrian path on the western side and pedestrian paths on the eastern side of The Northern Road
New Intersections	Six new intersections: • Traffic lights at the southern boundary of the planned western Sydney airport, incorporating a dedicated U-turn facility on the western side • Traffic lights for service vehicle access to the airport, including 160 m of new road to the planned airport boundary • Traffic lights connecting the realigned The Northern Road with the existing The Northern Road south of Luddenham • A give way controlled intersection with Eaton Road (east of the new alignment, left in, left out only) • Traffic lights at a realigned Elizabeth Drive • Traffic lights at the Defence Establishment Orchard Hills entrance, incorporating a U-turn facility
New traffic lights	New traffic light signals at four existing intersections: • Littlefields Road, Luddenham • Kings Hill Road, Mulgoa • Chain-O-Ponds Road, Mulgoa • Bradley Street, Glenmore Park incorporating a U-turn facility
Modified intersections	Modified intersection arrangements at six locations: • Dwyer Road, Bringelly (left in, left out only) • Existing Elizabeth Drive, Luddenham (access removed) • Gates Road, Luddenham (left in only) • Longview Road, Luddenham (left in, left out only) • Grover Crescent south, Mulgoa (access removed) • Grover Crescent north, Mulgoa (left in, left out only)
U-turn facilities	Dedicated U-turn facilities at: • The existing The Northern Road at Luddenham, southwest of Elizabeth Drive • The existing Elizabeth Drive, Luddenham around 800m east of The Northern Road • Chain-O-Ponds Road, Mulgoa
Local road changes	Local road changes and upgrades, including: *Luddenham* • Closure of Vicar Park Lane, east of the realigned The Northern Road • Eaton Road cul-de-sac, west of the realigned The Northern Road • Eaton Road cul-de-sac, east of the realigned The Northern Road • Elizabeth Drive cul-de-sac, about 300 m east of The Northern Road with a connection to the realigned Elizabeth Drive • A new service road between the Littlefields Road roundabout and Gates Road, including a 'give way' controlled intersection at Gates Road

Aspect	***Description***
	Mulgoa • Extension of Littlefields Road, east of The Northern Road • A new roundabout on the Littlefields Road extension • Extension of Vineyard Road between Longview Road and Kings Hill Road • A new roundabout on the Vineyard Road extension at Kings Hill Road
Ancillary facilities	Operational ancillary facilities including: • Heavy vehicle inspection bays for southbound traffic, adjacent to Longview Road • An incident response facility at the south-western corner of the proposed four-way traffic light intersection at Elizabeth Drive – to open when the planned airport and M12 Motorway are operational
Additional	• Twin bridges over Adams Road, Luddenham • Drainage infrastructure upgrades • New traffic management facilities including Variable Message Signs (VMS) • Roadside furniture and street lighting • Utility services relocations • Changes to property access along The Northern Road (generally left in, left out only) • Property adjustments as required

2.2. Construction

Construction of The Northern Road Upgrade project, if approved, is expected to take approximately five years and require approximately 186 hectares of land. The likely staging of the project is detailed in **Figure 4**, with complexities associated with utility relocations between Littlefields Road and Glenmore Parkway resulting in an extended construction period of approximately two years (above what was detailed in the exhibited EIS).

* incident response facility to be delivered in mid 2020s

Figure 4: Indicative construction timeline (Source: SPIR)

The key construction works are summarised in **Table 2**. Most construction activities will occur between 7 am and 6 pm weekdays and 8 am to 1 pm on Saturdays. However, some works would need to be undertaken outside of these hours for safety and operational reasons.

Table 2: Construction works overview

Component	**Activities**
Early works	• Notifying residents of construction work and leasing or acquisition of land • Relocating fencing and surveys for unexploded ordinance on DEOH land • Cadastral surveys of the construction footprint • Geotechnical and other soil investigations

Component	Activities
	• Pre-clearing surveys, marking out no-go zones and identifying fauna habitat trees prior to vegetation clearing • Installation of construction signage and advisory signs • Dilapidation and building condition surveys • Adjustment, relocation and protection of public utilities and services • Establishment of temporary drainage and environmental controls
Site establishment	• Establishment of temporary ancillary facilities • Establishment of construction site fencing, signage and lighting • Establishment of construction site access points, traffic management measures, alternate public access routes and diversions • Demolition of redundant structures on acquired/leased land • Relocation and/or removal of farm infrastructure (including farm dams) as required and in consultation with affected land owners • Establishment and use of temporary ancillary facilities and access tracks during construction
Road construction	• Vegetation clearing • Removal and stockpiling of topsoil • Construction of temporary haul roads • Minor demolition of kerbs, other road elements and other structures • Earthworks including cut and fill, construction of retaining walls, removal of geotechnically unstable material and compaction of foundation material • Modification or installation of drainage infrastructure and other services • Placing, compacting and finishing of either concrete or gravel road surface subbase layers (to match existing adjacent road surface profile) • Placing, compacting and finishing of asphalt road surface base layers • Asphalting works would involve either full pavement reconstruction or the milling and re-sheeting of asphalt overlay and full depth asphalt paving of the additional lanes • Finishing works such as line marking, kerb and gutter construction, installation of safety barriers, installation of street lighting, sign posting and landscaping • Decommissioning and rehabilitation of temporary ancillary facilities and all temporary works
Adams Road bridge	A new bridge to be constructed across Adams Road which would include piling, construction of bridge abutments and installation of precast concrete planks/girders and barriers

Up to 21 construction compounds would need to be established along the project corridor (see **Figure 5** and **Figure 6**).

The compounds would be generally used for site offices, stockpiling of construction materials and a pug mill (at compound C5 or C8) for mixing and working clay to produce road construction materials. The compounds will comprise the following infrastructure:

- temporary buildings (generally prefabricated) including offices and meeting rooms, amenity, first aid and toilet facilities;
- hardstand parking areas with capacity for all construction workers expected at the site;
- materials laydown and storage areas, including purpose-built temporary structures as required; and
- perimeter fencing, including visual screening of construction compounds where necessary.

Some of the sites would only be used for stockpile and materials storage and would therefore contain minimal facilities. Three construction compounds are to be used as primary site compounds (C8, C12 & C16) to reflect the anticipated construction schedule (see **Figure 4**), comprising offices, amenities and parking, with four sites identified as secondary compounds with the remainder to serve as stockpile sites.

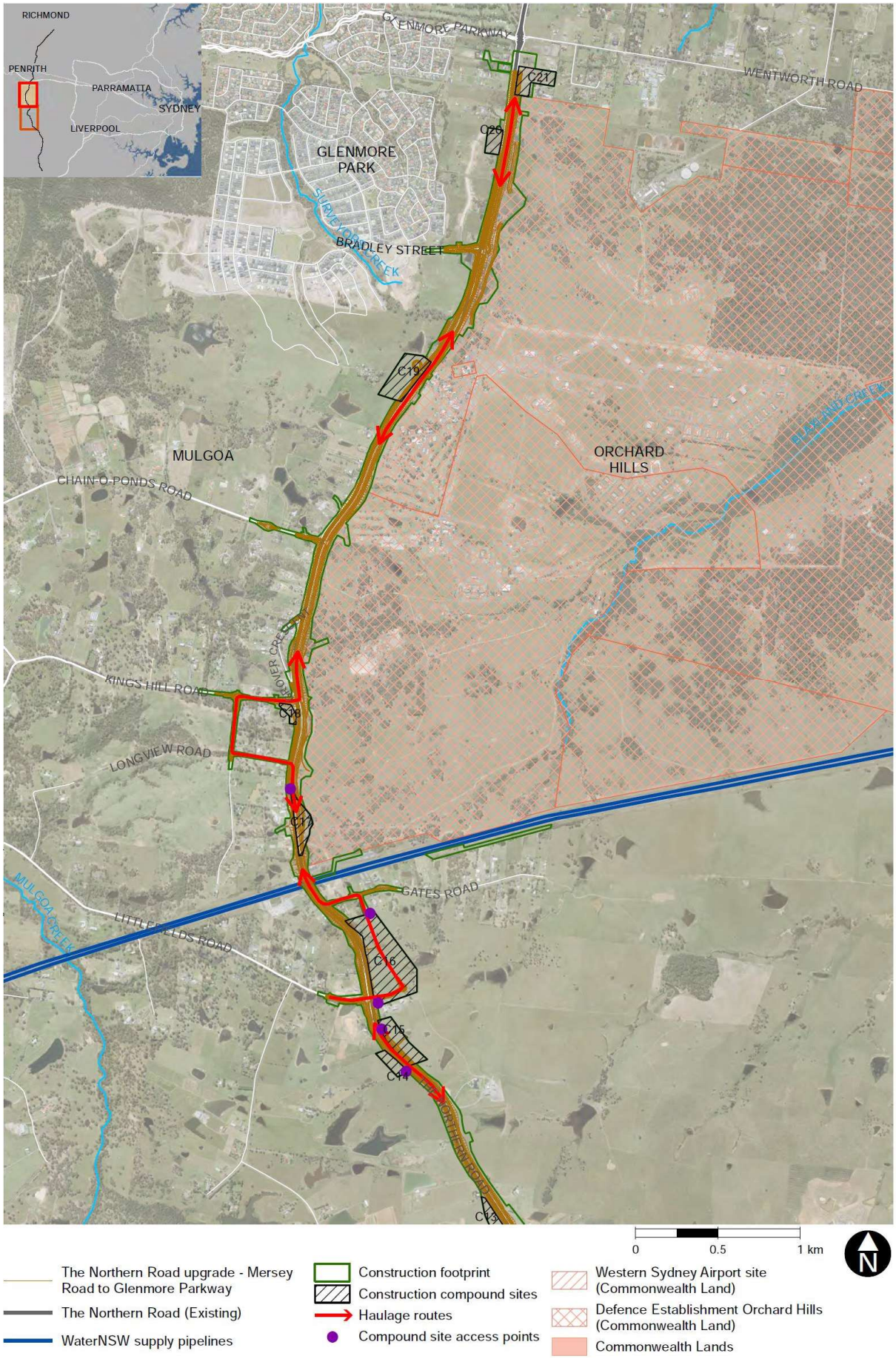

Figure 5: Location of construction compound sites – northern section (Source: RMS, EIS)

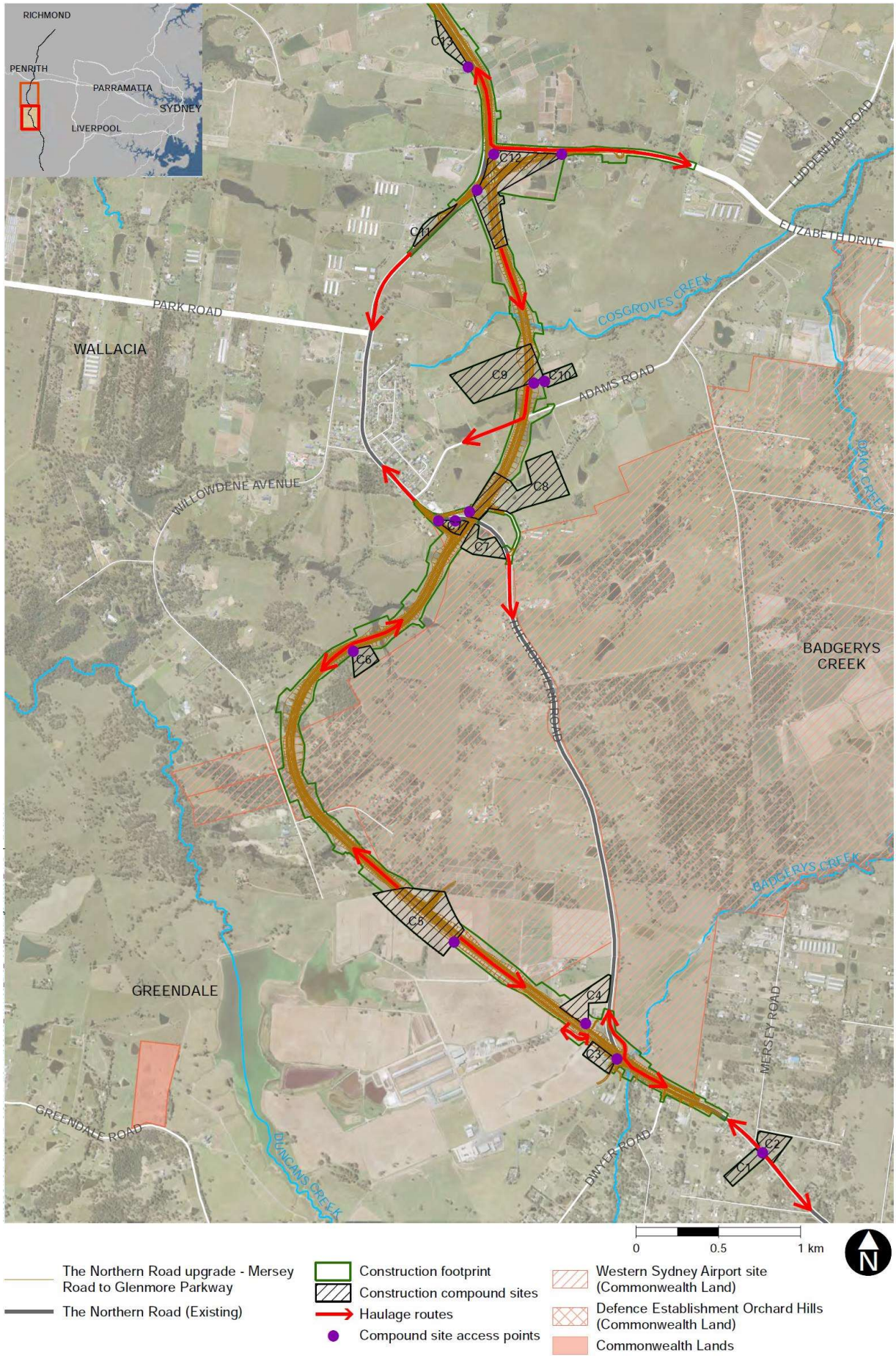

Figure 6: Location of construction compound sites – southern section (Source: RMS, EIS)

2.3. Project Need and Justification

Sydney's road and motorway network supports economic growth across NSW by connecting people to jobs, facilitating trade between businesses and providing the required infrastructure for efficient freight movements. Efficient transport systems will become increasingly important in facilitating future population and economic growth.

District plans for the Sydney region have been developed by the Greater Sydney Commission with the goal of creating well-coordinated, integrated and effective planning for land use, transport and infrastructure. This includes the Western City District Plan, which encompasses The Northern Road.

The Northern Road Upgrade is part of the joint NSW and Commonwealth Government's $3.6 billion *Western Sydney Infrastructure Plan* to upgrade road infrastructure in western Sydney over the next 10 years (see **Figure 7**).

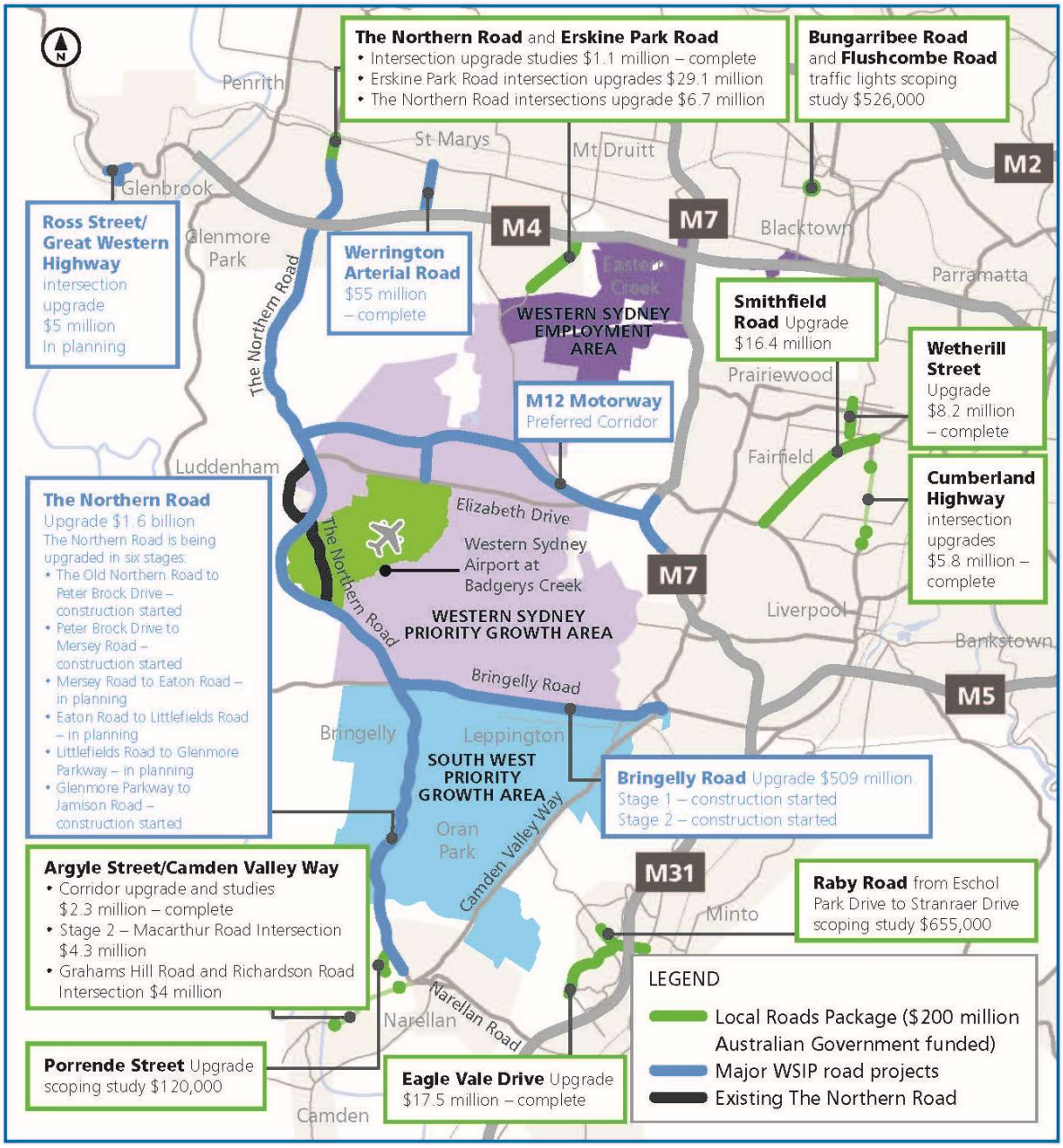

Figure 7: Western Sydney Infrastructure Plan (Source: www.rms.nsw.gov.au)

The project is part of a program to upgrade 34 kilometres of The Northern Road between Narellan and Penrith, linking priority growth areas in Sydney's west with the western Sydney airport and the M4 Western Motorway and the M5 Motorway. The project is forecast to cut travel times by up to 25 minutes compared to the 2015 base case for The Northern Road, improve the reliability of bus operations and reduce the frequency of road crashes.

The Western Sydney Infrastructure Plan features in *The State Infrastructure Strategy 2018-2038* (February 2018) and *Future Transport Strategy 2056* (March 2018), which both support the *Greater Sydney Region Plan*. These strategies recognise the importance of the Western Parkland City in catering for future population growth in the Sydney region. and identifies several infrastructure projects to cater for this growth, including The Northern Road Upgrade.

2.4. Project Development and Alternatives

The Proponent considered two general options when developing the preferred design for the project:

- 'do minimum' – a realignment around the airport site with no upgrades to the road and intersections on other existing sections; and
- variations on a realignment around the airport site and widening of the existing road corridor.

The 'do minimum' option was discounted as it does not satisfy the key requirements of the WSIP nor would it deliver the project benefits outlined in section 2.3. Therefore the options development process focussed on possible iterations of the upgraded route and realignment.

The RMS undertook an options analysis process over 12 months to identify its preferred route, which focussed on the new section of road around the airport site and a bypass of Luddenham to reduce land acquisition impacts and improve the amenity and safety for businesses and residents in the village. The section north of Littlefields Road did not require detailed route options analysis as the existing road corridor facilitated the proposed upgrades, and considered expansion either to the east or to the west.

The options considered for the section south of Littlefields Road comprise various routes west of Luddenham, along the existing corridor and to the east of Luddenham, with all routes around the airport site to the west, except for a tunnel under the airport site (see **Figure 8**). The options were assessed against criteria established from the WSIP and project objectives, with progressive workshops held with community stakeholders as the options narrowed.

The preferred route (Route Option 9B connecting with Route Option 1) generally ranked higher in all criteria, with less impacts on endangered ecological communities (EECs), and it was the preferred option for most community stakeholders. Whilst the do-minimum option would result in fewer impacts to EECs, it was discounted as The Northern Road corridor would not accommodate the forecast traffic growth.

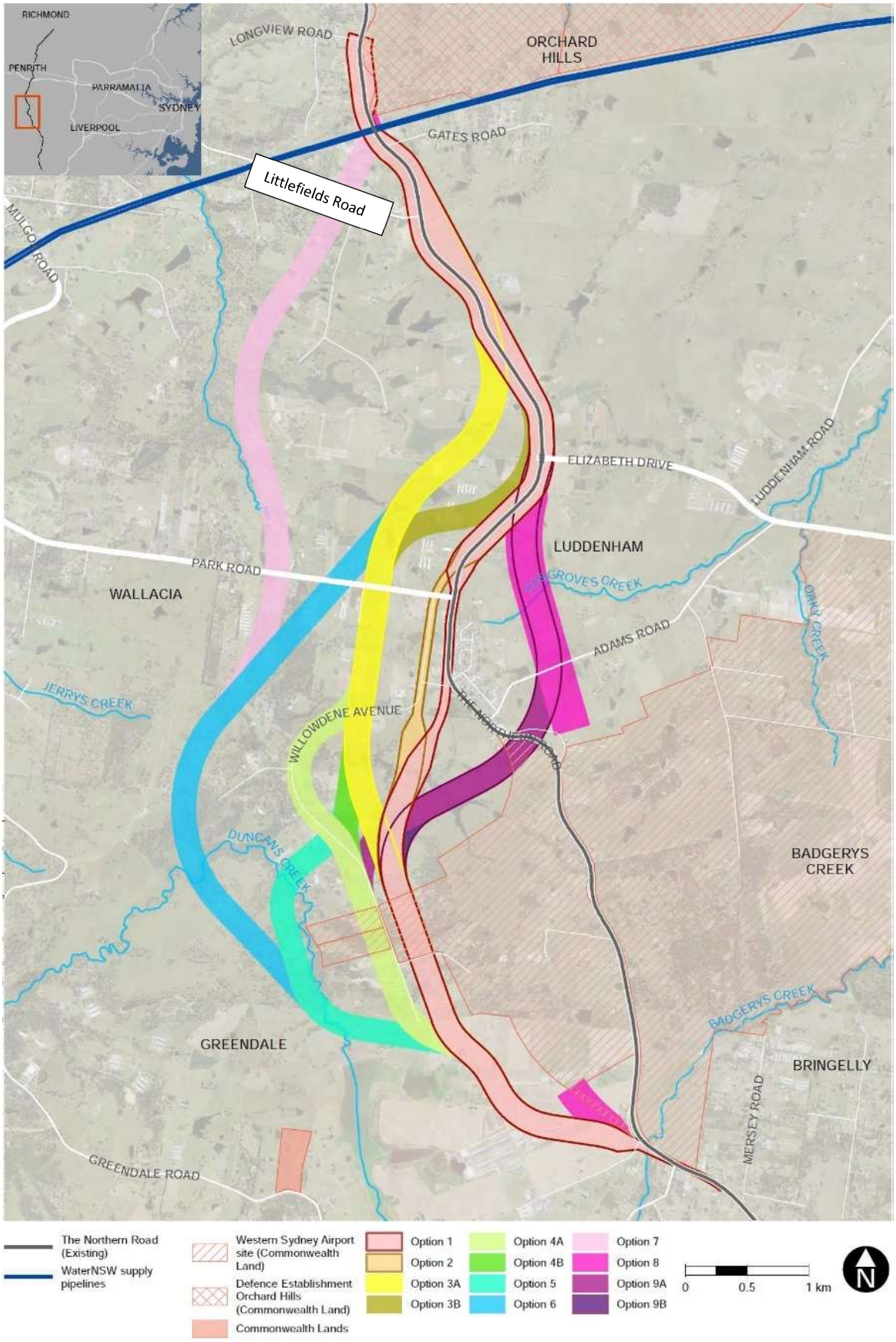

Figure 8: Route options to bypass Luddenham and western Sydney airport site (Source: RMS, EIS)

3. STATUTORY CONTEXT

3.1. State Significant Infrastructure

The project is Critical State significant infrastructure (CSSI) pursuant to section 5.13 of the Environmental Planning and Assessment Act, 1979 (EP&A Act). The Minister for Planning is the approval authority for the project.

3.2. Permissibility

The proposal is development permitted without consent in accordance with clause 94 of *State Environmental Planning Policy (Infrastructure) 2007.*

3.3. Environmental Planning Instruments

In accordance with Section 5.22(2) of the EP&A Act, the only environmental planning instruments that apply to the proposal are *State Environmental Planning Policy (Infrastructure) 2007*, as it relates to the declaration of development that does not require consent, and *State Environmental Planning Policy (State and Regional Development) 2011* (as it relates to the declaration of infrastructure as SSI and CSSI). There are no other environmental planning instruments that substantially govern the carrying out of the project.

3.4. Objects of the Environmental Planning and Assessment Act 1979

The determination must have regard to the objects of the EP&A Act, as set out in Section 1.3 of the Act. The Department has given consideration to the objects of the EP&A Act including:

- how the proposal would promote the social and economic welfare of the community and a better environment, with reference to the management of air quality, noise and vibration, soils and water (refer to Chapter 5);
- the strategic justification of the proposal in terms of the orderly and economic use and development of land (refer to Section 5), and how the proposal would affect traffic and access throughout the region and beyond (refer to Section 5);
- protection of the environment by assessing the effectiveness of proposed management and mitigation measures, including the impacts on biodiversity (refer to Section 5.3);
- to facilitate ecologically sustainable development (refer to Section 3.6); and
- community involvement and participation in the assessment of the proposal.

3.5. Environment Protection and Biodiversity Conservation Act 1999

On 21 July 2016, the Commonwealth Department of the Environment and Energy (DoEE) determined the proposal to be a ‘controlled action’ under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as it was considered likely that the proposal could have a significant impact on listed threatened species and communities and it will impact Commonwealth Land.

Because the project affects Commonwealth land, the NSW Assessment Bilateral Agreement (February 2015*)* does not apply to the project and it is being assessed concurrently under the EPBC Act separately by the DoEE.

Ongoing discussions have occurred between the Department and DoEE during the assessment of the project.

3.6. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991.* Section 6(2) of that Act states that ecologically sustainable development requires the effective integration of economic and environmental considerations in decision making processes, and that ESD can 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.

Project objectives which guide the delivery and operation of the proposal would contribute to the sustainability of the project and the meeting of ESD principles. In addition to the objectives, the Proponent 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.

The Department has also recommended conditions of approval requiring:

- that the project achieves an excellent level of performance for the CSSI using market leading sustainability rating tools, such as ISCA or other justified rating mechanism; and
- the preparation of a Sustainability Strategy that will be implemented throughout the detailed design, construction and operation of the project.

The precautionary principle is applied throughout the EIS and the Department considers the assessment and the range of mitigation measures adequately adopt the principle. The Department is also satisfied that the valuation and pricing of the environmental resources associated with the project have been adequately undertaken and internalised through the project design and mitigation measures.

4. CONSULTATION AND SUBMISSIONS

4.1 Department Consultation

The Department consulted regularly with the Proponent and the DoEE during the assessment of the project at fortnightly project meetings. During the exhibition period, the Department attended a community information session hosted by the Proponent.

4.2 Exhibition

The Department exhibited the EIS from Wednesday 21 June 2017 until Wednesday 2 August 2017 (a total of 42 days), meeting the minimum 30 day requirements of the EP&A Act. The EIS was available online on the Department's website and at NSW Service Centres. It was also available in hard copy format at the:

- Nature Conservation Council: Level 14, 338 Pitt Street, Sydney;
- Penrith City Library: 601 High Street, Sydney;
- Narellan Library: Corner of Queen and Elyard Streets, Narellan;
- Liverpool Library: 170 George Street, Liverpool; and
- Camden Council: 70 Central Avenue, Oran Park.

The Department advertised the public exhibition in The Australian, The Sydney Morning Herald, The Daily Telegraph, Liverpool Leader and Penrith Press. The Department also directly notified State and relevant local government authorities.

The Department received 38 submissions during the exhibition period, including 9 submissions from public authorities, submissions from Campbelltown, Liverpool and Penrith councils and 26 submissions from the general public and special interest groups. A summary of the key issues raised in the submissions follows. A copy of all submissions can be found at **Appendix B**.

To streamline the environmental assessment requirements under Division 5.2 of the EP&A Act and Part 8 of the EPBC Act, a single EIS was prepared that addresses both the SEARs and the Commonwealth EIS Guidelines. The Draft EIS was therefore also exhibited under section 103(a)(c) of the EPBC Act.

4.3 Submissions from the Public and Special Interest Groups

Of the 26 public and interest group submissions, 16 did not state a position, and ten objected to the proposal on various grounds as described below. Key issues raised in the submissions are further addressed in Section 5 of this report.

<u>Biodiversity</u>
- dewatering of dams will remove habitat for Eastern Long Neck turtles
- the need for pre-clearing surveys to ensure no animals are still inhabiting the land
- connectivity impacts especially for migrating animals including Eastern Grey Kangaroos and Flame and Rose Robin
- two remnant trees at Orchard Hills haven't been adequately addressed and should be retained
- light spill should be reduced as much as possible to minimise impact on animals and retaining rural character
- using local native flora species in the landscaping phase of the upgrade
- preservation of the Cumberland Plain Woodland and its natural features and character
- concerns regarding location of biobanking offsets and the offset process

<u>Property Impacts</u>
- justification as to why Government land wasn't utilised over individual properties to avoid property acquisition
- privacy and security as the Northern Road project will dissect properties
- emphasis is placed on economic impacts to businesses and not residential properties
- access to local properties

<u>Noise</u>
- the need for acoustic assessments of affected residents along the Northern Road corridor, to determine the appropriate mitigation measures

<u>Traffic</u>
- location of intersections and increased congestion on local roads
- use of Willowdene Avenue as an access and haulage route
- the existing route through Luddenham will become a rat run if there is congestion or other issues on the new section of road
- lighting should be utilised on roadways to deter crime
- road capacity isn't appropriate considering the long-term growth surrounding the airport and associated development

<u>Heritage</u>
- Significance assessment needs more clarification, the non-Aboriginal heritage technical paper contains factual errors

4.4 State and Local Government Agency Submissions

No public authority objected to the project, however each raised issues for consideration. A summary of the issues raised in submissions is provided below.

The **Environment Protection Authority's (EPA**) submission addressed issues in relation to background noise monitoring, and recommended conditions for construction noise and vibration; air quality, specifically in relation to dust and emissions from diesel equipment; and erosion and sediment control measures.

The **Office of Environment and Heritage (OEH)** raised concerns with the lack of mitigation measures for heritage items and sought further information to support the assessment of the two archaeological sites impacted by the projects, noting that the assessment must be consistent with the current regulations and guidelines.

The OEH also commented on the biodiversity assessment including the challenge with locating credits for critically endangered species (Regent Honeyeater) and whether impacts on land owned by DEOH are included in the Biodiversity Offset Strategy.

The **NSW Rural Fire Service** commented on the need to ensure public road access and landscaping complies with the principles of *Planning for Bush Fire Protection 2006*.

Water NSW commented on stormwater and the potential impact from runoff onto adjacent land. They also raised concern with potential vibration impacts on the concrete-lined water supply pipeline in the corridor. Access and security, utilities and services, property acquisition and incident notification were also mentioned in its submission.

The **Civil Aviation Safety Authority** raised no concerns with the project.

Division of Resources and Geoscience with the Department of Planning and Environment raised no concerns as the proposal is unlikely to restrict exploration activities near the Northern Road Upgrade.

The **Department of Primary Industries** provided comments and recommended conditions in regards to water resources and aquatic habitat, specifically relating to riparian corridors and waterway realignment. They also raised an issue with crossings along the alignment, they should provide opportunities for increased flow and terrestrial crossings. Several environmental management measures were also included to address the above matters.

Sydney Water notes major trunk and reticulation assets exist in the project area, the requirement for Sydney Water to be consulted, requirements for asset adjustments, deviation and protection and need for access to be retained.

Liverpool City Council supports the project and the wider delivery of infrastructure surrounding the western Sydney airport however suggested the traffic modelling should be updated to 2051 to cater for long term growth and to proactively set land aside if further upgrades are required. It also raised comments regarding construction traffic management and signage to encourage visitors to access Luddenham Town.

Liverpool City Council also requested additional flood modelling to include the 20-year Average Recurrence Interval and a flood impact assessment to be undertaken for all design events. Council also requests flood maps for all design events including the 1% AEP and the Probable Maximum Flood (PMF).

Liverpool City Council commented on the heritage assessment and recommended further investigations to address NSW Heritage Division Guidelines.

Campbelltown City Council supports the proposed upgrades and encourages the proposal to be completed in a timely manner and environmentally sensitive manner.

Penrith City Council commented on the lack of strategic considerations in regards to future land use and traffic/transport planning. Penrith City Council is concerned appropriate landscaping won't be undertaken and native vegetation should be utilised. It also highlighted the need to minimise impacts from land contamination, noise and air quality. There is also concern over biodiversity and the loss of habitat and vegetation including the availability of biodiversity credits. Council recommended the installation of signage to encourage visits to Luddenham businesses.

Traffic management considerations were also raised and Council sought more information on the M12 connection to the Northern Road and bus shelter infrastructure. Council also recommended that the shared pedestrian and cycle path be continuous and attractive to users.

4.5 Response to Submissions and Preferred Infrastructure Report

After the formal exhibition period, the Department directed the Proponent to prepare a response to the submissions received. The Proponent's consideration of the submissions led to changes to the project which are described in a Submissions and Preferred Infrastructure Report (SPIR), refer **Appendix C**.

The changes to the project design include:

- changes to the staging and delivery of the project including:
  - conversion of bus lanes from continuous along the main alignment to priority lanes at intersections only at opening with provision for continuous lanes in the future;
  - staging of the incident response facility; and
  - staging of the section between Littlefields Road and Glenmore Parkway;
- changes in cuttings, embankments and medians such as changes to batter slopes, providing a section of split carriageway between Gates Road and Longview Road, refinements in median widths;
- Utilities and services changes including relocation of Endeavour Energy substation from private property to in the road corridor;
- Design criteria (geometry and alignment) changes, including:
  - reconfiguration of a cul-de-sac at Elizabeth Drive and replacement of a second lane opening at the u-turn facility on Elizabeth Drive with a give-way entry; and
  - changes to access arrangements at Grover Crescent;
- Intersection changes, including:
  - reconfiguration of Littlefields Road including replacement of roundabout with a u-turn facility; and
  - u-turn stub added to the roundabout opposite DEOH entrance;
- Removal of northbound heavy vehicle inspection bay;
- Removal of variable message signs at the approach to Elizabeth Drive and heavy vehicle inspection bays and change in staging of incident response facility;
- Refinements to drainage and water quality infrastructure; and
- Property adjustments including new access at various locations.

The SPIR includes updated assessments for traffic and transport, noise and vibration, biodiversity, water quality, hydrology and flooding, and Aboriginal and non-Aboriginal heritage. The Department sought the advice of government agencies and councils on the SPIR with the responses summarised below.

The **Department of Primary Industries** and **OEH Heritage** provided recommended conditions of approval and the **EPA** advised it had no further comments.

Water NSW notes its issues have been acknowledged and largely addressed and asked that it be consulted on issues relating to the project adjacent to the Warragamba Pipeline Corridor.

Penrith City Council commented on future land uses and assumptions, socio-economic considerations, urban design, biodiversity and environmental management.

Liverpool City Council commented on the traffic assessment, particularly future grade separation of the intersection of The Northern Road and M12, provision of heavy vehicle facilities and bus shelters. Council also requests funding be provided for signage to minimise the economic impacts on Luddenham town centre, and for it to be consulted during the development of a landscaping plan and recommended other general mitigation measures.

5. ASSESSMENT

5.1. Traffic and Transport

Issue
The traffic and transport performance of the project was evaluated against its key objectives, which are to connect to the western Sydney airport at Badgerys Creek, support major land use changes and urban growth, and integrate with the broader transport network.

The EIS includes a traffic and transport impact assessment which considers the impacts on traffic flows during construction, changes to access arrangements for local roads and properties, impacts on the public transport network and changes in pedestrian and cyclist routes.

Traffic surveys between November 2014 and July 2015 show existing traffic volumes range from as low as 290 vehicles per day (on Chain-O-Ponds Road) up to 21,982 vehicles per day (on The Northern Road between Glenmore Parkway and Bradley Street). The predominant mode of transport is by car, with only two per cent of trips made by public transport (via the Route 789 bus operating twice a day between Penrith and Luddenham during weekday peak hours). The Northern Road also forms a significant north-south freight function, with up to 19 percent of daily traffic attributable to heavy vehicle movements.

Limited dedicated cyclist and pedestrian infrastructure is currently available in the study area, with no formal continuous footpaths along The Northern Road (except for approximately 550 metres in Luddenham between Roots Ave and the Caltex service station).

<u>Construction traffic</u>
Construction of the project is expected to take approximately five years, with construction vehicles mostly using The Northern Road, with a small proportion travelling along Elizabeth Drive and light construction vehicles on Willowdene Avenue (needing to access The Northern Road construction corridor for the period where that section is under construction).

Construction of the section between Glenmore Park and Elizabeth Drive and a small section near Dwyer Road will involve widening and upgrading the existing alignment, and will therefore require road or lane closures. Reduced speed limits and active traffic control are proposed to manage these impacts, and will be further developed during the preparation of a Construction Traffic Management Plan for the project.

Peak construction traffic movements would be up to 230 light vehicle movements per day, equating to a 2.2 per cent increase in traffic on The Northern Road and approximately 0.3 per cent increase on Elizabeth Drive. The maximum number of truck movements to any one work site is likely to be around 100 trucks per day (12-13 truck movements per hour in peak hour). The combined average daily traffic construction vehicle movements are likely to represent less than a 5 per cent increase in traffic volumes, and are predicted to have a negligible impact on the operation of the road network.

Overlapping construction stages may lead to multiple construction sites and higher number of construction vehicle movements. The Proponent states that cumulative impacts would be managed by spreading the traffic load over the network and minimising the concentration of construction traffic in one area, to be described in staging plans and traffic management plans.

The Proponent proposes to maintain access to properties adjoining the road works during construction, with arrangements made in consultation with residents where required.

As no on-street parking is currently available along the length of The Northern Road in the study area, no impact on the availability of public parking is expected. Parking for construction worker vehicles would be provided on site at the compounds along the project corridor, with access obtained via internal access roads or via The Northern Road. Pedestrian and cyclists may need to use alternative temporary paths where one side of The Northern Road may be temporarily inaccessible.

Temporary relocation of bus stops away from construction zones would occur (with up to 3 stops affected at one time during construction), with alternative access to relocated stops to be provided where required.

The Proponent proposes to implement a range of management measures to manage the potential construction-related traffic impacts (such as Traffic Control Plans, signage, temporary traffic control measures and communication plans). These measures would be described in a Construction Traffic Management Plan for the project.

<u>Operational traffic</u>

The EIS predicts the changes in traffic network performance due to the project, including an analysis of intersection performance (a key safety indicator for road users). The modelling for the project considered the following traffic scenarios for the morning and evening peak periods for the years 2021 and 2031:

- the base case, being the existing scenario for 2015;
- “do minimum” – 2021 and 2031 without the project; and
- “with project upgrade” – including road upgrades for the M12 (by 2031), western Sydney airport (by 2031) and realignment of the existing The Northern Road around the western Sydney airport site to a two-lane undivided road.

Under the “do minimum scenario”, intersections along The Northern Road would continue to operate acceptably by 2021, however by 2031 there would be insufficient capacity in the existing road configuration due to increased traffic associated with the planned M12 motorway, western Sydney airport and associated uses. Without upgrades, the majority of intersections are predicted to operate at a Level of Service (LoS) of “F” by 2031, resulting in unacceptable delays along the road corridor.

The “with project upgrade” modelling indicates the project would relieve existing capacity constraints along The Northern Road, particularly at intersections where no traffic signals currently exist. Average travel times are predicted to reduce by approximately 25 minutes in both directions.

Most intersections would operate satisfactorily (LoS of C or better) under the 2021 and 2031 future year scenarios with the project. The only exception would be the intersection of The Northern Road and Elizabeth Drive, which would operate near capacity in the evening peak hour by 2021 (with a LoS D) due to the large volumes of conflicting traffic movements.

The EIS predicts some previously un-signalised intersections would perform worse with the project. The average delay for some intersections would increase because the traffic signal timing favours the higher volume traffic on The Northern Road.

Apart from intersections, direct access to and from the Northern Road would also be restricted to left in/left out only, with a central median preventing right hand turn movements. Existing right turns into/from some properties fronting the Northern Road would therefore be removed. To maintain property access, a new service road and several U-turns and roundabouts are to be introduced as part of the new road network.

Road safety

The project has been designed to provide the following additional improvements to road safety:

- the divided carriageway would remove the need for opposing-lane overtaking and the associated risk of head-on crashes;
- reduced congestion at intersections would reduce the likelihood of vehicle crashes;
- higher design speeds would allow safer travel along the corridor;
- existing priority controlled intersections would be upgraded to signal control; and
- new heavy vehicle inspection areas would be constructed as part of the project south of Longview Road, which would increase safety of heavy vehicles operations.

Pedestrian and cyclist safety and connectivity

The project seeks to improve the accessibility and safety of pedestrians through the provision of a new shared pedestrian/cyclist path along the western side of The Northern Road and a new footpath on the eastern side. Both would provide a dedicated space for cyclists and/or pedestrians that is separated from traffic, which would reduce potential conflict with cars. Formal pedestrian and cycle crossing facilities at all signalised intersections would also be provided.

The proposed bypass of Luddenham is predicted to reduce the volume of cars and trucks travelling through the village and would therefore reduce conflicts with local traffic and pedestrians in this higher pedestrian activity area.

Public transport

A dedicated kerbside bus lane was proposed in each direction along The Northern Road in the exhibited EIS. The timing of its delivery has been amended in the SPIR, as the existing bus frequency does not warrant a dedicated bus lane. Priority bus lanes are to be implemented at intersections at opening of the project. Dedicated bus lanes will be established in consultation with Transport for NSW as demand requires, following the development of a new regional bus network to support the western Sydney airport and surrounding growth areas.

Most of the existing bus stops would be relocated at or near intersections of The Northern Road and adjoining side roads. The exceptions being the bus stops between Kings Hill Road and Littlefields Road, which would be relocated up to 650 metres from the existing bus stops.

Some additional bus stops would also be provided. This would make the bus stops more accessible to the surrounding properties. Signalised intersections would provide controlled and safe pedestrian crossing points close to the bus stops.

Freight transport and aviation
By providing additional traffic capacity and relieving existing traffic constraints, the project would improve reliability and travel times for freight traffic travelling in the project area, to the Sydney motorway network via the M4 Western Motorway (and the future M12) and to and from the western Sydney airport.

Submissions
Concerns raised in community submissions are summarised below:
- changed or restricted access to properties, including a proposal to amend the location of a western access intersection to the airport (to approximately 300 metres north of a proposed airport access point);
- the use of Willowdene Avenue as a construction access and haulage route;
- the existing road through Luddenham will become a rat run if there is congestion or other issues on the new section of road; and
- street lighting to be included at the Elizabeth Drive U-turn facility.

Liverpool City Council suggests the traffic modelling should use land use forecasts up to 2051 to cater for a 20 to 30-year population growth. Consideration should also be given to the provision of heavy vehicle facilities, bus shelters and shared path on the eastern side of the road. Council also commented on construction traffic management and signage to encourage visitors to Luddenham village.

Penrith City Council requests further information on the land use assumptions and therefore traffic forecasts of the western Sydney growth areas and also traffic forecast for the western Sydney airport. The EIS should also consider the rail needs of Western Sydney. Council also raised traffic management considerations regarding bus shelters, truck layby areas, consultation with residents and use of the shared path.

Campbelltown City Council supports the proposed road upgrades.

The **Federal Member for Macarthur** suggests three to four lanes each way is required.

Department's Consideration
Construction
The Department notes the likely increase in traffic volumes as a result of construction activities would be less than 5 per cent above existing traffic. It is also noted the Proponent has committed to limit construction traffic on Willowdene Avenue to light vehicles needing to access The Northern Road construction corridor, and only for the period where that section is under construction.

Whilst it is accepted that reduced traffic speeds and increased delays could occur through construction areas (in addition to accessibility changes), the Department agrees that construction related impacts resulting from the works and increased volumes can be managed to acceptable levels through the application of management measures including, but not limited to:
- ensuring safe and continuous traffic movement for construction workers and the general public;
- maintaining the capacity of existing roads where possible during construction in order to minimise road user delays; and
- maintaining continuity of access to local roads and properties (including consultation with impacted residents and business and stakeholders).

To reinforce this the Department has recommended a condition requiring the Proponent to prepare a Traffic and Transport Management Sub plan as part of the Construction

Environmental Management Plan (CEMP) for the project, in consultation with both Liverpool and Penrith Councils.

Operation

The Proponent has advised that while the assessment reported on performance up to 2031, the project intersections were designed to accommodate forecast peak traffic volumes up to the year 2041 (including assumptions on likely traffic generation from the western Sydney airport).

The project will change access to and from properties fronting The Northern Road because the central median would prevent right hand turn movements. The additional distance travelled to access properties will be reduced through measures such as the new service road, several U-turn facilities and roundabouts.

The additional travel distance (and time) varies, from 300 metres (less than 1 minute) to 8.8 kilometres (9 minutes and 10 seconds) with an average increase of 2.55 kilometres (2 minutes and 49 seconds). The worst case scenario is for vacant properties on the realigned section around the airport site to the south of Luddenham. The most affected locations, with travel distances above 3 kilometres, are shown in **Table 3**.

Table 3: Increased travel distances to affected properties

Section	Affected movement	Maximum additional travel distance (km)	Maximum additional travel time (min:sec)
Western Sydney Airport access to Luddenham southern access	Right turn from The Northern Road (coming from the south) into properties to the east of The Northern Road	8.8	9:10
	Right turn into The Northern Road (to travel north) from properties to the east of The Northern Road	5.8	5:40
Eaton Road access to Elizabeth Drive	Right turn into The Northern Road (to travel north) from properties to the east of The Northern Road	4.9	5:02
Luddenham southern access to Eaton Road	Right turn from The Northern Road (coming from the south) into properties to the east of The Northern Road	4.7	4:52
Littlefields Road to Longview Road	Right turn into The Northern Road (to travel south) from properties to the west of The Northern Road	4.3	3:54
	Right turn from The Northern Road (coming from the north) into properties to the west of The Northern Road	3.4	3:12
Bradley Street to Glenmore Parkway	Right turn into The Northern Road (to travel south) from properties to the west of The Northern Road	3.2	3:06
Littlefields Road to Longview Road	Right turn from The Northern Road (coming from the south) into properties to the east of The Northern Road	3.0	2:54

The Department acknowledges that this altered access would inconvenience some drivers, however the improved overall travel times (averaging up to 25 minutes) from the project are more than the additional time taken to access the properties.

The Department also notes that the projected increase in traffic is likely to worsen the performance of The Northern Road without the proposed upgrades, and the estimated

additional travel time does not account for congestion and delays that would be experienced by vehicles turning right to enter or exit The Northern Road if it was not upgraded.

The Proponent consulted with the potentially impacted landowners during the development of the project design to understand how the restricted right turns would impact various properties and to determine the appropriate locations for intersections and turn-around facilities. The longest distance to travel to a property with an existing dwelling is 4.9 kilometres, an additional five minute travel time.

A submission relating to a proposed development near the realigned section around the airport site requested the relocation of a signalised intersection, which the Proponent addressed in its SPIR, advising that intersection was located based on discussions with the western Sydney airport developer. The restricted access to existing properties was not raised in any other submissions.

The Department is therefore satisfied the impacts of additional travel distance would be outweighed by the benefits derived by the improved safety and travel time along The Northern Road.

The staged delivery of the dedicated kerbside bus lanes will initially require buses to merge in and out of the general lanes at bus stops, which may slightly increase bus travel times compared with the project described in the EIS. The Department considers the staged approach is reasonable given the paucity of existing bus services and the gradual increase in demand as the region develops.

Some bus stops would be relocated, which could increase the walking distance for some residents by up to 650 metres. However, the Department accepts that it is prudent to locate bus stops near major intersections to provide safe crossing points for passengers.

The project would significantly improve pedestrian and cyclist accessibility and safety compared with the existing situation, with new shared paths and formal crossing facilities at all signalised intersections.

The Department notes the Luddenham bypass would facilitate significant improvements to local amenity, traffic and safety by removing through traffic, particularly heavy vehicles (see section 5.4). Whilst it is possible the existing route through Luddenham could become a detour route during an incident on the upgraded section, the incident would be short-term, and for critical incidents the RMS incident response team and Police would manage traffic diversions.

Conclusion

The Department notes the consequences for the local and regional road network under the “do minimum” scenario, with the increased traffic generated by the major land use changes and urban growth areas causing unacceptable intersection performance by 2031. The Department therefore acknowledges that insufficient capacity exists along The Northern Road and road upgrades are required to enable it to operate at an acceptable level of service into the future.

The Department considers the project has been designed to meet the traffic and transport objectives for the region. As a result, it is considered the project would provide significant improvements for local and through traffic, with intersections operating satisfactorily under the 2021 and 2031 future year scenarios, and reduced travel time of up to 25 minutes predicted between Mersey Road and Glenmore Parkway. The project would also complement the additional improvements being undertaken or planned for the remainder of The Northern Road and other roads in the surrounding growth areas.

The Department also considers the Proponent would be able to effectively manage traffic using its existing management systems (such as implementation of traffic control plans and maintaining the capacity of roads) once the project commences operation. This approach has been adopted for a number of road upgrades, without adverse issues, and has been adopted for the future operation of a number of upgrade projects currently under construction.

5.2. Noise and Vibration

Issue
The key noise and vibration issues for the project include those generated during construction activities and the changed noise conditions once the project is operational, with increased traffic volumes and the realigned sections around the western Sydney airport and Luddenham bypass.

The Proponent assessed the potential noise impacts of the project in accordance with NSW Government noise guidelines. The noise assessment predicted the worst-case noise scenarios across eight Noise Catchment Areas (NCAs) covering an area extending up to 600 metres from the edge of the project corridor (refer to **Figure 9**, **Figure 10** and **Figure 11**).

The land uses along the project corridor are mostly semi-rural residential properties plus the suburban areas in Glenmore Park and Luddenham village. Existing noise is dominated by road traffic, particularly from The Northern Road and connecting roads such as Glenmore Parkway, Elizabeth Drive, Adams Road and Park Road. Traffic on the M4 Western Motorway is audible at the northern end of the project area.

The noise assessment identified 1,349 receivers (individual buildings) in this study area, comprised of:

- 1,306 residential dwellings;
- 23 commercial properties;
- 10 education buildings – at Penrith Anglican College, Luddenham Public School and Holy Family Catholic Primary School;
- 4 places of worship – Luddenham Uniting Church (which has 2 buildings), St James Anglican Church and Sacred Heart Parish;
- 4 outdoor recreation facilities including Luddenham Showground; and
- 2 industrial buildings – a water filtration plant and power station.

<u>Construction Noise</u>
Construction of the project is expected to take up to five years and would mostly occur during the standard construction hours of 7 am to 6 pm, Monday to Friday and 8 am to 1 pm on Saturday.

The key noise generating activities during construction include earthworks, roadworks, bridge construction works, drainage works and paving.

Table 4 summarises the proposed construction activities outside of standard construction hours. These out-of-hours works are proposed to avoid closing lanes during peak periods thus minimising congestion impacts on traffic, traffic incidents and to protect construction worker safety.

Except as detailed in **Table 4**, no works outside standard construction hours are proposed in the southern section of the project, as construction of the realigned section of The Northern Road would not require activities in or adjacent to the existing road formation.

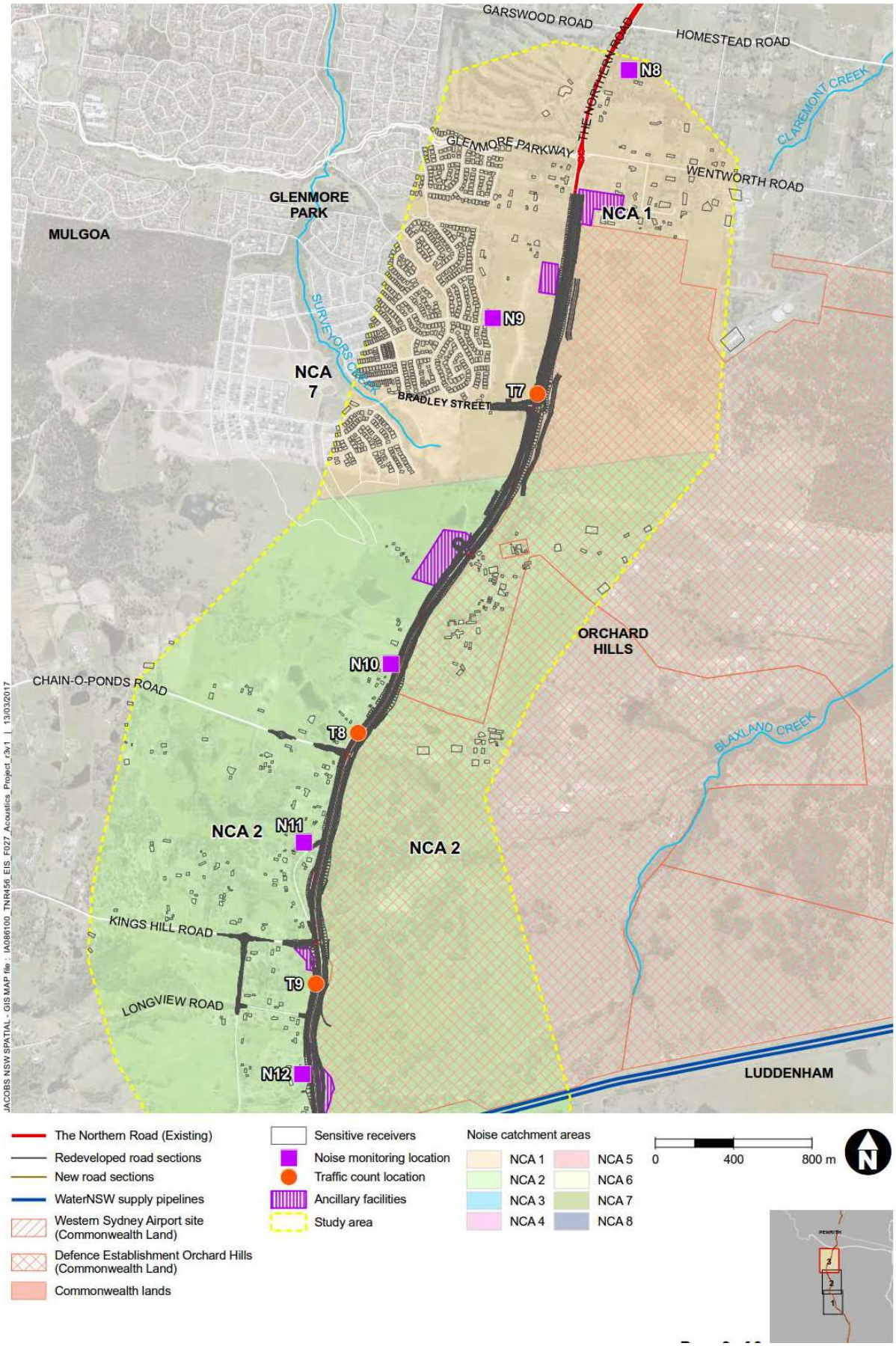

Figure 9: Noise Catchment Areas 1-2 (Source: RMS, EIS)

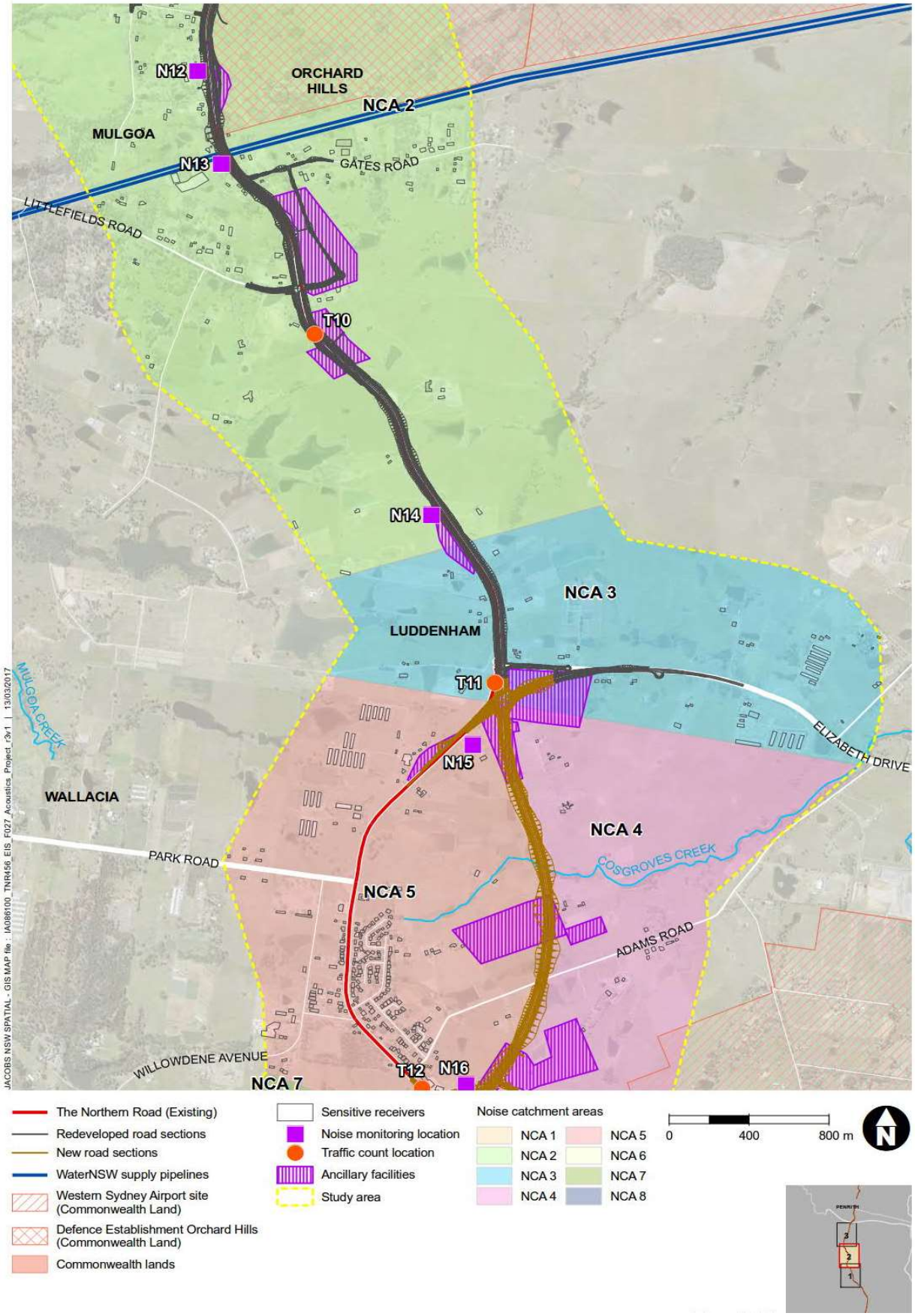

Figure 10: Noise Catchment Areas 2-5 (Source: RMS, EIS)

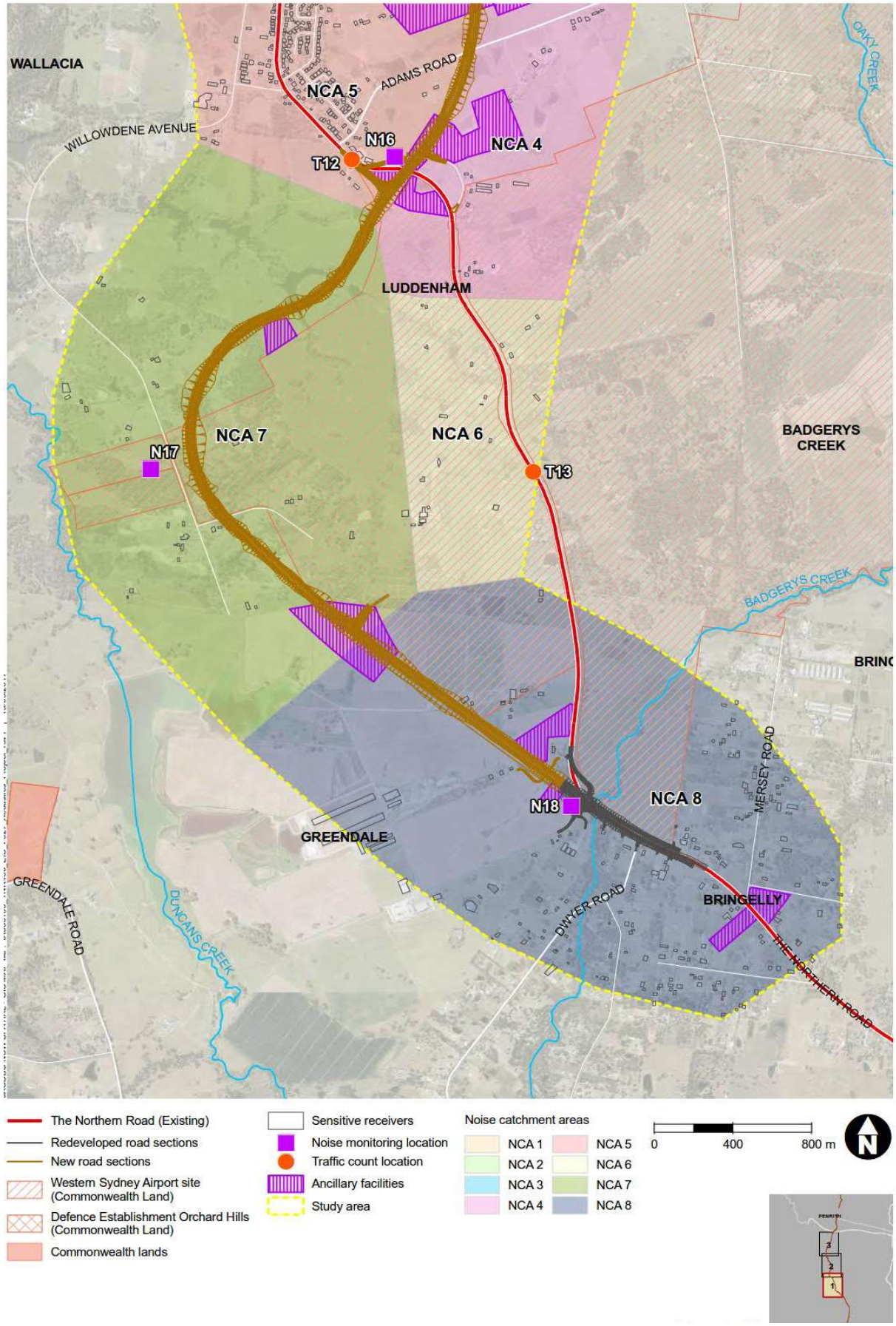

Figure 11: Noise Catchment Areas 5-8 (Source: RMS, EIS)

Table 4: Proposed works outside standard construction hours

Activity	Works
Road paving works	• Intersection tie-ins for all intersections along the alignment • Traffic switches at points which the existing Northern Road and the new alignment meet and/or at intersections
Adams Road Bridgeworks	• the delivery and installation of large pre-cast bridge elements (such as girders) – excludes impact piling
Ancillary facilities	• storage and movement of materials, chemicals plant and equipment • access to office facilities and amenities

The Proponent has proposed the following general mitigation measures to reduce the impacts of construction noise on nearby receivers:

- restricting works to standard construction hours as far as practicable, and if required, planning works outside standard construction hours so that noisier works are carried out in the earlier part of the evening or night-time;
- scheduling activities outside times of heightened sensitivity (e.g. school hours);
- use of physical barriers (such as acoustic fencing, enclosing work areas and use of existing structures) to screen noise intensive activities;
- maximising the distance between receivers and noisy plant or activities;
- use of quieter plant and equipment, which will be regularly maintained;
- scheduling respite periods (such as limiting operation of pavement sawing to three hours at a time);
- minimising the number of consecutive nights of works adjacent to receivers;
- limiting heavy vehicle use on local roads to access worksites; and
- monitoring the effectiveness of mitigation measures.

The proponent would require its construction contractors to prepare a Construction Noise and Vibration Management Plan which details how these measures will be implemented during construction.

Construction Noise Impacts

The noise assessment predicted that all NCAs would experience noise above the construction noise management levels (NMLs) at certain stages during construction. The work activities impacting the most residential receivers are shown in **Table 5**.

Table 5: Work activity with the highest number of NML exceedences (impacted receivers)

Precinct	Hours	Activity*	Duration of activity (weeks)**	NML (dB(A))	Predicted maximum noise level (dB(A))	Maximum Exceedance of NML (dB(A))	Number of receivers predicted to exceed NML
NCA1	Standard	Road work & Paving	2-10	58	84	26	47
	Night-time	Paving	2-10	59	83	24	33
NCA2	Standard	Road work & Paving	2-10	57	85	28	98
	Night-time	Paving	2-10	51	84	33	122
NCA3	Standard	Road work	2-10	56	80	24	19
	Night-time	Paving	2-10	50	79	29	21
NCA4	Standard	Earthworks	4-16	47	68	21	16
	Night-time	Paving	2-10	52	68	16	16
NCA5	Standard	Bridgework	0-26	52	72	20	201
	Night-time	Paving	2-10	49	89	40	180

Precinct	Hours	Activity*	Duration of activity (weeks)**	NML (dB(A))	Predicted maximum noise level (dB(A))	Maximum Exceedance of NML (dB(A))	Number of receivers predicted to exceed NML
NCA6	Standard	Road work & Paving	2-10	52	55	3	3
	Night-time	Paving	2-10	49	54	5	6
NCA7	Standard	Road work & Paving	2-10	47	71	24	19
	Night-time	Paving	2-10	52	70	18	15
NCA8	Standard	Road work & Paving	2-10	58	76	18	33
	Night-time	Paving	2-10	57	75	18	42

* concrete saw for approximately 1 week, vibratory roller for approximately 5 weeks; Bulldozer/grader for approximately 12 weeks; piling rig for approximately 10 weeks
** indicative duration of exposure at any one receiver

Table 6 summarises the number of receivers that are highly noise affected (experiencing noise greater than 75 dB(A)) during construction. Up to 39 receivers will be highly noise affected during both roadwork and paving activities.

Table 6: Highly noise affected receivers (>75 dB(A)) during construction

Precinct	Activity						
	Early work	Earthworks	Roadwork	Drainage	Paving	Utility Relocation	Finishing work
NCA1	1	1	1	1	1	1	1
NCA2	4	15	25	17	25	10	17
NCA3	-	2	6	3	6	1	3
NCA4	-	-	-	-	-	-	-
NCA5	4	5	5	5	5	4	5
NCA6	-	-	-	-	-	-	-
NCA7	-	-	-	-	-	-	-
NCA8	-	-	2	1	2	-	1
Total	**9**	**23**	**39**	**27**	**39**	**16**	**27**

Construction road traffic noise
Construction traffic would mainly use existing designated heavy vehicle routes such as Elizabeth Drive, the M4 motorway and The Northern Road. The expected increase in noise levels from construction traffic would be approximately 0.5 dB(A), and is therefore unlikely to be discernible.

Sleep disturbance
The night time construction activities are predicted to exceed the sleep disturbance criteria (49 dB(A) – 59 dB(A)) at:

- 435 receivers during paving works in all NCAs, with the worst case exceedance being up to 40 dB(A) in NCA5;
- 226 receivers during bridgework in all NCAs (except NCA 7), with the worst case exceedance being up to 23 dB(A) in NCA5; and
- 225 receivers in the vicinity of ancillary facilities in all NCAs (except NCA 7), with the worst case exceedance being up to 23 dB(A) in NCA5.

The noise assessment predicts 87 receivers would experience noise that exceeds the sleep disturbance criteria by more than 15 dB(A) and 22 receivers would experience noise greater than 25 dB(A) above the sleep disturbance criteria (the maximum predicted level being 89 dB(A)).

Construction Vibration

The main sources of construction vibration would be vibratory rollers during earthworks and bridge construction, jack hammers during drainage works and impact piling and rock breaking during bridgeworks. No blasting is proposed.

As shown in **Table 7**, construction activities will occur within the applicable buffer zones for maintaining structural integrity (31 residential and commercial properties) and human comfort (113 residential and commercial properties). Where works are required within these buffer zones, the Proponent will modify its methods and equipment to minimise vibration levels and undertake monitoring to ensure compliance with the relevant structural and human comfort criteria.

Table 7: Construction vibration assessment summary (Source: EIS)

Precinct	Number of receivers within safe working distance			
	Structural integrity (22 m buffer zone)		Human comfort (100 m buffer zone)	
	Residential	Commercial	Residential	Commercial
NCA1	1	-	8	-
NCA2	20	2	63	3
NCA3	-	-	6	1
NCA4	-	-	1	-
NCA5	4	2	15	3
NCA6	-	-	-	-
NCA7	-	-	1	-
NCA8	2	-	12	-
Total	**27**	**4**	**106**	**7**

Operational Noise

The Proponent modelled predicted noise impacts for 2021 and 2031 based on the following scenarios:

- without the project ("No-build") incorporating the existing road network; and
- with the project ("Build") incorporating the newly upgraded The Northern Road and the diversion around the planned western Sydney airport.

The 2021 scenario assumes only The Northern Road is upgraded, whereas the 2031 scenario assumes additional trips generated by forecast land use changes (i.e. western Sydney airport and surrounding growth areas) and other network changes such as the proposed M12 and Bringelly Road upgrade.

The noise assessment indicates that the project would increase road traffic noise for most receivers in the study area, with the greatest increase occurring at semi-rural receivers near the new bypass alignment with an increase in daytime noise levels of up to 22 dB(A) and increase in the night-time noise levels of up to 21 dB(A).

Increased road traffic noise is also predicted to exceed the applicable criteria by up to 14 dB(A) at the Luddenham Public School's main block of classrooms, and up to 15 dB(A) at the St James Anglican Church and Luddenham Uniting Church.

The selection of the most appropriate mitigation measures for properties affected by road noise is guided by the EPA's Road Noise Policy (RNP) and by the Proponent's Noise Mitigation Guideline. This adopts an approach which analyses potential options for reducing noise at surrounding receivers, which include the design of the road, barriers (such as noise walls or earth mounds) and measures at the affected properties.

For the project, the use of low-noise pavement was considered impracticable due to the on-going need to re-surface roads near intersections. The use of noise barriers was discounted as there are no groupings of closely spaced receivers eligible for noise mitigation. The final approach considered is the use of mitigation at the affected receivers, which can substantially reduce the noise inside the building compared with outside (reductions typically range from 10 to 20 dB).

Of the potentially affected receivers analysed for the project, operational road noise will be high enough at 78 locations (75 residences and 3 classroom buildings at Luddenham Public School) to trigger the consideration of at-property treatment. The Proponent proposes to provide at-property treatment at all these 78 receiver locations, and it will review the detailed design to to verify the noise predictions and if additional receivers will be eligible to receive treatment.

Submissions
Community submissions raised concerns about a lack of acoustic measurements at their properties and increased traffic noise levels.

The **EPA** raised concerns regarding the measured "rating background level" for Saturday afternoon being up to 7 dB(A) above what was measured during standard construction hours. The EPA recommends more monitoring be undertaken for the Saturday afternoon period in addition to recommended conditions of approval.

Liverpool City Council suggests that the project should implement noise mitigation measures on existing properties that would be exposed to increased traffic noise (where required).

Penrith City Council provided comments on construction noise management measures, implementation of at-building acoustic treatments and the need to collect operational traffic volume to confirm the consistency of the predicted impacts.

Department's Consideration
Construction Noise
The Department acknowledges that receivers close to the widened or realigned sections of the road will inevitably be impacted by construction noise.

With respect to the EPA's concerns about background noise levels on Saturdays, the Proponent acknowledges the RBL provided in the assessment was incorrect and proposes to apply the RBL from standard construction hours to the Saturday afternoon period. The Department is satisfied this would provide a conservative approach to managing noise impacts on Saturdays.

Works associated with the roadworks and paving activities would result in the greatest noise impacts, particularly during vibratory rolling or concrete sawing close to residences with predicted exceedances of the 49 dB(A) criteria by up to 40 dB(A) during the night-time period.

Given the linear nature of the project, the construction activities and equipment will progressively move along the length of the road. Therefore, the most extreme noise impacts will likely be temporary, lessening as the works progress towards and away from the receiver.

Additionally, with construction noise mitigation in place, the actual noise levels would be lower than those predicted. Similar measures have been employed on other road and large infrastructure projects with similar environments, and have effectively reduced construction noise impacts compared with the conservative predictions in the EIS noise assessment.

In this respect, the Department has recommended conditions requiring the Proponent to prepare and implement a Construction Noise and Vibration Management Sub-plan (CNVMP) as part of the CEMP, which describes the measures to manage and reduce noise and vibration levels during construction and sets out procedures for monitoring noise impacts.

Activities at the construction compounds would generate noise for the duration of the construction. To ensure the duration and intensity of construction noise impacts are minimised as early as possible, the Department has recommended that the proposed 2.4 metre high acoustic hoardings are installed as soon as site establishment works for the ancillary facilities are completed (and before undertaking works at the facilities). Where it can be justified that the acoustic benefit of the hoarding is not warranted, this will be detailed in the Ancillary Facilities Management Plan for the project.

The Proponent proposes to implement operational noise mitigation (i.e. at-property architectural treatment) early in the construction program at those receivers eligible for such treatment. The Department supports this approach as it would help mitigate construction noise impacts, and considers a clear timeframe should be established for the implementation of such measures. The Department has therefore recommended that all operational noise mitigation measures (except for those that might be damaged or compromised during construction works) must be implemented no later than six months after commencing construction, or within another timeframe agreed by the Secretary, and be detailed in the CNVMP Sub-plan of the CEMP.

The Department accepts that some out-of-hours work is required for technical, efficiency (reducing the timeframe of construction), operational or safety reasons. The Department also recognises that there may be circumstances where flexible working hours are warranted. Consequently, the Department has recommended that out-of-hours work may be permitted where it is appropriately managed through the project's Environmental Protection Licence (EPL).

Whilst the Proponent has committed to schedule noisy activities outside normal school hours where practicable, the Department has recommended a condition requiring the Proponent to also restrict noise generating works outside of sensitive periods (e.g. examinations, school performances etc), unless other reasonable arrangements are made with the affected receivers (at the Proponent's cost).

The Department has also recommended conditions requiring the Proponent to implement a complaints management system and develop procedures for notifying sensitive receivers of construction activities that may impact them.

<u>Construction Vibration</u>
The Department is satisfied the Proponent has sufficiently identified the vibration generating activities that are likely to cause discomfort to the surrounding community. The Department is also satisfied that the Proponent has identified sufficient safeguards to ensure that appropriate site-specific controls are in place to minimise the risk of vibration impacts on sensitive receivers and structures. To ensure vibration impacts are appropriately managed, the Department has recommended conditions requiring:

- compliance with construction vibration criteria for human comfort and structural integrity;
- building condition surveys and rectification of damage caused by the construction of the project;
- the provision of respite periods; and
- measures and procedures to minimise construction vibration impacts, including monitoring to ensure that no exceedance of the structural criteria occurs.

Operational Noise
The project is predicted to increase road noise, particularly near the new bypass alignment and junctions, by up to 22 dB(A) during the daytime and 21 dB(A) at night. The road noise criterion will be exceeded at 179 residential receivers, three school buildings and two places of worship during the day and at 156 residential receivers at night.

Of these receivers, 78 sensitive receivers (including the 3 affected school buildings) were determined to exceed the noise mitigation triggers for the consideration of at-property treatment due to the level of noise increase predicted at the receivers. The final number of receivers will be confirmed following updated modelling based on the detailed design, with the Proponent to install at-property acoustic treatment at these receivers.

The Department is satisfied that the proposed mitigation measures have been considered in accordance with the RNP and are the most appropriate given the nature of the land uses around The Northern Road. To ensure that the noise benefits of the project are realised, the Department has recommended that the Proponent prepare and implement an Operational Noise and Vibration Management Plan and Operational Noise Compliance Report which provides for the monitoring of noise and mitigation measures if noise levels exceed the recommended criteria.

Conclusion
Construction of the project is likely to generate noise impacts along the project area, with predicted daytime noise levels up to 28 dB(A) above the NML, and night-time noise levels up to 40 dB(A) above the NML. The Department is satisfied the Proponent's commitments, combined with the Department's recommendations, would adequately manage noise and vibration impacts during construction.

The operation of the project (in the modelled years 2021 and 2031) would generate traffic noise levels up to 22 dB(A) above the RNP criteria, particularly near the new bypass alignment and junctions. Areas where this occurs would receive mitigation measures such as 'at-property' treatment to reduce noise levels.

The Department has recommended a range of conditions to ensure noise levels from the road are verified and appropriately mitigated. These conditions include the preparation of an Operational Noise and Vibration Management Plan and Operational Noise Compliance Report.

5.3. Biodiversity

Issue
The potential biodiversity impacts of the project were assessed in accordance with the *Framework for Biodiversity Assessment* and the *Biodiversity Offset Policy for Major Projects* and included detailed flora and fauna surveys and database searches.

The project is located on mostly rural land containing several waterways, ephemeral drainage lines and farm dams, in the Cumberland sub-region of the Sydney Basin Bioregion. The project area contains approximately 11.8 percent native vegetation cover. Construction of the project (as amended in the SPIR) would impact approximately 40.78 hectares of remnant native vegetation along the edge of the existing alignment and in the realigned section south of Luddenham (see **Table 8** and **Figure 12** to **Figure 14**).

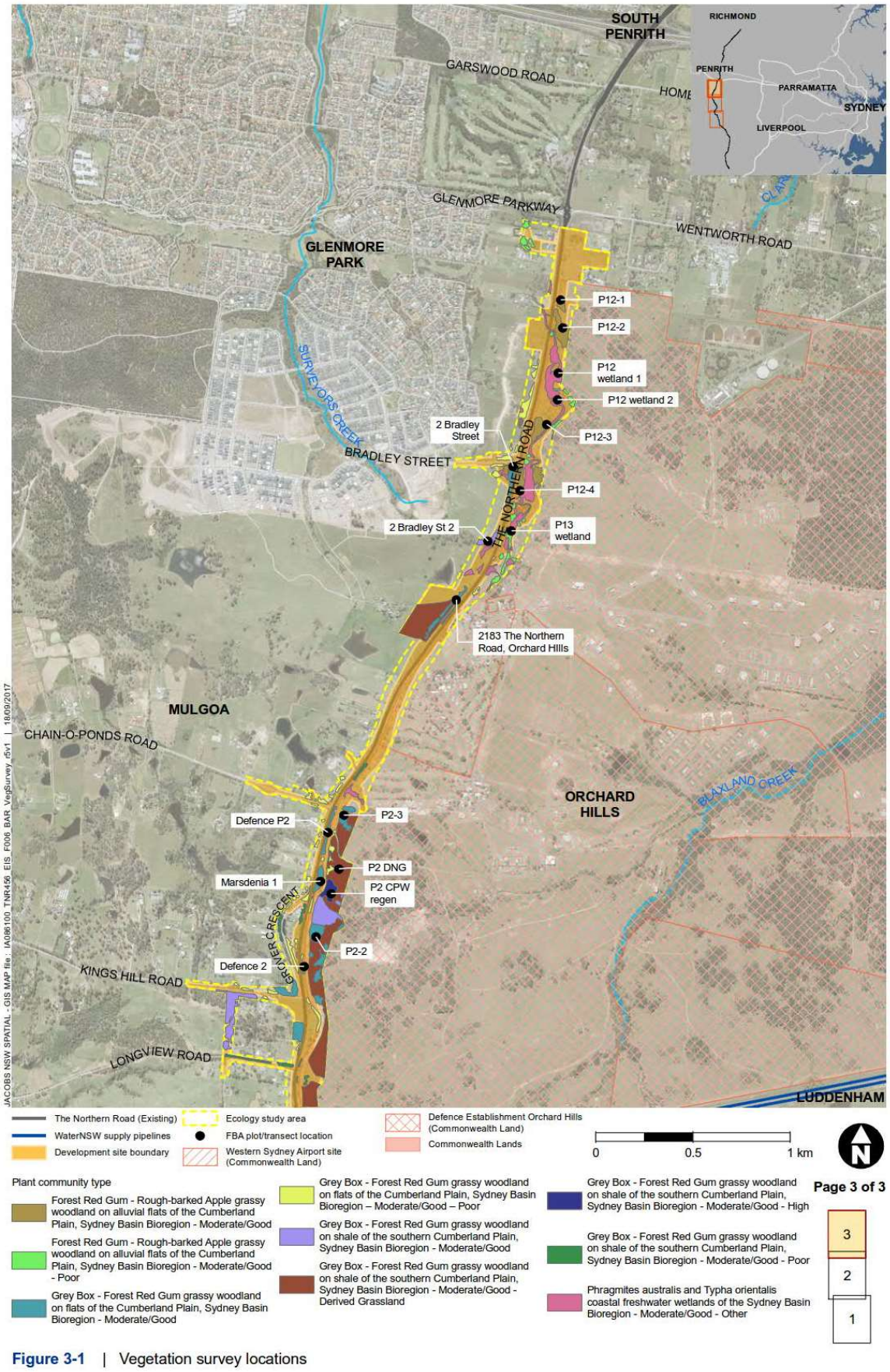

Figure 12: Vegetation Communities – northern section (Source: RMS, EIS)

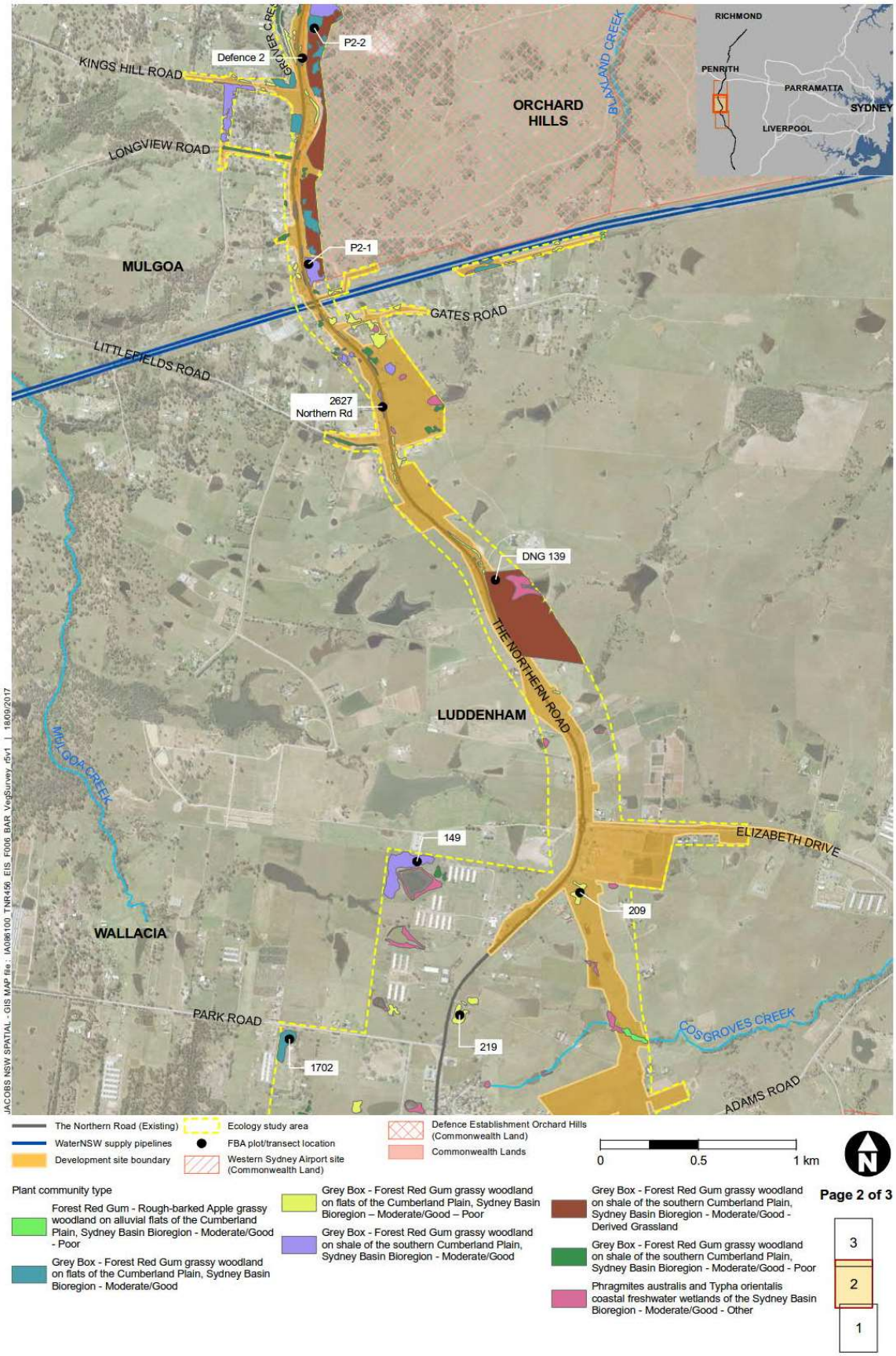

Figure 13: Vegetation Communities – central section (Source: RMS, EIS)

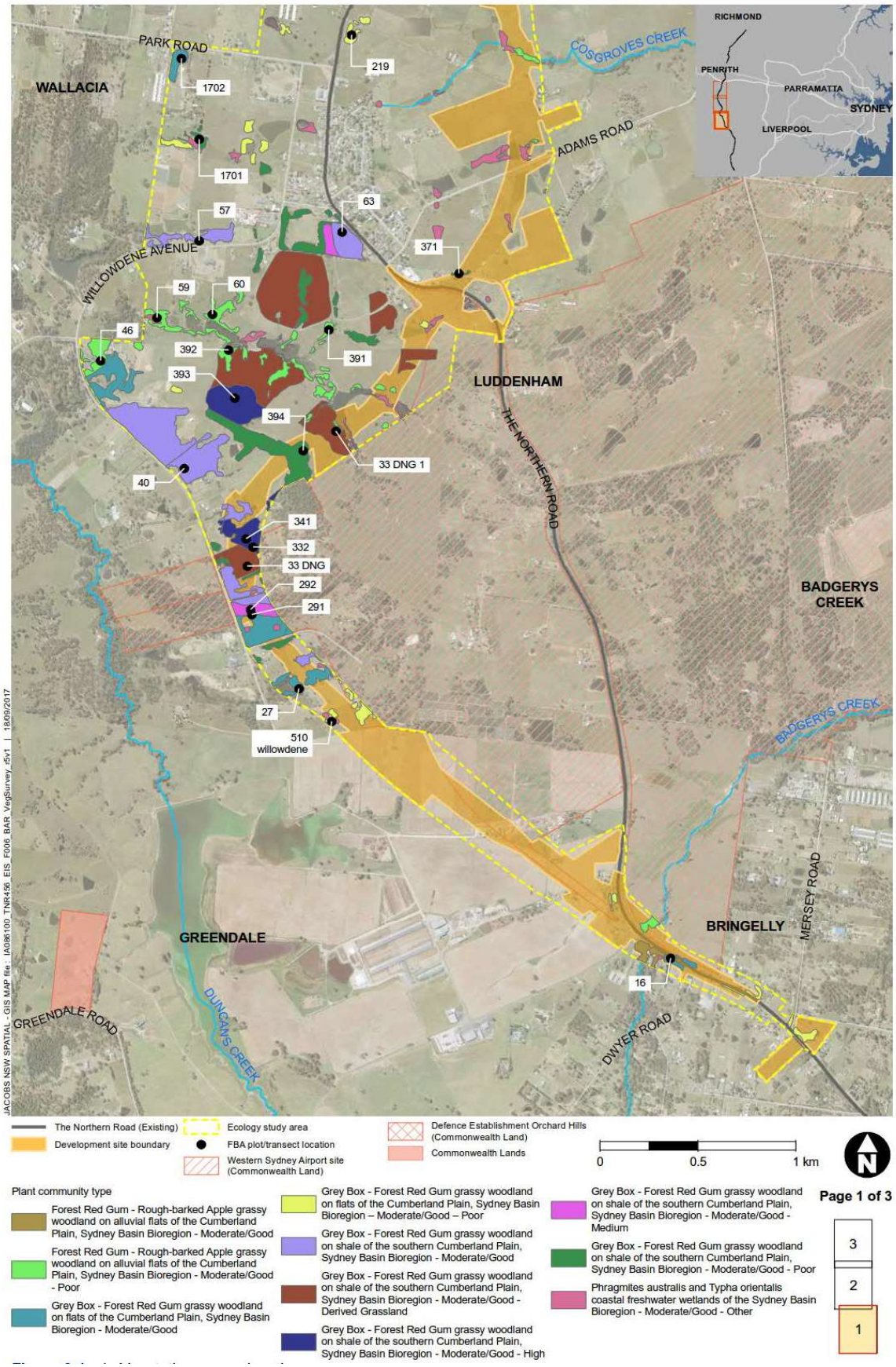

Figure 14: Vegetation Communities – southern section (Source: RMS, EIS)

Table 8 Vegetation impacted by project and assessed under the FBA

Vegetation Community/ Plant Community Type	Conservation Status		Total area impacted (ha)
	TSC Act	EPBC Act	
Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (Moderate to Good quality)	Critically endangered[1]	Critically endangered[3]	9.68
Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Critically endangered[1]	Critically endangered[3]	10.38
Grey Box – Forest Red Gum derived grasslands on shale hills of the Cumberland Plain (50-300m asl)	Critically endangered[1]	Critically endangered[3]	10.81
Forest Red Gum – Rough–barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Endangered[2]	-	3.86
Phragmites australis and *Typha orientallis* coastal freshwater wetlands of the Sydney Basin Bioregion	-	-	6.05
Total			**40.78**

Notes to Table
[1] listed as Cumberland Plain Woodland in the Sydney Basin Bioregion.
[2] listed as River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.
[3] listed as Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest (EPBC Act).

Surveys identified five vegetation communities in the study area (see **Table 8**) and four of these meet the classification of a threatened ecological community under the *NSW Threatened Species Conservation Act 1995* (TSC Act), namely the:

- Critically Endangered Cumberland Plain Woodland in the Sydney Basin Bioregion; and
- Endangered River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

The threatened flora species identified in surveys of the project disturbance corridor are described in **Table 9**.

Table 9 Threatened flora species impacted by project

Species	Conservation Status		Individuals or habitat impacted
	TSC Act	EPBC Act	
Pultenaea parviflora	Endangered species	Vulnerable	6 individuals and 0.98 ha of soil seedbank
Marsdenia viridiflora R. BR. subsp. viridiflora	Endangered population	-	31 individuals

Fauna

Threatened fauna species potentially impacted by the project are outlined in **Table 10**. No significant impacts were identified.

Cumulative impacts

The cumulative biodiversity impacts were considered based on available information on approved or proposed development in the region, including the airport (but not the proposed M12 motorway). Up to 387 hectares of native vegetation would be impacted by those projects. While the project would contribute to likely cumulative biodiversity impacts, the proportion of impacts from the project (10%) is minor.

Table 10. Impacts to Threatened Fauna

Species	Conservation Status		Individuals or habitat impacted
	TSC Act	EPBC Act	
Cumberland Plain Land Snail	Endangered	-	12.40 ha of suitable habitat
Grey Headed flying-fox	Vulnerable	Vulnerable	24.10 ha of local foraging habitat
Regent Honeyeater	Critically endangered	Critically endangered	24.10 ha of marginal foraging habitat
Swift Parrot	Endangered	Critically Endangered	24.10 ha of marginal foraging habitat
Large-eared Pied Bat	Vulnerable	Vulnerable	24.10 ha of foraging habitat
Eastern Bentwing-bat	Vulnerable	-	Impact to potential roosting habitat – large trees located in the study area
Eastern False Pipistrelle	Vulnerable	-	
Eastern Freetail-bat	Vulnerable	-	

Key species likely to be significantly impacted by cumulative activities include the Grey Headed Flying-fox, Large-eared Pied Bat, Regent Honeyeater and the Swift Parrot. Remnant vegetation communities of the Cumberland Plain Mitchell Landscape are also likely to be detrimentally and irreversibly impacted.

Mitigation
As part of the route selection process the Proponent identified areas of high ecological value to avoid where possible. The Proponent has also committed to minimise impacts through more refined vegetation mapping to identify key areas to avoid where possible, weed management, erosion and sediment controls, re-vegetation with locally native species and providing supplementary fauna habitat.

The *NSW Biodiversity Offsets Policy for Major Projects* was used to calculate the number of ecosystem and species credits required to offset the residual impacts of the project. The Biodiversity Offset Strategy will be finalised after the offset investigations have been completed. The final offset requirement will be determined following detailed design and confirmation of the project footprint.

Submissions
Public submissions raised concerns about the impact to the Eastern Long Neck turtles, Eastern Grey Kangaroos, Flame and Scarlet Robin, and habitat including large remnant trees, creek lines and connectivity of wildlife corridors including Surveyors Creek.

Mulgoa Landcare and **Cumberland Conservation network** commented on biodiversity connectivity impacts and the biobanking process.

The **Office of Environment and Heritage** (OEH) raised the issue of locating credits for the critically endangered Regent Honeyeater.

Penrith City Council commented on landscaping, biodiversity connectivity and fragmentation and the loss of habitat.

Department's consideration
The Department notes that the route selection process considered impacts to biodiversity and that all options considered would impact biodiversity values, with the preferred option having less impacts on EECs than alternative options considered. The Department also notes that the project will not cause significant impacts to threatened or vulnerable fauna.

The Department supports the proposed commitments to manage biodiversity impacts, including minimising native vegetation removal and re-establishing native vegetation and habitat following construction (including staged habitat removal when hollow bearing trees are present). The CEMP for the project will include a stream and farm dam de-watering plan that describes the procedures for dewatering stream and farm dams and relocating Eastern long neck turtles and other aquatic species found during the works.

Habitat connectivity and fauna movement would be restricted by the expansion of the road corridor. In this respect, the project includes new fauna crossings, such as a fauna friendly drainage culvert at Badgerys Creek. Additional fauna crossings or connectivity measures will be further explored during detailed design in accordance with the RMS *Wildlife Connectivity Guidelines for Road Projects* (currently in preparation).

Offsets

Ecosystem and species credits required to offset the residual impacts of the project were calculated in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*. Direct like-for-like credits are available for most of the ecosystem credits required, including those required to offset impacts to critically endangered ecological communities, but there is a shortfall in available credits for:

- *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (not listed under the TSC Act or EPBC Act);
- *Pultenaea parviflora* (listed under both the TSC Act and the EPBC Act)*;*
- *Marsdenia viridiflora* subsp. *viridiflora* (listed under the TSC Act);
- Cumberland Plain Land Snail (listed under the TSC Act); and
- Regent Honeyeater (listed under both the TSC Act and EPBC Act).

The Proponent is actively seeking like-for-like credits, where possible. Where this is not possible the *NSW Biodiversity Offsets Policy for Major Projects* includes variation rules for calculating offsets where like for like credits are unavailable, providing the Proponent has demonstrated it has taken reasonable steps to locate like for like offsets. In this respect the Proponent states it is working with OEH (and DoEE) with respect to additional offsets in the form of a supplementary measures package with a focus on landscape scale measures in the local area. This may include measures such as weed eradication programs in Cumberland Plain Woodland. The Proponent is also in discussions with private landholders to enter into Bio-Banking agreements on their land and to purchase the credits issued.

It is noted that all Commonwealth listed communities impacted by the project are covered by credits which are currently available and that impacts to vegetation on DEOH land are being assessed by the DoEE.

Cumulative impacts

While the project has the potential to contribute to cumulative impacts, the implementation of proposed environmental management measures and the calculated offset credits will compensate for the project's biodiversity impacts in accordance with government policy.

Conclusion

The project will directly impact approximately 40.78 hectares of vegetation, including threatened flora and fauna and threatened ecological communities. The impacts to the species and communities will be offset in accordance with the *Framework for Biodiversity Assessment,* the *NSW Biodiversity Offsets Policy for Major Projects* and secured with Biobanking agreements.

The Department is satisfied that biodiversity impacts will be effectively mitigated by the implementation of proposed management measures and residual impacts compensated through the proposed offsets. The Department has therefore recommended conditions of

approval requiring the preparation of a Biodiversity Sub-plan as part of the CEMP and development of a Biodiversity Offset Strategy.

5.4. Land Use, Social and Economic

Issue
The project area comprises a range of socio-economic environments including rural, rural residential, agricultural and commercial, as well as Commonwealth land (the future airport site and DEOH).

Operation of the project would require approximately 186 hectares of land (including 45 hectares of Commonwealth land), potentially reducing the availability of land in the region for commercial, environmental or social uses. Of this, approximately 58.1 hectares of the land to be impacted is currently used for infrastructure such as roads and the Warragamba pipeline easement. A summary of the land uses impacted by the project is provided in **Table 11**.

Table 11. Summary of land uses Impacted by the project

Land Use	Area Impacted (ha)	Comments
Agriculture/primary production	94.18	• 70.22 ha grazing land • 17.22 ha cropping land • 5.15 ha horticulture land • 1.59 ha intensive animal production
Infrastructure (transport and other corridors)	58.10	
Special category	22.16	• DEOH land • WSA land
Environmental uses	7.2	• Waterways and tree/shrub cover • Further discussion on the environmental impacts of the project is provided in Section 5.3 (Biodiversity) and Section 5.5 (Hydrology)
Low density residential	4.39	

The project requires the full acquisition of seven lots (four of which are road reserve) and partial acquisition of 131 lots (which includes the acquisition of eight houses, 15 other buildings (sheds) and part of the Orchard Hills Golf Course in DEOH land). Temporary leases will also be required over 20 lots during construction to accommodate ancillary construction facilities (such as worksites, compounds and laydown areas).

<u>Business impacts</u>
The project will generate an estimated 928 full-time equivalent jobs during construction. Further jobs such as retailers who provide goods and services to support day-to day needs of the construction force, would also be indirectly created by the project.

The project will directly impact up to 20 businesses through acquisition and temporary leases of land during the construction of the project. This includes 12 non-agricultural businesses (mainly construction related, transport and equipment hire and specialist retail (equestrian, pet and rural supplies)) and eight agricultural businesses (including those that sell produce direct from the property).

The ongoing operation of eight businesses will be affected by land acquisition and associated infrastructure such as sheds and dams (see **Table 12**). Impacts relate to loss of productive land, impact on farm infrastructure, severance of properties, changes in the movement of farm equipment and changes to property access. The project is unlikely to directly affect the

ongoing operations of the other 12 businesses with relocation and business operations unlikely to change, and only minor demolition of infrastructure required.

Table 12: Impacts to operation of local businesses

Business	Impacts
Luddenham Pet Meat	• acquisition of 2% of land impacting a dwelling and landscaped areas • adjoining shed will not be impacted • restriction on right turns to/from the property
AL Tours and A&M Excavation	• acquisition of 10% of land fronting the property, impacting a dwelling and grassed areas • sheds will not be impacted
Top Shape Live Christmas Trees	• realignment of Elizabeth Rd will bisect the land • land acquisition of 35% of the area used for growing trees, and demolition of 2 dwellings and 4 sheds • 24% of additional land to be temporarily leased for construction • restriction on right turns to/from the property
Triple A Christmas Tree Farm	• acquisition of land will affect 12% of the property - used for growing trees, grazing and dam infrastructure • 4% of additional land to be temporarily leased for construction • affected dam infrastructure will be relocated in the property (where practicable) prior to construction • restriction on right turns to/from the property
Strawberry farm	• acquisition of land will impact on a dwelling, shed and loss of 6% of land for growing • infrastructure will be relocated in the property (where practicable) prior to construction • restriction on right turns to/from the property
Primary Production 2422-2430 The Northern Road	• acquisition of 16% of land used for primary production (cattle grazing and dam infrastructure) • 1% of additional land to be temporarily leased for construction • restriction on right turns to/from the residual property.
Primary production 28 Eaton Road	• the lot will be bisected, with the acquisition of 54% of land used for primary production (cattle grazing and dam infrastructure) • access to the main parcel will be maintained via Eaton Road, however right turns to/from the property into The Northern Road will be restricted
Market garden and cattle	• the lot will be bisected with the acquisition of 35% of land used for primary production (cattle grazing and dam infrastructure) and a market garden • restriction on right turns to/from the property

The EIS estimates that removing right turn movements into businesses along The Northern Road would increase travel distances for business owners and customers by up to 5,980 metres.

Luddenham Village Businesses
Creating a bypass of Luddenham will divert traffic around the village and may reduce business patronage.

The EIS found the impact would be temporary and short term as traffic through Luddenham is predicted to increase over time, mainly due to growth and development associated with the western Sydney airport and urban development in the region. Long term, businesses in Luddenham, particularly those reliant on road traffic such as the Caltex service station and takeaway food stores, are likely to remain attractive for customers with access to the north and south provided off The Northern Road.

To encourage motorists to visit Luddenham town centre, the Proponent has committed to provide signage to guide passing motorists. The Proponent will also consult with Liverpool City Council and Penrith City Council and financially support the preparation of plans to revitalise the Luddenham town centre (such as through streetscape and landscape treatments).

The Proponent also proposes to establish and maintain a business risk register to identify and minimise disruptions and develop measures to manage specific construction impacts for individual businesses, including consultation with impacted businesses (keeping affected property owners informed of the project and associated implications).

Submissions
Concerns raised in community submissions include:
- property devaluation and acquisition;
- security measures, such as lighting, for the Elizabeth Drive U-turn facility;
- privacy and security of certain properties fronting the new road where it will dissect properties;
- little qualitative information for community histories and makeup, particularly regarding the difference between villages and their history; and
- little information provided about “significant impact” and cumulative impacts.

Penrith City Council asked to be engaged in discussions to revitalise the Luddenham Town centre and to be notified when land is acquired.

Water NSW provided comments on impacts to the Warragamba pipeline. The Proponent has committed to consult with Water NSW during design and construction of the project to avoid impacting the pipeline.

Department’s Consideration
The planning of the future growth areas around the western Sydney airport is in the early stages, and given specific land use plans and rezonings are not yet identified, the Department’s assessment has primarily focussed on the existing land use situation. Notwithstanding, the Department acknowledges the region will experience significant change with the development of the western Sydney airport and urban growth areas, with the landscape likely to change from mostly rural to an urban, industrial and commercial landscape.

<u>Land acquisition</u>
The Department accepts that land acquisition is an unavoidable outcome of linear transport projects. It is acknowledged that anxiety, stress and other effects on social wellbeing may arise during the acquisition process.

The Proponent has sought to minimise land acquisition as far as practicable during design and refined the project design following exhibition, further reducing the operational footprint by 16 hectares.

The acquisition of properties will be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*, which includes the consideration of impacts to farm infrastructure as a result of partial acquisitions. Impacts on the landowners’ remaining holdings would also be factored into the acquisition process. The Proponent will enter into agreements with relevant Government departments for the permanent or temporary use of Government-owned land.

The Proponent has assigned dedicated place managers to assist the affected landowners, particularly with finding new homes or businesses premises, finding new schools for children and other services to ease the experience of moving.

The Department is satisfied that the implementation of these processes would assist in mitigating the potential social and economic impacts resulting from property acquisitions.

Land use

The largest proportion of land use impacted by the project (approximately 51 percent) is primary production – used for pasture, feed crop and horticulture production, an important land use in the western Sydney region. The Department notes this impact is only a small proportion (0.13 percent) of what is regionally available. The Department considers that this loss would be outweighed by improved regional access and connectivity for the area, including to freight links and regional growth areas.

The Proponent proposes the following measures to reduce the impacts on existing agricultural land:

- locating the realigned road corridor near property boundaries where practicable;
- maintaining access to properties during construction and operation;
- providing an underpass for the Leppington Pastoral Company so cattle can cross to grazing land on either side of The Northern Road;
- consulting with property owners during detailed design to determine adjustments to fencing, farm infrastructure and other impacted structures;
- environmental management measures and procedures to minimise the risk of spreading weeds and pests between rural properties; and
- following construction, reinstating the land not required for the ongoing operation of the project to its former capacity (including impacted infrastructure).

The project will affect a small proportion (0.01%) of the region's low density residential land use. This will be countered by the development of the priority growth areas, which would be supported by an upgraded The Northern Road.

Business Impacts

The Proponent has advised that it is consulting with affected businesses (including home-based businesses) to identify measures to manage disruptions to business operations, including potential relocation. In this respect the Proponent will engage appropriately qualified professionals to carry out property assessments and identify alternate opportunities for remaining holdings. This includes considering impacts on the owners' remaining holdings during the acquisition process, undertaking property adjustments and relocating infrastructure (fencing, dams, etc.) in consultation with the property owner. Compensation for reasonable disturbance costs would also be considered by the Proponent.

The Department supports this approach and has reinforced this through a recommended condition requiring the Proponent (if requested by the landowner) to employ a suitably qualified and experienced independent agricultural specialist during detailed design. The specialist would provide independent advice to landowners, if required, to identify alternative farming opportunities. The Department has also recommended a condition requiring the Proponent to minimise the project's intrusion and disruption to agricultural activities, unless otherwise agreed by the landowner.

A business risk register will also be maintained to minimise disruptions and develop measures to manage specific construction impacts for individual businesses, including consultation with impacted businesses (particularly in keeping affected property owners informed of the project and any associated implications).

The prevention of right turn access between the intersections on the upgraded road is a key design element to provide a safer road. As discussed in Section 5.1, while this would increase travel distances to and from some businesses, this is considered reasonable.

Overall the Department is satisfied the Proponent has appropriately minimised the property impacts of the project.

The Department acknowledges that the short-term loss of through traffic may impact businesses in Luddenham village, however the longer-term traffic volumes are expected to increase with the development of the airport and urban development. The bypass will be relatively close to Luddenham, as the turnoffs will be approximately 1 kilometre and 500 metres from the town centre. The Department considers that economic impacts could be mitigated with the implementation of the Proponent's signage strategy. This approach has been adopted in other road upgrade projects involving town bypasses (such as the Pacific Highway road upgrades).

Overall, the Department considers the removal of through traffic (particularly heavy vehicles) would improve the amenity of Luddenham village (reducing conflict between local traffic and pedestrians), creating a more pleasant area to live and conduct business (which is conducive to medium to long term economic growth).

Economic benefits would also flow from the project (including short-term construction employment opportunities), and enhanced access connections would be provided to freight links and between important employment and growth areas (see Traffic and Transport Section 5.1). The project would also improve the safety and convenience of short term travel on the bypassed sections of the road. Once operational the project would also cater for substantial traffic growth through improved access and connectivity, which would result in benefits of additional trade for surrounding businesses.

<u>Community infrastructure impacts</u>
The majority of social infrastructure around the project is located in Glenmore Park and Luddenham village. This includes schools, sporting and recreational facilities, cultural facilities and open space. These facilities may experience amenity impacts (particularly noise impacts in Luddenham) during construction, and changed traffic conditions would temporarily affect connectivity to some community facilities. Overall the Department acknowledges that improved travel times are likely to benefit the wider community, including improved access to regional community services (such as the University of Western Sydney, Nepean Hospital and Western Sydney Parklands).

The project would support better access to public transport through a dedicated (future) bus lane and provide improved pedestrian and cyclist infrastructure with shared paths and pedestrian crossings at intersections.

Reduced heavy vehicle traffic would also deliver a safer pedestrian environment. Whilst some journey times may be increased due to changed traffic conditions, the Luddenham town centre would still be assessable from the north, south and west enabling continued access to businesses, services and facilities in the town centre, including schools, churches, medical facilities and shops. The project would also facilitate improved cycle and pedestrian connectivity to the Luddenham town centre.

Widening of The Northern Road would require the strip acquisition of land in the Orchard Hills Golf Course (located in the DEOH site), requiring changes to the layout of some of the holes. The Proponent proposes to consult with the golf club during detailed design about potential layout changes and management of the impacts. The Department notes that no concerns were raised by the Orchard Hills Golf Course.

The Department is satisfied the recommended construction management plans and strategies (detailed in the specific topic areas in this assessment report) would provide adequate

processes and safeguards to effectively manage indirect impacts on the amenity and accessibility of community facilities (such as schools and churches) close to construction works.

Conclusion
The Department acknowledges that the project will result in social and economic impacts, particularly through property acquisitions, relocation of businesses and short-term amenity impacts during its construction.

Overall the Department is satisfied the Proponent has appropriately minimised the land use impacts of the project, and that the project itself does not result in significant land use change. It would support long term opportunities through the planned growth of the region, particularly in relation to the western Sydney airport and surrounding growth areas.

Although the social and economic impacts cannot be offset entirely, the Department considers the recommended conditions of approval, in conjunction with the Proponent's proposed environmental management measures, would mitigate the impact to acceptable levels. The Department is also satisfied that the proposed Business Risk Register would effectively mitigate indirect amenity and accessibility impacts to individual businesses and the community.

The Department acknowledges that the regional road network must accommodate the expected traffic growth that would be generated through the planned priority growth areas and development of the western Sydney airport. On balance the Department considers the road network upgrades will significantly benefit the local and regional community and help continue the growth and development of the western Sydney region.

5.5. Flooding, Drainage, Salinity, Erosion and Sedimentation

Flooding and Drainage
The Northern Road upgrade corridor mostly follows a natural ridgeline traversing several waterways and ephemeral drainage lines in seven associated catchments, including the Badgerys Creek and Surveyors Creek catchments. These catchments currently experience flooding and the project has the potential to alter flooding and drainage characteristics by changing the landform in the flood zone.

The EIS includes a specialist flooding report which considers impacts to the road and surrounding land from runoff from the catchments, including potential changes associated with climate change.

The modelled changes to flooding and drainage include:

- changes (increases and decreases) to the rate and volume of runoff discharging to drainage lines and existing dams, including changes to scour potential;
- peak flood levels increasing for events up to the 100 year ARI in areas of undeveloped pastoral land;
- minor increases in the spatial extent of flood affected lands for events up to 100 year ARI due to the relatively steep sided drainage lines. The largest area affected during the 1 in 100 year ARI event is upstream of Glenmore Parkway, affecting land owned by the DEOH, Transgrid and the Penrith Golf and Recreation Club (see **Figure 15** – the purple area is land that would be affected by flooding that wasn't previously and the pink area is land that was affected by flooding but is now flood free); and
- increases in peak flood levels along the upstream side during a PMF event affecting four dwellings (two additional dwellings) on the Badgerys Creek floodplain and undeveloped pastoral land.

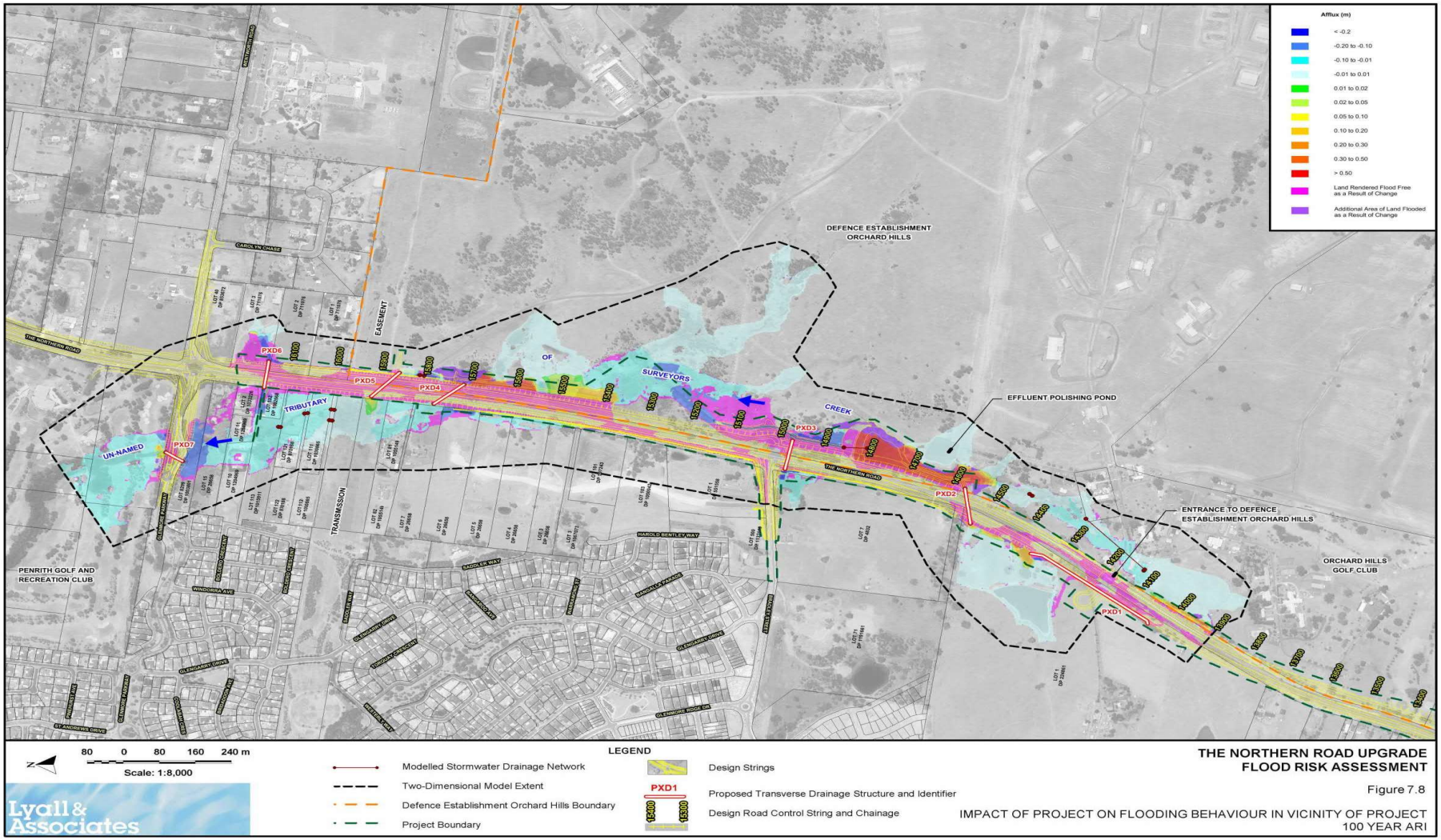

Figure 15: Increases in spatial extent of flooding on land owned by DEOH, Transgrid and Penrith Golf and Recreation Club (shown in purple)(Source: RMS, EIS**)**

The project has been designed to provide a minimum 100 year ARI level of flood immunity to the new carriageways and to mitigate the impact of the project on flooding behaviour on adjoining land. The project design includes transverse drainage and flood mitigation (new drainage infrastructure, permanent ponds and piped drainage channels) to manage flows.

While some areas that were previously flood affected would now be flood free during the 100 year ARI, some currently flood free land would be flood affected.

As flooding may occur during construction, the Proponent has committed to prepare a flooding contingency plan to manage scouring of waterways and erosion and sedimentation risk, and to install scour protection along temporary drainage lines and construction areas.

The Proponent has also proposed standard management measures to control erosion and sedimentation impacts to waterways during construction. These include:

- implementing and maintaining erosion and sediment controls;
- baseline water quality monitoring;
- progressive stabilisation to manage scour potential; and
- engaging a soil conservationist to review plans and complete routine inspections of the construction works.

The potential for scour and erosion of waterways during operation would be managed by incorporating additional scour protection in the waterways (such as the installation of rock mattresses at transverse drainage inlets and outlets, and rock lined spillways in permanent basins). This would be designed and installed in consultation with potentially affected land owners as part of the drainage and flood mitigation strategy.

The project is unlikely to increase salinity potential.

Submissions

Public submissions include concern about changes to stormwater and flood management, including changes to dam and pond inflows (both increases and decreases).

The **OEH** noted the potential for increases in damages and flood liability from increased peak flows, increased PMF levels impacting two previously unaffected dwellings and recommended scour management.

Water NSW raised concerns about flooding impacts to its water infrastructure, namely the Warragamba Pipelines, anchor blocks, air valves and a cross connection.

Liverpool City Council requested additional flood modelling to include the 20 year ARI and a flood impact assessment for all design events. Council also sought flood maps for all design events including the 1% AEP and the PMF.

The **EPA** recommended conditions of approval with respect to erosion and sediment control.

Department's Consideration

The Department supports the Proponent's committments to refine the detailed design of the road to further minimise flooding impacts on properties and to:

- prepare a transverse drainage and flood mitigation strategy in consultation with affected land owners to determine if further mitigation is necessary;
- consult with landholders where existing dams would receive less flow reducing the available yield of these dams; and
- provide additional scour protection in waterways where flood rates and volume may increase.

Reduction in yield to farm dams
Where the available yield of farm dams would be reduced due to the project, the Proponent has committed to consult affected landowners to understand the potential impacts and negotiate further mitigation or compensatory measures. The Department supports this approach and has recommended a condition of approval requiring the Proponent to consult with affected landowners and negotiate alternative arrangements or compensatory measures where relevant.

Construction Compounds
The Department supports the Proponent's commitment to preparing a flooding contingency plan and a Construction Environment Management Plan and sub plans to manage the risks associated with a flood during construction.

This is also reflected in the Department's recommended conditions requiring a Water, Soil and contamination CEMP sub-plan which would ensure consideration and management of impacts during construction.

Probable maximum flood (PMF)
The EIS predicted a PMF event would increase peak flood levels by up two metres at an additional two dwellings and undeveloped pastoral land near Badgerys Creek. In the SPIR, the Proponent lowered the vertical alignment of the road, which results in only a minor increase on existing conditions in the flood risk at the two dwellings (the flood level would increase at one dwelling by 0.1 m and the second dwelling by 0.2 m).

The Department has also recommended conditions requiring the Proponent to manage potential water quality impacts and to consolidate soil and water impact mitigation measures, such as the dewatering plan and ground water monitoring plan, in a Water, Soil and Contamination Sub-plan as part of the CEMP.

Conclusion
The Department supports the proposed measures to reduce flooding impacts compared to that currently experienced, and notes that the project would result in minor increases in flooding impacts adjacent to drainage lines close to the project during the 1 in 100 year ARI event.

The Department also acknowledges that by reducing flooding impacts, flow to some existing farm dams will also be reduced. The Department has recommended conditions of approval to ensure that the detailed design maintains or improves flood characteristics, appropriate flood modelling is completed and compensatory measures are negotiated with the affected landowner to offset the impact of reduced flows to farm dams.

Where there is a risk of scour, salinity, erosion or sedimentation, mitigation measures are also proposed which the Department supports and has reinforced through recommended conditions of approval.

5.6. Other issues

Aboriginal Heritage
The EIS identified 28 Aboriginal archaeological sites in the project area. All sites relate to transitional or transitory activities with 20 of the sites assessed as having moderate significance (being spatially connected by the landform itself whilst also representing connections through thousands of years of time). The remaining eight are generally disturbed or contain low value deposits.

It is considered the Proponent has adequately assessed those impacts of the project that could not be avoided. In this respect 16 archaeological sites would be partially impacted by the project (with 14 assessed as having moderate significance) and 12 archaeological sites would be wholly impacted by the project (with five assessed as having moderate significance).

The Proponent has included several mitigation strategies relating to the management of the identified Aboriginal sites, including:

- a salvage excavation program prior to construction works (for the Aboriginal sites of moderate significance as they exhibit moderately intact archaeological deposits);
- identifying the sites in a Construction Heritage Sites Map;
- identifying areas as environmentally sensitive no go zones;
- erecting barrier fencing to protect areas of the identified sites outside of the project boundaries; and
- the preparation of strategies for the unexpected identification of skeletal remains and/or Aboriginal objects.

The Department considers this a satisfactory approach, and has reinforced these commitments through recommended conditions of approval including the preparation of a Construction Heritage Management Sub-Plan, Salvage Strategy and Heritage Report. The Department considers that in conjunction with the recommended conditions of approval, the Proponent's commitments in regards to the management of Aboriginal sites would ensure that the project would not significantly impact on Aboriginal cultural heritage.

Non-Aboriginal Historic Heritage

The project is anticipated to have impacts on four listed or known potential heritage items in and immediately adjacent to the project area (see **Table 13**).

Table 13: list of known and potential heritage items of significance

Heritage item	Impact	Significance
Orchard Hills Cumberland Plain Woodland (Chaffey Brothers Irrigation Scheme Canal)	Direct	Commonwealth
Warragamba Dam to Prospect Reservoir Pipeline	Indirect	Local
Miss Lawson's Guesthouse Site, Luddenham	Direct	Local
Lawson's Inn site (former 'The Thistle' site)	Direct	Local

OEH (Heritage) raised concerns with the EIS regarding lack of historical investigation and mitigation measures for heritage items, and recommended a number of management measures. The SPIR provides additional historical research, assessment and identification of mitigation measures for the project, with OEH further recommending a number of conditions for the project.

It is noted that the Orchard Hills Cumberland Plain Woodland (Chaffey Brothers Irrigation Scheme Canal) is largely located on Commonwealth land, with the Department of Environment and Energy undertaking its own assessment of the project under the *Environment Protection and Biodiversity Act, 1999.*

The construction of the carriageway and fill slope of The Northern Road overlaps with the Warragamba Dam to Prospect Reservoir Pipeline alignment on the western side of The Northern Road located south of the Defence establishment land. The pipeline is below ground, and no physical impact is expected subject to the application of the identified mitigation measures (such as erosion and sediment control and stormwater management). Two concrete culverts located in a proposed access track and drainage works area however are proposed to be directly impacted. The removal of these items is not deemed to impact the significance

of the pipeline as they do not contribute to the historical or technological significance of the site.

The project would directly impact all surface items (such as archaeological remains and deposits) at Miss Lawson's Guesthouse, given the guesthouse site is located within the proposed road alignment. The project would also directly impact a portion of the historical curtilage of Lawson's Inn (being the western portion of the property), however it would avoid impacting the inn building, known associated outbuildings and the bulk of anticipated archaeological evidence at the site. At both sites there is potential for subsurface archaeological deposits which may be impacted during construction.

The Proponent proposes testing and salvage excavation of the Lawson's Inn historic curtilage prior to construction. Should archaeological resources in areas of low archaeological potential be identified, the Proponent has committed to review the design and, where feasible and reasonable, adjust the design to avoid or minimise impacts.

While the Department accepts that impacts have generally been minimised though route selection and design, it is recommended that impacts to heritage be avoided and minimised further if possible, or that the Proponent ensures heritage values are appropriately recorded where unavoidable. This process would include archaeological investigation in the form of test and salvage excavation (which the Proponent has committed to), and which the Department has re-inforced through the preparation of a detailed Salvage Strategy in consultation with OEH and documented in a Heritage Report.

The Department has also recommended implementation of a Construction Heritage Management Sub-plan as part of the CEMP for the project, which would include an adaptive framework for dealing with unexpected heritage finds.

Air Quality

Land use around the proposed roadway is predominately rural/residential with low-density residential at Orchard Hills and Luddenham village. The closest receivers are approximately 20 m from the project.

Background air quality was established using data collected between 2013 and 2015 from existing OEH monitoring stations around the project (St Marys, Bringelly, Prospect and Liverpool). A summary of the observations are:

- maximum 24 hr average PM_{10} concentrations exceeded the 50 µg/m^3 criterion in 2013 and 2015 by up to 49 µg/m^3, however are below the criterion in 2014.
- annual average PM_{10} concentrations ranged from 15 to 9 µg/m^3 below the criterion of 30 µg/m$^{3.}$
- maximum 24 hour average $PM_{2.5}$ background concentrations measured at prospect and Liverpool exceeded the 25 µg/m^3 criterion by up to 49 µg/m^3 (Liverpool; 2013).
- annual average $PM_{2.5}$ concentrations exceeded the 8 µg/m^3 criterion by 1 µg/m$^{3.}$
- maximum 1-hour average and annual average $N0_2$ background concentrations, and maximum CO concentrations are well below the relevant criterion.

The potential air quality impacts during construction arise primarily from the generation of dust, during early works (vegetation clearing, grubbing and removal), earthworks (stripping and stockpiling) and the excavation, placement and compaction of road base.

The Proponent undertook a risk based qualitative assessment of construction air quality impacts, which indicates that a moderate risk remains for several phases of construction following the implementation of air quality management measures. Regular monitoring and inspections are therefore proposed to confirm the effectiveness of the mitigation measures.

The potential overlapping of construction activities with the construction of the western Sydney airport or other stages of The Northern Road has also been considered. There is potential for cumulative construction air quality impacts to occur, which would primarily be related to dust.

The Proponent has proposed a range of established air quality management measures to limit potential dust impacts during construction, which include identifying the sources of dust, installing perimeter fencing, undertaking regular watering of exposed areas, covering loads and revegetating finished areas as soon as possible. These measures would be documented in an Air Quality Management Sub-plan as part of the CEMP for the project.

With the implementation of the dust management and mitigation measures, the project would have a minor impact on local air quality during construction. The Department has also recommended conditions of approval to prepare a Construction Environmental Management Plan to manage and mitigate potential air quality impacts arising from the construction of the proposal.

The operational air quality assessment predicts vehicle emissions for the years 2021 and 2031 for both the "Do Minimum" and "Proposed Upgrade" scenarios. The assessment predicts concentrations of PM_{10}, NO_2, CO, VOCs and 24 hour-averaged $PM_{2.5}$ would not exceed their respective criteria at any sensitive receivers during all scenarios. While exceedances of the $PM_{2.5}$ criteria are predicted due to the elevated background levels, the project, during the modelled worst-case scenario, would only contribute up to 0.6 µg/m^3 of $PM_{2.5}$ based on the comparison between during the "*2031 proposed upgrade*" scenario and the "*2031 Do Minimum*" scenario.

Therefore, the project contribution would not materially change annually averaged roadside concentrations and are therefore acceptable.

Urban Design and Visual Impact

The project passes through an existing rural landscape setting, however the future landscape would be altered by the approved western Sydney airport and surrounding growth areas.

The project design objectives were based on the *South Western Sydney Urban Design Strategy* (Cox Richardson, 2015 prepared for the Roads and Maritime Services), *The Northern Road Corridor Plan of Management - Narellan to Bringelly* (Roads and Maritime Services, 2015), *Beyond the Pavement, Urban Design Policy Procedures and Design Principles* (Roads and Maritime Services 2008) and the upgrade of The Northern Road between Glenmore Parkway and Jamison Road. The adopted design objectives aim to:

- protect and enhance existing views, character and cultural values of the corridor;
- provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape;
- facilitate the provision of good urban design outcomes for areas adjoining the road; and
- develop a simple and unified palette of elements and details that are attractive and easily maintained.

During construction, visual impacts are expected from temporary lighting, ancillary facilities and barriers. These impacts will be managed through the CEMP and include containing construction activities to the works site, use of barrier screens and avoidance of light spill to adjoining sensitive receivers.

Operational impacts were considered for five different landscape character zones (LCZ). Moderate to high visual impacts are predicted for these zones from the introduction of new project elements including the road alignment and bridge structures, substantial earthworks and embankments, variable message signs, the incident response facility and vegetation removal.

Over the long term, the landscape is likely to change from a mostly rural to an urban, industrial and commercial landscape setting and the road would become less visually prominent as other development occurs. However, until this time the project will be highly visible in its rural setting.

The Department notes that visual impacts from a project of this type and scale are inevitable and supports the Proponent's design objectives which aim to protect and enhance existing views, character and cultural values of the corridor, integrate the new road with the natural and built landscape and facilitate good urban design outcomes for areas adjoining the road. The Department also supports the Proponent's commitment to coordinate the visual and urban design aspects of the project in consultation with key stakeholders including councils (such as during preparation of the Urban Design and Landscape Management plan) and to consider and recognise the changes proposed to the landscape from other development.

The Department has further recommended that the project retain as many trees as possible. For those trees not covered by the biodiversity offset strategy (Section 5.3), the Department has recommended conditions requiring the Proponent to replace the trees removed during construction at a rate of two trees for every tree removed, with the planting of these trees to be coordinated with the relevant Council.

The Department considers the project design objectives are appropriate to guide the design of the project to be considerate of its current and future surroundings and it has recommended conditions of approval for ongoing consultation with relevant stakeholders including Councils to ensure the project achieves this.

Climate Change

Construction of the project is expected to generate 88,955 tonnes of CO2e which is mainly from fuel combustion, bitumen usage and vegetation removal. Of this, the greatest proportion is related to the combustion of fuel in on-site construction plant and equipment. The use of bitumen as part of the asphalting process is the second largest factor followed by fuel used during demolition and earthwork activities.

With forecast growth in traffic numbers, traffic modelling suggests that the 'do minimum' configuration would result in greater congestion, slowing average speeds and reducing the amount of traffic that can pass per unit time. Under the 2031 'do minimum' scenario it is understood the GHG Efficiency $kgCO_2e/y/vehicle$ would be 0.41 while the 2031 'with project' would sit at 0.28 and reducing the emissions per vehicle. The project would allow for a greater number of vehicles to use the upgraded road – with fewer stop / starts, less congestion and a greater average speed.

Emissions over a 50-year period were modelled for the project and identified that road traffic contributes to 97% of emissions released. The total emissions from road traffic of the 'with project' over 50 years post year of opening are 1,736 $ktCO_2e$. Although this is higher than the 'do minimum' scenario the efficiency per vehicle is considerably greater.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Need and justification

The Greater Sydney Commission's *Greater Sydney Region Plan – A Metropolis of Three Cities* (2018) envisages the emerging Western Sydney region and the Western Parkland City as part of the three cities vision for the Greater Sydney area, in conjunction with the developing Central River City and established Eastern Harbour City.

Key planned developments of the Western Parkland City include the western Sydney airport (scheduled to open in 2026) and Aerotropolis at Badgerys Creek, and the surrounding employment and residential growth areas. As a result, the region is predicted to experience significant growth over the next 40 years, with an estimated population increase of nearly one million people.

The Northern Road will play a major role in connecting traffic to and from these developments, and the projected growth will exceed The Northern Road's existing capacity, particularly at major intersections along the corridor. A section of the existing road passes through airport land, therefore a realignment of The Northern Road is needed.

The Northern Road Upgrade is part of the joint NSW and Commonwealth Government's $3.6 billion *Western Sydney Infrastructure Plan* to upgrade road infrastructure in western Sydney over the next 10 years. The Western Sydney Infrastructure Plan features in *The State Infrastructure Strategy 2018-2038* (February 2018) and *Future Transport Strategy 2056* (March 2018), which both support the *Greater Sydney Region Plan*. These strategies recognise the importance of the Western Parkland City in catering for future population growth in the Sydney region. and identifies several infrastructure projects to cater for this growth, including The Northern Road Upgrade.

The project has local benefits with reduced congestion at intersections which would reduce the likelihood of crashes and higher design speeds to allow safer travel along the corridor. Other benefits include improved connectivity for pedestrians and cyclists by providing off road shared user paths, and significant improvements to the local amenity and safety of Luddenham by removing through traffic, particularly heavy vehicles.

6.2. Key Considerations

The Department has assessed the merits of the proposal taking into consideration the issues raised in submissions and is satisfied that the environmental impacts have been satisfactorily addressed in the Proponent's EIS, SPIR and through the Department's recommended conditions of approval.

Key issues of the proposal include traffic, noise and vibration, biodiversity, land use and socio-economic impacts, flooding and drainage.

The Department is satisfied that the project has been adequately designed to meet the future traffic and transport objectives for the region. Some of the road safety improvements include:

- an improved alignment and a divided carriageway to remove the need for opposing-lane overtaking and the associated risk of head-on crashes;
- upgraded intersections to reduce congestion and the likelihood of crashes;
- a bypass of Luddenham to remove through traffic, particularly heavy vehicles; and
- new heavy vehicle inspection areas.

Construction related traffic impacts include road and lane closures, reduced speed limits and changed access arrangements to properties. While this has the potential to disrupt traffic

flows, the Department's assessment concludes these impacts can be adequately managed through traffic controls and night-time works where road closures are required. A key community concern was also maintaining property access, with the Department recommending that pedestrian and vehicular access be maintained in consultation with the affected residents and businesses.

The Department acknowledges operational road noise levels will increase, with operational noise being a key community concern raised in submissions. At-property treatments are to be installed for 78 receivers. Construction of the project would also result in the generation of high noise levels, which will be managed through the implementation of a Construction Noise and Vibration Management Plan, the provision of respite periods and early implementation of the operational noise mitigation measures.

The project requires the clearing of approximately 40.78 hectares of vegetation, with a Biodiversity Offset Strategy developed to outline how the projects impacts will be offset in perpetuity. The final offset requirement will be determined following detailed design and confirmation of the project footprint. The management for the de-watering of dams and relocation of Eastern long neck turtles and other aquatic species found during the works was also a key concern raised during submissions. The CEMP for the project will include a stream and farm dam de-watering plan that describes the required dewatering and relocation procedures.

The Department acknowledges that the project is likely to result in change for the local community, particularly through property acquisitions, relocation of businesses and short-term amenity impacts during its construction. The Department however is satisfied these impacts have been minimised as far as practicable, and the road network upgrades would provide significant benefits to the local and regional community and help continue the growth and development of the Greater Sydney Region.

The project would result in minor increases in flooding, and water flow to some existing dams would also be reduced. The Proponent is required to consult with affected landowners to understand the potential impacts on existing dams and negotiate further mitigation or compensatory measures. The Department has also recommended conditions to manage potential water quality impacts.

Other issues assessed, and considered to be managed appropriately, include Aboriginal heritage, Non-Aboriginal heritage, air quality, urban design and visual impact and climate change.

Whilst some residual impacts are expected, the Department has recommended conditions that enhance the Proponents mitigation measures and provide improved community and amenity outcomes, including:

- the preparation of plans in consultation with Liverpool City Council to re-vitalise Luddenham town centre and implementation of a signage strategy to encourage patronage of local businesses;
- biodiversity offsets for impacts to threatened species and ecological communities, plus an increase in tree coverage and landscape character, with two trees to be planted for the removal of each tree not covered by the biodiversity offset strategy, in consultation with the relevant councils;
- the provision of operational noise mitigation measures and early implementation of these noise mitigation measures to mitigate construction noise impacts; and
- maintaining access to private property.

The potential environmental impacts associated with the construction and operation of the proposal would be acceptable subject to the implementation of appropriate mitigation

measures and the Department's recommended conditions of approval. The proposal would comply with the objects of the EP&A Act and with the principles of Ecologically Sustainable Development.

6.3. Recommendation

On balance, it is concluded that the proposal's benefits outweigh its potential impacts and that residual impacts can be managed and would not, subject to conditions, result in long term adverse or irreversible effects.

The Department therefore recommends that the project be approved subject to the recommended conditions of approval.

4/5/2018

Glenn Snow
Director
Transport Assessments

4/5/18.

David Gainsford
Executive Director
Priority Projects Assessments

APPENDIX A ENVIRONMENTAL IMPACT STATEMENT

See the Department's website at
http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7127

APPENDIX B SUBMISSIONS

See the Department's website at
http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7127

APPENDIX C PROPONENT'S PREFERRED INFRASTRUCTURE REPORT AND RESPONSE TO SUBMISSIONS

See the Department's website at
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APPENDIX D SUMMARY OF KEY CONDITIONS

Condition	Subject	Summary
E3	Biodiversity	A Biodiversity Offset package is to be prepared in consultation with OEH
E6	Flooding and Hydrology	Measures to maintain or improve flood characteristics to be incorporated into detailed design
E8	Flooding and Hydrology	Impacts to water supply and measures to prevent, mitigate or offset a loss in water supply
E12-E13	Non-Indigenous Heritage	Preparation of Historical Archaeological Salvage Strategy and Excavation Report
E18-E19	Aboriginal Cultural Heritage	Preparation of Aboriginal Archaeological Salvage Strategy and Excavation Report
E28	Noise	Construction vehicles arriving at the project site and compounds outside of standard hours not to queue with idling engines
E29	Noise	Outlines the consultation process and implementation of respite from noisy construction works
E31	Noise	Temporary acoustic barriers to be installed as soon as site establishment works at ancillary facilities are completed
D9 and E36	Noise	Requirement for an Operational Noise Compliance Report and Operational Noise Mitigation Report to review the proposed operational noise mitigation measures and any additional measures if required
E37	Noise	Operational noise mitigation measures to be implemented within 6 months of commencement of construction
E39	Property and Landuse	Construction of the project is to minimise intrusion and disruptions to agricultural operations/activities
E40	Property and Landuse	Where the viability of existing agricultural operations are to be impacted an independent agricultural expert is to assist in identifying management measures
E42-E43	Building condition surveys	Building and structure condition surveys to be undertaken for all buildings and structures at risk of damage prior to, and at the completion of works
E51	Sustainability	A sustainability strategy is to be prepared to achieve an equivalent ‘As Built’ rating of excellent
E57	Traffic and Transport	Pedestrian and vehicular access to business and affected properties is to be maintained
E58	Traffic and Transport	Signage and directions to businesses to be provided during construction
E59	Traffic and Transport	Operational signage to be provided along the project alignment
E60	Urban Design	The project must be designed to retain as many trees as possible, with the requirement to replace the trees removed during construction at a rate of two trees for every tree removed
E62-E65	Urban Design	An Urban design and Landscape Plan is to be prepared in consultation with Councils and the community
E72	Water	Drainage feature crossing, swales and depressions to be designed and constructed in accordance with relevant guidelines