



Australian Government

BUILDING OUR FUTURE



The Northern Road Upgrade Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park

NSW Environmental Impact Statement /
Commonwealth Draft Environmental Impact Statement

Volume 1: Main Report

June 2017



The Northern Road Upgrade – Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park

**NSW Environmental Impact
Statement / Commonwealth Draft
Environmental Impact Statement
June 2017**

Volume 1: Main Report

Prepared for
Roads and Maritime Services
By Jacobs Australia
RMS: 17.274
ISBN: 978-1-925659-22-1

BLANK PAGE

Contents

Contents	iii
Glossary of terms and abbreviations.....	ix
Executive summary	xxi
1 Introduction	1
1.1 The project.....	2
1.2 Location and context of the project.....	4
1.3 Project location	7
1.4 Structure of this environmental impact statement	8
2 Assessment process	13
2.1 Approval framework.....	14
2.2 Other legislation.....	17
3 Strategic justification and project need.....	19
3.1 NSW strategic planning and policy framework	19
3.2 National strategic planning and policy framework	26
3.3 Project need	27
3.4 Project objectives	30
3.5 Statement of strategic need.....	31
4 Project development and alternatives	33
4.1 Alternatives considered	34
4.2 Evaluation of alternatives considered	35
4.3 Route options development.....	42
4.4 The project.....	69
5 Project description.....	75
5.1 Project scope.....	76
5.2 The completed project	78
5.3 Design criteria.....	126
5.4 Construction	130
5.5 Staging	157
6 Consultation	161
6.1 Consultation objectives and strategy	163
6.2 Consultation process and activities to date	164
6.3 Summary of issues raised	174
6.4 Future consultation	180
7 Assessment of key Issues	183
7.1 Traffic and transport	187
7.2 Noise and vibration.....	219

7.3	Biodiversity	280
7.4	Socio-economic and land use	369
8	Assessment of other issues	429
8.1	Hydrology and flooding	430
8.2	Soils, water and contamination	454
8.3	Aboriginal heritage	498
8.4	Non-Aboriginal heritage	524
8.5	Urban design and visual impact	568
8.6	Air quality	614
8.7	Resources and waste management	632
8.8	Climate change and greenhouse gas	643
8.9	Hazard and risk	657
9	Cumulative Impacts	667
9.1	Nature of cumulative impacts	668
9.2	Potential cumulative impacts	675
9.3	Environmental management measures	687
10	Sustainability	689
10.1	What is sustainability	689
10.2	Project sustainability framework	690
10.3	Project sustainability strategy	692
10.4	Ecologically sustainable development	705
11	Environmental risk analysis	709
11.1	Overview	709
11.2	Environmental risk analysis results	710
12	Summary of environmental management measures	725
12.1	Environmental management framework	726
12.2	Construction Environmental Management Plan	726
12.3	Summary of construction safeguards and management measures	736
12.4	Operational environmental management	791
13	Project justification and conclusion	797
13.2	Conclusion	805
14	References	811
	List of tables	823
	List of figures	829

Appendices

- Appendix A – Proponent details and environmental performance of the proponent
- Appendix B – Secretary’s environmental assessment requirements
- Appendix C – Commonwealth EIS Assessment requirements
- Appendix D – Environmental Planning and Assessment Regulation 2000 checklist
- Appendix E – Environment Protection and Biodiversity Conservation Regulation Checklist
- Appendix F – Persons and agencies contacted during the EIS
- Appendix G – Technical working paper: Traffic and transport
- Appendix H – Technical working paper: Noise and vibration
- Appendix I – Technical working paper: Biodiversity
- Appendix J – Technical working paper: Socio-economic
- Appendix K – Technical working paper: Flood risk assessment
- Appendix L – Technical working paper: Soils, water and contamination
- Appendix M – Technical working paper: Aboriginal cultural heritage assessment report
- Appendix N – Technical working paper: Non- Aboriginal heritage
- Appendix O – Technical working paper: Urban design, landscape character and visual impact assessment
- Appendix P – Technical working paper: Air quality
- Appendix Q – Technical working paper: Greenhouse gas assessment and Climate change risk assessment
- Appendix R – Draft Community Involvement Plan
- Appendix S – EIS Team
- Appendix T – Roads and Maritime Services Environmental Policy Statement

BLANK PAGE

been completed. As such, the BOS cannot outline specific details of a proposed offset package (ie location and size of any offset sites, maps for an offset site, ownership and tenure, etc.).

7.4 Socio-economic and land use

This chapter describes the socio-economic values of the study area and identifies the potential impacts to these values as a result of the construction and operation of the project. This chapter also recommends environmental management measures to reduce the socio-economic impacts of the project.

The technical working paper, Socio-economic Assessment (Appendix J) has been used to inform this chapter.

Table 7-56 sets out the Secretary's Environmental Assessment Requirements (SEARs) and requirements of the Commonwealth EIS Guideline as they relate to socio-economic impacts and states where in this EIS these have been addressed.

Table 7-56 Environmental assessment requirements – Socio-economic

Requirement	Where addressed in the EIS
Secretary's Environmental Assessment Requirements	
Social and Economic — including: impacts on directly affected properties and land uses, including impacts related to access and severance, existing and proposed land uses, property acquisition and amenity related changes;	Refer to Section 7.4.3 for property and land use impacts
social and economic impacts to the community and businesses in the vicinity of the proposal (including agricultural businesses), associated with traffic, access, property, public domain and amenity related changes; and	Refer to Section 7.4.3 for community and business impacts
draft Community Involvement Plan for the works, identifying relevant stakeholders, procedures for distributing information and receiving/ responding to feedback and procedures for resolving community complaints during construction. Key issues that should be addressed in the draft Plan should include (but not necessarily be limited to): <ul style="list-style-type: none"> • traffic management (including property access and pedestrian access), and • noise and vibration mitigation and management, including work outside standard construction hours. 	A Draft Community Involvement Plan for the project is referenced in Chapter 6 and attached in Appendix R
Commonwealth EIS Guidelines	
The EIS must include a description of the environment of the proposal site and the surrounding areas that may be affected by the action. It is recommended that this include the following information: <ul style="list-style-type: none"> • A description of the environment in all areas of potential impact, including all components of the environment as defined in Section 528 of the EPBC Act: <ul style="list-style-type: none"> – Ecosystems and their constituent parts, including plants and animals, people and communities, landscapes and soils – Natural and physical resources, including water resources 	Refer to Section 7.4.2 for description of the environment Refer Section 7.3, 8.2, 8.5 Refer Sections 8.1, 8.2,

Requirement	Where addressed in the EIS
<p>and air</p> <ul style="list-style-type: none"> – The qualities and characteristics of locations, places and areas – Heritage values of places <p>The social, economic and cultural aspects of a thing mentioned in preceding dot points.</p>	<p>8.6</p> <p>Refer Section 8.5</p> <p>Refer Sections 8.3, 8.4</p> <p>Refer to Section 7.4.3</p>
<p>Impacts to the environment (as defined in Section 528) should include but not be limited to the following:</p> <p>Changes in recreational use and amenity of natural areas</p>	<p>Refer to Section 7.4.3</p>
<p>The economic and social impacts of the action, both positive and negative, must be analysed. Matters of interest may include:</p> <ul style="list-style-type: none"> • Details of any public consultation activities undertaken, and their outcomes • Employment opportunities expected to be generated by the project (including construction and operational phases). <p>Economic and social impacts should be consisted at the local, regional and national levels.</p>	<p>Refer to Sections 7.4.3, 7.4.4</p> <p>Refer to Chapter 6 Consultation</p> <p>Refer to Sections 7.4.3, 7.4.4</p>

7.4.1 Assessment methodology

The socio-economic impact assessment involved a process of analysing, monitoring and managing the intended and unintended social and economic impacts, both positive and negative, of the project. It involved identifying, assessing and evaluating changes to or impacts on, communities, business and industry that are likely to occur as a result of the project, in order to mitigate or manage impacts and maximise benefits. This assessment has been developed in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note N05 – Socio-economic assessment* and to address socio-economic matters outlined in the SEARs and the economic and social matters identified in the Commonwealth EIS Guidelines.

The information sources used in carrying out the assessment are identified below, where applicable, and comprise ABS Census Data and previous assessments. A complete list of information sources used in the assessment is provided in the working paper. The assessment methodologies described below identify where those sources of information have been verified or considered to be the latest available data. Additional surveys have also been used to gather further information to assist the assessment.

Where information regarding specific socio-economic parameters are unknown (such as financial information associated with private businesses), or unpredictable (such as the extent of impact on individual businesses from the project), the assessment has identified these uncertainties.

The approach to this assessment involved five main stages:

1. Scope socio-economic issues. This stage involved scoping the range of potential socio-economic impacts for local and regional communities, business and industry that could result from the project
2. Establishing a socio-economic baseline. This stage involved an investigation of the key socio-economic characteristics and conditions. It included consideration of:
 - Government policy and strategy
 - Population, demographic and housing indicators
 - Industry, employment and income data

- Existing and future land use, including land use zoning
 - Economic information, including data on employment and income, agricultural uses, and local business and industry in the study area
 - Existing social infrastructure, including education facilities, health and emergency services, recreation uses and transport facilities
 - Community values relating to factors such as amenity and sense of place, access and connectivity, and community health and safety.
3. Describing the existing land use, planning and socio-economic conditions principally from information in the ABS Census of Population and Housing 2011 (ABS, 2012b) which is the most comprehensive dataset currently available on population and housing in the study area, supplemented with more recent information and data where available, including the information collected during stakeholder consultations (as documented in Chapter 6), and the surveys of local businesses (see below and in Section 7.4.2)
 4. Assessing potential impacts. This stage involved evaluating impacts on and changes to socio-economic conditions and values in the study area from the project's construction and operation
 5. Development of measures to avoid, manage, or mitigate impacts. This stage involved the development of measures to address socio-economic impacts. Opportunities to maximise the benefits of the project were also explored.

The outcomes of consultation and key stakeholders including local communities, business representatives, local government officers and community service providers informed all of the assessment stages.

The study area for this socio-economic assessment has been based on those communities that have potential to experience impacts on or changes to socio-economic conditions due to the location of the project, construction activities and changes in movement patterns for residents, workers and visitors. It includes the Australian Bureau of Statistics (ABS) Statistical Areas Level 2 (SA2) geographies of:

- Glenmore Park-Regentville SA2 (referred to as Glenmore Park-Regentville)
- Mulgoa-Luddenham-Orchard Hills SA2 (referred to as Mulgoa-Luddenham-Orchard Hills)
- Badgerys Creek-Greendale SA (referred to as Badgerys Creek-Greendale).

It also considers at a broader level, regional impacts on communities and businesses in the Local Government Area's (LGA) of Penrith City and Liverpool City as well as the wider Sydney region.

Two separate surveys were conducted to gather information on local businesses in the study area. These included:

- Car park (number plate) survey to gather information on the origin of 'shoppers' within Luddenham
- Survey of local business owners/ managers to gather information on local businesses within the study area about the type and nature of businesses, business operations, and business owners' perceptions of potential benefits and impacts for local businesses of the projects construction and operation.
- Written surveys were conducted with owners/ managers of retail and service businesses (eg doctors, hairdressers, etc) businesses within Luddenham and other areas near the project. Surveys were hand delivered to local businesses on Wednesday, 9 March 2016. These were either completed face-to-face with business owners/ managers or left for the business owners/ managers to complete separately. Some surveys were also completed over the telephone. A copy of the business survey is provided in Appendix J.

Economic appraisal of individual business impacts has not been carried out as part of the socio-economic assessment in this EIS. Due to the sensitivities of the bypassing of Luddenham, Roads and Maritime deemed that approaching business owners to attain business operations records would be inappropriate.

Further detail regarding these surveys is provided in Appendix J – Socio-economic Assessment.

7.4.2 Existing environment

This section describes existing socio-economic characteristics and features of the study area to provide a baseline against which the project's socio-economic impacts can be assessed. As outlined above, the existing environment (or baseline) has been derived from ABS Census 2011 data which is the most comprehensive dataset currently available. The data has been supplemented with more recent information from surveys or from previous assessments.

The existing environment includes information on land use and land use zoning, population and housing, the economy, community values, social infrastructure and transport and access.

Property and land use

Regional land use

The project extends from the Liverpool LGA in the south to Penrith LGA in the north and west.

Penrith comprises predominantly rural land uses, including a wide range of agricultural activities such as dairying, poultry farming, hobby farming, orcharding, market gardening and horse breeding. Major commercial centres in the LGA are located at Penrith, west of the project and St Marys, east of the project. The LGA also accommodates the DEOH adjacent to The Northern Road. In addition to buildings and structures, land within the DEOH includes areas used for recreation, conservation, water storage (dams) and open space.

Land uses in the Liverpool LGA include a mix of rural and urban uses, including residential, commercial, agricultural and industrial uses. The LGA also accommodates Defence uses including the Holsworthy Barracks. The Liverpool CBD is the key commercial centre for the region, offering a range of retail, business and commercial uses. The LGA accommodates a number of major community services and facilities, including education facilities, major health care services and recreational facilities.

Agricultural uses in the study area vary in their scale and intensity, from small-scale market gardens and hobby farms to capital-intensive agribusiness developments such as the Leppington Pastoral Company, occupying about 600 ha on The Northern Road at Bringelly which is used for intensive dairying, grazing and feedlots. While its use (for now) remains rural and agricultural, the site of the Western Sydney Airport at Badgerys Creek, which is of socio-economic significance at the local, regional and national levels, lies on land within the Liverpool LGA. For the purposes of this assessment, it has been assumed that as the airport site begins to be developed for aviation purposes, its regional and national socio-economic importance would begin to grow in regard to its impacts on land use, employment, industry and business in the western Sydney region.

The NSW Government has mapped land at a regional scale to identify areas of Biophysical Strategic Agricultural Land (BSAL), which is land with high quality soil and water resources capable of sustaining high levels of productivity. No land within the study area has been identified at a regional level as BSAL (www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/Safeguarding-our-Agricultural-Land).

A number of regional and state level community services and facilities are located within the Penrith and Liverpool LGAs that cater for communities in the study area as well as in the broader western Sydney region. These include:

- Major hospitals such as Nepean public and private hospitals at Penrith, and Liverpool Hospital at Liverpool
- Tertiary education facilities, including University of Western Sydney campuses at Kingswood and Werrington, TAFE Western Sydney Institute – Nepean College campuses at Kingswood and Penrith; TAFE South Western Sydney Institute – Liverpool College

- Regional, state and national sport and recreation facilities, such as Penrith Lakes Regional Park, including Sydney International Regatta Centre and Penrith Whitewater Stadium; Nepean Aquatic Centre; Penrith Park, including Penrith (Pepper) Stadium and Howell Oval; and Western Sydney Parklands, including Sydney International Shooting Centre, Eastern Creek International Raceway and Sydney International Equestrian Centre
- Major retail, commercial uses, cultural and community support facilities located in the Penrith and Liverpool CBDs.

Land use in the study area

Land use zones within the study area are shown in Figure 7-12. Current and future land uses in the study area are listed below.

Rural use zones (RU) generally cover the southern part of the study area, mainly south of the WaterNSW Supply Pipelines. They include:

- Primary production areas, located south of Elizabeth Drive and generally west of The Northern Road at Luddenham, Greendale and Bringelly (including agricultural land used for cropping, grazing, dairying, horticulture and intensive animal production, as well as a quarry)
- Small lot primary production around Willowdene Avenue at Luddenham and at Bringelly
- Rural landscape areas, located on either side of The Northern Road between the WaterNSW Supply Pipelines and Elizabeth Drive, and at Mulgoa opposite the DEOH
- Rural village at Luddenham, west of The Northern Road.

Residential zones (R) are mainly located at Bringelly, Luddenham and Glenmore Park. They include:

- Large lot residential areas at Luddenham, east of The Northern Road and Luddenham town centre and at Bringelly, south of The Northern Road
- Low density residential areas at Luddenham town centre, and Glenmore Park
- Environmental living and general residential areas at Glenmore Park.

Land in the study area zoned for special purposes (SP) comprises:

- Special Activities zone, including:
 - DEOH, located in the northern part of the study area, east of The Northern Road (this includes the land occupied by the Orchard Hills Golf Club)
 - The site of the Western Sydney Airport, located in the southern part of the study area, east of the proposed The Northern Road corridor.
- Infrastructure zone, including:
 - The existing The Northern Road Corridor
 - The WaterNSW Supply Pipelines, which crosses The Northern Road corridor at Orchard Hills and Mulgoa.

Land zoned for environment protection (E) is mainly located in the northern part of the study area and includes:

- Environmental conservation areas (E2), surrounding the DEOH and along Cosgroves Creek north of Elizabeth Drive (including conservation areas, river systems, farm dams, and tree coverage)
- Environmental management areas (E3) west of The Northern Road at Mulgoa.

The environmental conservation zone (E2) seeks to prevent development that could destroy, damage or otherwise have an adverse effect on areas of high ecological, scientific, cultural or aesthetic value. The zone allows for low impact, passive recreational uses and ancillary land uses that are consistent with the retention of the natural ecological significance.

The Environmental Management zone (E3) provides for limited development that does not have an adverse effect on special ecological, scientific, cultural or aesthetic values. The zone also seeks to ensure development is compatible with the environmental capabilities of the land and preserve and improve natural resources through appropriate land management.

Other land use zones in the study area include:

- Business zones (B), including neighbourhood centres within Luddenham town centre and local centres at Glenmore Park
- Recreation zones (RE), including public recreation areas at Glenmore Park and Luddenham, and land zoned for private recreation at Glenmore Park (Penrith Golf and Recreation Club) north of the project
- Commonwealth Defence land within the DEOH, used for recreation, conservation, dams, or open space buffers
- Commonwealth land that has been acquired for the development of the Western Sydney Airport at Badgerys Creek
- Town centre of Luddenham (refer below).

The objectives of each land use zone are further outlined in Appendix J.

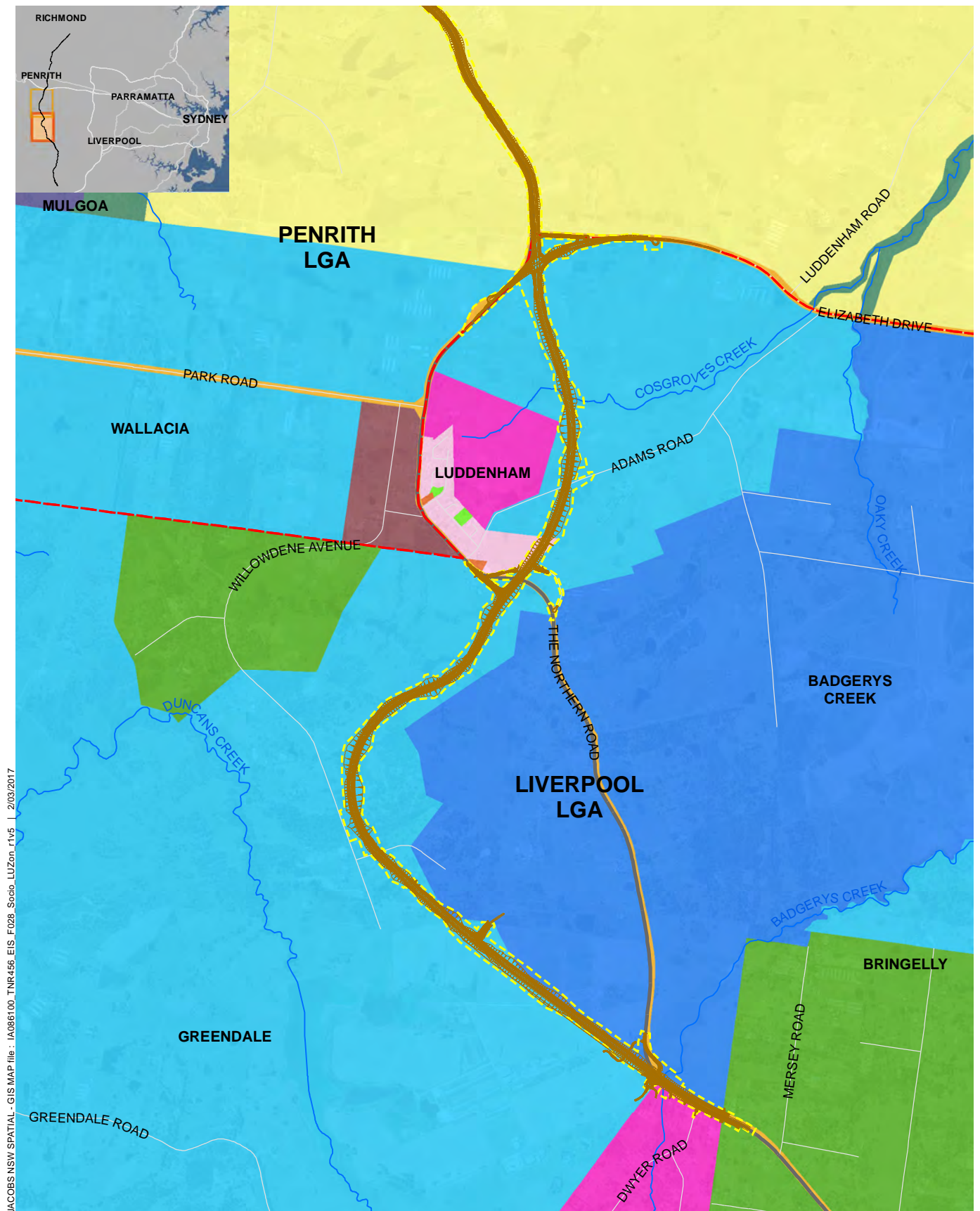
Additionally, it is noted that an existing Mineral Exploration Licence (EL 8429) held by The Austral Brick Co Pty Ltd exists over the study area, as granted on 20 April 2016. An exploration licence gives the holder the exclusive right to explore for the specified mineral group(s) within the exploration licence area, during the term of the licence. The purpose of exploration is to locate areas where mineral resources may be present, to establish the quality and quantity of those resources and to investigate the viability of extracting the resource. The granted licence EL 8429 is for Group 5 Clay minerals, and is due to expire on 20 April 2018.

Commonwealth land

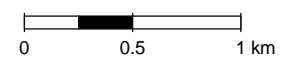
As referred to above, extensive areas of Commonwealth land exist within and adjacent to the study area, which have a major bearing on the project. The lands required for the Western Sydney Airport at Badgerys Creek have been acquired and set aside by the Commonwealth, with the airport's development being a key driver for the project in socio-economic terms. The DEOH is also on land owned by the Commonwealth, and occupies an extensive site fronting The Northern Road on its eastern side, north of the WaterNSW Supply Pipelines. The site for the Western Sydney Airport largely remains in rural and agricultural use pending commencement of the airport's development, while the DEOH land is primarily used for a range of Defence-related purposes although remains largely undeveloped. There is a section within the DEOH site that also contains the Orchard Hills Golf Course. The golf course is currently leased from the Commonwealth Government for private use.

Both the DEOH site and the site of the Western Sydney Airport contain natural drainage lines and named waterways such as Badgerys Creek. The two sites also contain naturally vegetated areas including patches of Cumberland Plain Woodland and Riverflat Eucalypt Forest. The biophysical characteristics of the Commonwealth lands are described in the respective sections of Chapters 7 and 8 of this EIS, along with discussion about the project's likely impacts on biophysical processes and landform features. Additionally, a description and assessment of the potential impacts to natural heritage on the DEOH site is provided in Chapter 8.4.

This chapter describes the project's socio-economic impacts on Commonwealth land in accordance with the Commonwealth EIS Guidelines.



JACOBS NSW SPATIAL - GIS MAP file : IAC66100_TNR456_EIS_F028_Socio_LUZon_r1v5 | 2/03/2017



- The Northern Road upgrade - Mersey Road to Glenmore Parkway
- The Northern Road (Existing)
- Operational boundary
- Local government area

- Zone**
- Low Density Residential
 - Large Lot Residential
 - Infrastructure
 - Environmental Conservation
 - Environmental Management
 - Neighbourhood Centre

- Primary Production
- Primary Production Small Lots
- Public Recreation
- Rural Landscape
- Special Activities
- Village

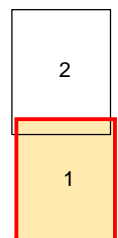
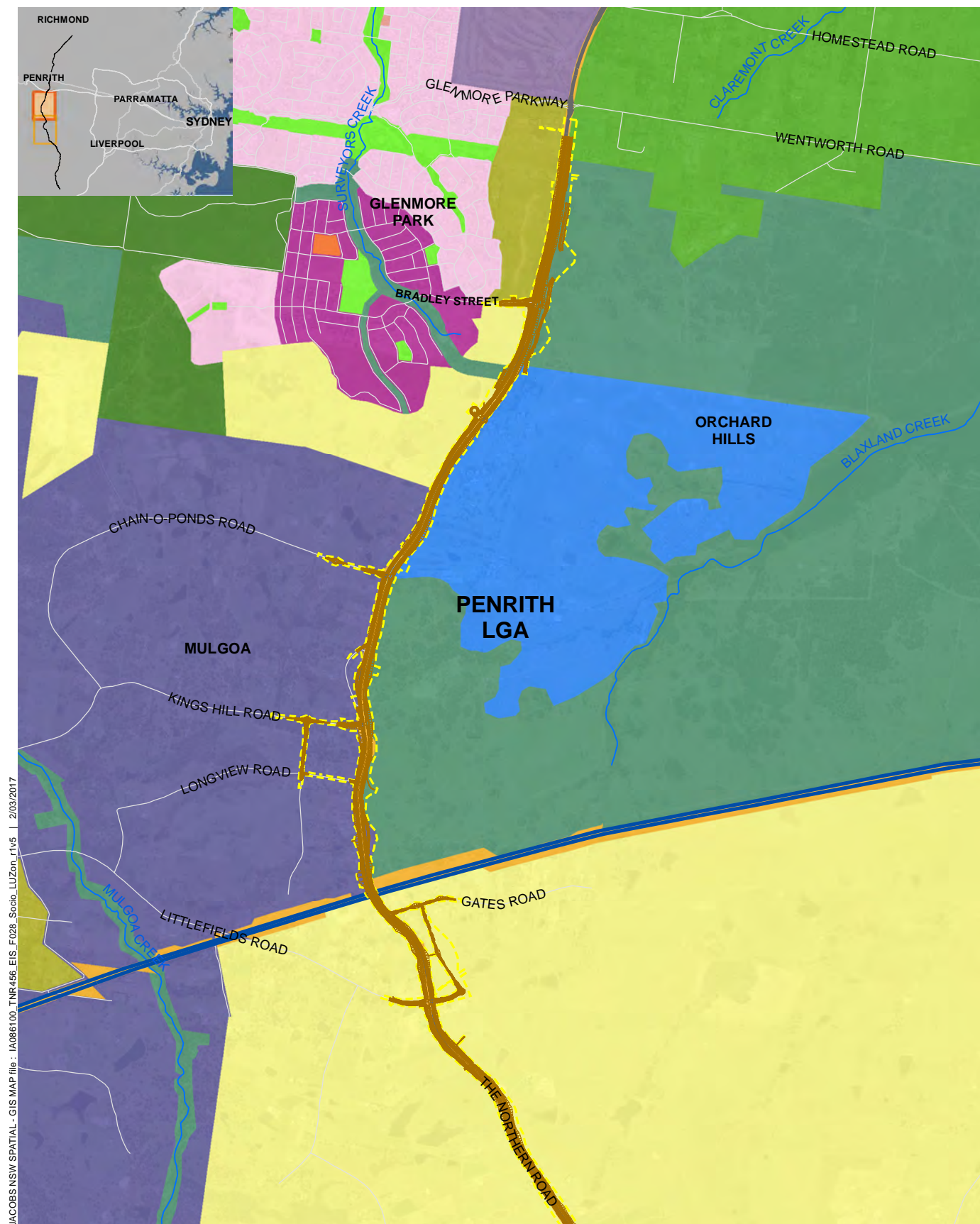
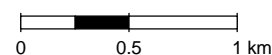


Figure 7-12 | Land use zoning



JACOBS NSW SPATIAL - GIS MAP file : JAC06100_TNR456_EIS_F028_Socio_LUZon_r1v5 | 2/03/2017



- The Northern Road upgrade - Mersey Road to Glenmore Parkway
- The Northern Road (Existing)
- WaterNSW supply pipelines
- Operational boundary
- Local government area

- Zone**
- Low Density Residential
 - Medium Density Residential
 - General Residential
 - Infrastructure
 - Local Centre
 - Environmental Conservation
 - Environmental Living

- Environmental Management
- Primary Production Small Lots
- Public Recreation
- Private Recreation
- National Parks and Nature Reserves
- Rural Landscape
- Special Activities

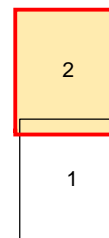


Figure 7-12 | Land use zoning

Areas of public domain

The public domain comprises the community's public space, both functionally and visually. It includes shared urban areas and spaces, the structures that relate to those spaces and the infrastructure that supports and serves them, such as areas that are publicly owned and commonly accessed/ used by the community (for example, parks, public squares and road verges); spaces between public and private activities (for example, outdoor eating and/or trading areas); private spaces that are visible but physically inaccessible to the public (Penrith City Council, 2014).

Key characteristics of the public domain in the study area include:

- Landscaping of the road verge for The Northern Road and other roads, which mainly comprises grassed areas and some established trees, but also includes moderately vegetated areas (for example, south of Bradley Street, near Grover Crescent and south of Luddenham town centre)
- Established trees and landscaping within properties along The Northern Road
- Rural landscapes, including grazing and cropping areas, rural residential uses, and conservation areas
- Luddenham town centre, which is characterised by its 'village' feel, and includes a mix of residential, commercial and community uses along The Northern Road
- Open space and recreation areas, including golf courses.

The public domain in the study area is affected by existing traffic on The Northern Road, including heavy vehicles, impacting noise, air quality, visual amenity and safety for local communities and road users. In particular, traffic volumes through the Luddenham town centre impact on the amenity and quality of the public domain.

Social environment

Population and housing

In 2015, the study area had a total resident population of 42,049 people, of which more than half lived within the Glenmore Park-Regentville area, which is suburban in character. The more rural area of Mulgoa-Luddenham-Orchard Hills had the smallest resident population at 7,867 people.

Over the 10 years to 2015, the population of the study area grew by about 6,559 people, an average of about 1.7 per cent per annum. This was above the rate of population growth for NSW over the same period and was driven by relatively high population growth in the Mulgoa-Luddenham-Orchard Hills area and the Badgerys Creek-Greendale area, particularly between 2010 and 2015. Population growth in the region is expected to continue, focused in the Western and Southern Sydney Priority Growth Area, and around the Western Sydney Airport.

Overall, the study area as a whole tended to have a younger population compared to the NSW population, with a lower median age; higher proportion of children aged 14 years or under and people aged 25-44 years; and lower proportions of older people aged 65 years or over.

The younger age profile of the study area was generally driven by a relatively young population in Glenmore Park-Regentville. At the 2011 Census, Glenmore Park-Regentville recorded a median age of 31 years, seven years below NSW as a whole. The older age profiles of Mulgoa-Luddenham-Orchard Hills and Badgerys Creek-Greendale is likely to reflect the more rural nature and more established communities in these areas.

Communities in the study area as a whole generally display lower levels of diversity compared with NSW, with lower proportions of Aboriginal people and people born overseas and higher proportions of people who speak English only.

In 2011, about 26.3 per cent of people in the study area were born overseas. After Australia, the most common countries of birth were:

- The United Kingdom, Channel Islands and Isle of Man (4.1 per cent)

- Italy (2.2 per cent)
- Malta (1.3 per cent)
- Philippines (1.3 per cent)
- India (1.2 per cent).

There were about 11,070 households in the study area in 2011. Compared to NSW, the study area had high proportions of family households and relatively low proportions of lone person and group households. There were about 10,039 families in the study area in 2011 of which, 46.1 per cent comprised families with children aged less than 15 years. This was higher than the proportion of this family type in NSW as a whole.

The study area, particularly Mulgoa-Luddenham-Orchard Hills, demonstrated relatively low levels of population mobility, with higher proportions of people who had lived at the same address both 12 months and five years prior to the 2011 Census compared to NSW. This demonstrates a stable community and is likely to reflect the rural nature of the area.

Housing cost and tenure

At the 2011 Census, the study area exhibited overall higher levels of home ownership, lower levels of residential tenancy (i.e. rentals), and lower levels of public housing occupancy than the respective NSW averages. Housing costs in the study area are relatively high, with median weekly rent and monthly mortgage costs above the NSW average. At the 2011 Census, an average of 13.7 per cent of households in the study area were paying 30 per cent or more of their income on mortgage payments, compared to 10.5 per cent in NSW. Housing costs and tenure are summarised below in Table 7-57.

Table 7-57 Housing tenure and costs, 2011

Locality	Owner occupied * (%)	Rented (%)	Rented (State housing authority) (%)	Median rental costs (\$/ week)	Median mortgage costs (\$/ month)	Rent payments are 30% or greater of household income (%)	Mortgage payments are 30% or greater of household income (%)
Glenmore Park-Regentville	77.7	21.0	0.8	360	2,200	6.5	16.7
Mulgoa-Luddenham-Orchard Hills	78.5	18.9	0.2	290	2,200	6.2	12.0
BadgerysCreek-Greendale	69.3	27.1	0.4	320	2,358	11.6	12.4
Study area**	75.8	22.1	0.6	323	2,253	8.1	13.7
Penrith LGA	70.6	26.7	4.4	300	1,983	9.8	13.2
Liverpool LGA	66.0	30.4	7.9	295	2,167	12.2	16.7
NSW	66.5	30.1	4.4	300	1,993	11.6	10.5

Notes: * includes dwellings owned outright or owned with a mortgage, ** Median rental and mortgage costs and rent and mortgage payments for the study area refers to the average of SA2s in the study area

Source: ABS (2012a), 2011 Census of Population and Housing, Basic Community Profile (Catalogue number 2001.0); ABS (2013), 2011 Census QuickStats

Community values

Community values include those values held as important to residents for quality of life and well-being. Community values are heavily influenced by the local amenity and character in the study area particularly agriculture, rural residents and local towns such as Luddenham and Mulgoa.

Community values have been extrapolated from the Penrith Community Plan (Penrith City Council, 2010), Growing Liverpool 2023 Strategy (Liverpool City Council, 2013) and include:

- Continued support of agricultural and local food production at Orchard Hills, Luddenham, Mulgoa, Badgerys Creek and Greendale including farming, market gardens, dairy, poultry farms, hobby farms, and fruit growing
- Protecting the study area's unique scenery and its mix of urban and rural landscapes
- Protection and conservation of the environment, biodiversity and natural assets such as rivers, creeks, and bushland areas
- Protecting the ecosystems, natural and physical resources on the larger, less disturbed sites such as the DEOH site and the site of the Western Sydney Airport (both of which are Commonwealth land). The biophysical characteristics of these (and other) sites, which are the source of their social and cultural value, are described in detail in Sections 7.3 (Biodiversity), 8.2 (Soils, water and contamination), and 8.5 (Urban design and visual impact). The description of the natural heritage characteristics of the site provided in Section 8.4 (Non-Aboriginal heritage)
- Protection and respect of the project area's Aboriginal cultural heritage values, through the protection and preservation of a number of scattered sites, some of which were found on Commonwealth land, identified during the Aboriginal heritage assessment which is documented in Section 8.3
- Protection and respect of the area's non-Aboriginal heritage values. This included buildings such as churches, the Chaffey brothers irrigation scheme canals, and other community facilities such as the Luddenham Showgrounds (refer to Section 8.4 Non-Aboriginal heritage)
- Maintaining high levels of access and connectivity while reducing congestion including the provision of improved public transport and active transport
- The importance of a balanced local economy, local employment and creating jobs to keep the community working locally
- Family heritage and connections to the land with some families having lived in the area, or on specific farms, over several generations
- Maintenance of the areas amenity relating to noise, air quality and visual amenity.

The study area has undergone change in recent decades, with the increasing urban development and development of residential estates such as Glenmore Park. These areas offer residents a range of urban residential uses, as well as access to open space, recreation and conservation areas. The development of a Western Sydney Airport is also likely to drive further growth in urban development in the study area and wider region over the coming years.

Social infrastructure

The study area includes a range of community facilities and services catering for communities in the study area and surrounding region. These facilities and services include churches, cultural facilities, community centres, educational facilities and schools, child care centres, emergency services, and sport, recreation and leisure facilities.

Some of these facilities are located within close proximity to the project and may be subject to direct or indirect impacts from the construction and operation of the project. These facilities are outlined in Table 7-58.

Table 7-58 Social infrastructure near the project

Facility type	Facility	Location	Description
Education facilities	Penrith Anglican College	Wentworth Road, Orchard Hills	The school offers primary and secondary education for students in Kindergarten to Year 12. In 2015, the school had an enrolment of 1,236 students. The school provides after hour care for students until 6.00pm. The Junior School Performing Arts Centre (the Lighthouse Theatre) is located at the school. It includes a 550 seat theatre and associated café, which is used for College and professional productions, for example play and music concerts. The theatre is also home to Christ Church @ the College, which holds services at 9.30am each Sunday.
Sport, recreation and leisure facilities	Penrith Golf and Recreation Club	The Northern Road, South Penrith	An 18-hole private golf course. The clubhouse is located near to The Northern Road boundary. Access to the clubhouse is via left-in access only and left and right out access.
	Orchard Hills Golf Club	The Northern Road, Orchard Hills	Golf course is located in the DEOH (ie is situated within Commonwealth land).
	Surveyors Creek Nature Reserve	Glenmore Park	The reserve provides informal recreation opportunities, including fitness trail and nature based recreation. Formal recreation facilities and a community centre are also located at the northern part of the reserve.
	Windmill Park	Saddler Way, Glenmore Park	The park provides informal recreation opportunities, including playground and open space areas.

Socio-economic disadvantage and need for assistance

A community's level of socio-economic disadvantage may influence the ability of that community to cope with or respond to changes. The ABS produces a range of indices that indicate relative levels of socio-economic advantage and disadvantage (Socio-economic Indexes for Areas (SEIFA)). The SEIFA index of relative socio-economic disadvantage is derived from variables such as income, educational attainment, unemployment, and vehicle ownership. Low decile values generally represent areas of disadvantage while high decile values generally represent areas of least disadvantage (Commonwealth of Australia 2013).

Communities in the southern part of the study area, south of Elizabeth Drive, generally demonstrate higher levels of relative disadvantage, with some communities in the bottom 30-40 per cent of communities in NSW in relation to disadvantage. Communities in the northern part of

the study area generally display lower levels of relative disadvantage, particularly in Glenmore Park and Mulgoa.

Need for assistance refers to people who need help or assistance in at least one of the three core activity areas of self-care, mobility or communication due to disability, a long-term health condition or old age. These groups may be more vulnerable to the effects of major projects, such as changes in local access; property acquisition, including loss of social and community networks; and changes in local amenity.

Overall the study area generally had levels of people needing assistance below the Penrith and Liverpool LGAs and NSW averages. At the 2011 Census, about 3.7 per cent of the study area's population needed assistance in at least one of the three core activities, compared to 4.3 per cent and 5.4 per cent in Penrith and Liverpool LGAs respectively, and 4.9 per cent in NSW.

Within the study area, Badgerys Creek-Greendale recorded the highest level of people needing assistance at 5.9 per cent. A further 8.4 per cent of people in this SA2 did not state whether they needed assistance, which was above the NSW average (at 5.7 per cent). Glenmore Park-Regentville recorded the lowest need for assistance in the study area.

Transport and access

The study area is serviced by a range of transport infrastructure and facilities, including major roads, public transport and active transport.

The Northern Road is a key north-south connection, linking Richmond Road and South Windsor in the north with Camden Valley Way at Narellan in the south. The road provides an important radial connection across western Sydney for residents, business and industry. In 2011, car travel was the predominant mode of travel to work for residents in the study area, with about 74.3 per cent of people aged 15 years or over using the car for all or part of their journey to work.

Locally, The Northern Road provides access to residential, rural and commercial properties along The Northern Road and in surrounding areas. Right turn access is currently provided to/ from properties fronting The Northern Road and at intersections with The Northern Road.

The study area is serviced by a number of bus routes, of which two services operate along The Northern Road through the project area. Only one currently operates along The Northern Road between Mersey Road and Glenmore Parkway; Route 789 which connects Penrith to Luddenham.

A number of school bus routes also connect to schools within the study area, some of which use The Northern Road for part of the route. A number of bus stops are located along The Northern Road between Luddenham and the M4 Motorway. Public transport was used for travel to work by about 7.3 per cent of people in the study area aged 15 years or over. This was well below the NSW average and is likely to reflect the limited public transport access in parts of the study area (for example, Mulgoa-Luddenham-Orchard Hills and Badgerys Creek-Greendale).

Existing pedestrian and cyclist facilities along The Northern Road are limited. Between Glenmore Parkway and the M4 Motorway, there is a short, isolated section of road shoulder along The Northern Road that is marked for cycle use. Other pedestrian or cycle facilities along The Northern Road are generally located within Luddenham. About 1.7 per cent of people in the study area aged 15 years or over walked or cycled to work, which was below the NSW average (at 4.8 per cent). This is likely to reflect the more rural nature of the study area and distance to employment centres.

Further information on active transport facilities is discussed in the Section 7-1 Traffic and Transport.

Economic environment

In 2011, income levels varied across the study area, with higher median incomes for the study area as a whole generally driven by very high incomes in Glenmore Park-Regentville. Badgerys Creek-Greendale had a median personal income below the NSW average although household incomes were above the NSW average.

Compared to NSW, the study area generally had lower proportions of low income households (with a weekly income of less than \$600) and higher proportions of high income households (with a weekly income of \$2,000 or more). The higher proportion of high income households in the study area was generally due to high proportions of this household type in Glenmore Park-Regentville and Mulgoa-Luddenham-Orchard Hills.

There were about 19,691 people in the study area aged 15 years or over who were either employed or looking for work at the 2011 Census. This represented a labour force participation rate of 69.2 per cent, which was above the NSW average at 59.7 per cent. Labour force participation varied across the study area, with Glenmore Park-Regentville having high rates of participation, while Badgerys Creek-Greendale reported labour force participation below the NSW average.

The study area had a relatively low rate of unemployment, with 3.9 per cent of the study area's labour force unemployed at the 2011 Census. This is compared to 5.9 per cent in NSW and 5.5 per cent and 7.0 per cent in Penrith LGA and Liverpool LGA respectively.

In 2011, key industries of employment for residents in the study area included:

- Retail trade (employing 11.3 per cent of the study area's population aged 15 years or over)
- Manufacturing (10.5 per cent)
- Construction (10.3 per cent)
- Health care and social assistance (8.8 per cent)
- Public administration and safety (7.3 per cent).

With the exception of health care and social assistance, the proportion of people employed in these industries was above the NSW average.

Agribusiness

In 2010-2011 the study area had a total of 6,541 ha of agricultural land, of which nearly 65 per cent was located in Badgerys Creek-Greendale and about 35 per cent in Mulgoa-Luddenham-Orchard Hills. The study area accounted for about 68.8 per cent of the Penrith and Liverpool region's grazing land, and about 55.2 per cent of land used for cropping.

There were about 338 agricultural businesses in the study area, of which about 129 businesses were farming livestock, and about 217 businesses were farming crops. The Badgerys Creek and Greendale area had the largest number of agriculture, forestry and fishing businesses, accommodating nearly 70 per cent of agricultural, forestry and fishing related businesses in the study area. Agricultural, forestry and fishing related business comprised about 13.7 per cent of total businesses in Badgerys Creek-Greendale and 7.2 per cent of businesses in Mulgoa-Luddenham-Orchard Hills. The majority of businesses in the study area are considered to be small businesses employing less than 20 people.

The Penrith LGA had a total agricultural output of about \$83 million in 2010. At the same time, total agricultural output in the Liverpool LGA was about \$73 million. This represented about 0.7 per cent and 0.6 per cent of total agricultural production in NSW as a whole.

Agricultural enterprises that are making a substantial contribution to the study area's agricultural output include dairies (Leppington Pastoral Company), poultry and egg farms (Inghams, Farm Pride Foods), pastoral and grazing farms. Smaller operations in the study area comprise enterprises such as nurseries, honey producers, market gardens (including vegetable growers) and producers of agricultural products (such as fertilisers).

Local businesses

There were 3,495 registered businesses in the study area in June 2015. Construction had the most businesses; accounting for about 27.2 per cent of all businesses in the study area. This was followed by transport, postal and warehousing (12.0 per cent); rental, hiring and real estate services (9.6 per cent); and agriculture, forestry and fishing (8.0 per cent).

In June 2015, about 97.9 per cent of businesses in the study area comprised small businesses employing less than 20 people with about half that being sole traders or partnerships with no employees. There were very few large businesses (greater than 200 employees) within the study area. These were manufacturing businesses located in the Badgerys Creek-Greendale area.

Luddenham businesses

A range of businesses are located within Luddenham that service the needs of local and regional communities, including:

- Grocery retailers, including supermarket, fruit and vegetable stall, and butcher
- Other retailers, such as pharmacy, newsagent and post office, workwear supplier and florist
- Food services, including cafes, restaurants, bakery and takeaway
- Service stations
- Personal service providers, such as hairdressers and beauty salons
- Health and medical services.

As described in Section 7.4.1 surveys were conducted for businesses in Luddenham town centre. The majority of businesses surveyed have operated within Luddenham for more than six years, with three businesses indicating that they have been operating in Luddenham for more than 20 years. Most Luddenham businesses employ up to about five people, with one indicating they employed 21-50 people.

Most of the businesses surveyed indicated that they served a predominantly 'local' catchment within about 20 km of Luddenham. The main areas identified by businesses included:

- Bringelly, Harrington Park, Oran Park, Narellan and Gregory Hills south of Luddenham
- Penrith and Glenmore Park to the north
- Mulgoa, Wallacia, Warragamba, Silverdale and the Blue Mountains west of Luddenham
- Twin Creeks and Liverpool to the east.

The surveys found that businesses within the town centre also attract some customers from across the greater Sydney area. Based on number plate surveys, about 13 per cent of customers who drove to businesses in the town were from Luddenham, with the next most popular suburbs of origin being Bringelly (seven per cent) and Silverdale (six per cent).

Currently, The Northern Road runs through the Luddenham town centre, where the majority of local businesses are located. This provides a regular stream of passing trade; customers who access a business because they see it while they are walking or driving past.

'Passing trade' generally refers to customers who access a business because they see it while they are walking or driving past, as opposed to customers who have deliberately planned to visit a particular business. In general, the level of reliance of a business on passing trade is likely to be influenced by the type or nature of the business. For example, passing trade is likely to be of higher importance for businesses such as service stations and some takeaway food stores and cafes, compared to speciality retail or personal service businesses.

In relation to businesses within Luddenham town centre, passing trade was identified as important to a number of businesses surveyed, although perceptions about the importance of passing trade varied between individual businesses and was not consistent between similar business types. For example, two grocery retail outlets indicated that passing trade comprised less than 10 per cent of their business, while another indicated that this was between about 25-50 per cent.

The survey identified that:

- Businesses that indicated passing trade made up a relatively small proportion of their customers (that is, less than 10 per cent) included health care, beauty salon, grocer and food store

- Businesses that estimated between 10 per cent and 25 per cent of their customers were associated with passing trade included personal services and speciality retail
- Businesses that indicated that passing trade accounted for up to 50 per cent of customers included grocer and food stores and retail uses (for example, newsagent and clothing/ footwear store).

Business such as the service stations and cafes, estimated that more than half of their customers were associated with passing trade, with one business indicating that more than 75 per cent of customers related to passing trade. This business also indicated that the proportion of customers from passing trade was higher on weekdays than on weekends.

The existing business environment of the study area is expected to change over time due to such things as the development of the Western Sydney Airport and urban growth and development. This is likely to result in the diversification of businesses within the study area and broader region and changes to existing businesses and industries. Increased population density around centres is also likely to drive demand for local services and changes to local business.

7.4.3 Potential construction impacts

This section provides an assessment of the project's likely impacts on the socio-economic environment of the study area during construction.

Property and land use impacts

Temporary leases of land would be required during construction to accommodate ancillary construction facilities such as worksites, compounds and laydown areas. Properties identified for temporary lease mainly comprise areas of rural or vacant land, but also includes residential and commercial uses. Use and access to those areas affected by temporary leases would be temporarily disrupted during construction. These impacts would be temporary and short-term in nature.

Following construction, land occupied by construction works but not required for the ongoing operation of the project would be reinstated to its pre-construction use. This would include reinstatement of any affected infrastructure such as fencing, as agreed with the property owner. While these impacts are likely to be important to affected property owners and tenants, impacts associated with the temporary lease of land would be short-term and are not expected to be significant in the context of the project as a whole.

Details of temporary leases of land required for construction compounds are outlined in Table 7-59. The locations of construction compounds are discussed in Chapter 5.

Table 7-59 Summary of temporary property leases for construction

Compound number	Property (lot number)	Existing land use
C1	Lot 3 DP234403	Rural/ residential
C2	Lot 6 DP249262	Rural/ residential
C3/ C5	Lot 11 DP1092165	Rural/ commercial
C4	Lot 102 DP812653	Rural/ commercial
C6	Lot 2 DP851626	Rural/ commercial
C7	Lot 1 DP851626	Rural
C8	Lot 1 DP250030	Rural

Compound number	Property (lot number)	Existing land use
C9	Lot 2 DP519034	Rural
C10	Lot 105 DP846962	Rural
C11	-	Crown land (road reserve)
C12	Lot 1 DP517853	Residential/ commercial
C13	Lot 5 DP599382	Rural
C14	Lot 9 DP249113	Rural residential
C15/ C16	Lot 1 DP109697	Rural
C17	Lot 1 DP232322	Crown land (road reserve)
C18	Lot 1 DP202647	Residential/ commercial
C19	Lot 1 DP224861	Rural/ residential
C20	Lot 5 DP26658/ Lot 6 DP26658	Rural residential
C21	Lot 2 DP711076	Rural residential
C22	Lot 1 DP711076	Rural residential

Additionally there would be limited long-term impact on farm infrastructure such as dams, irrigation, fencing, sheds and storage areas, and other facilities. Where this infrastructure would be demolished and reinstated or relocated as a result of the project, this would be carried out in consultation with the property owner, prior to the removal of the infrastructure. Refer to agricultural impacts below with regards temporary short-term impacts during construction, as well as Section 7.4.4 for potential long-term permanent impacts during operation.

Land use impacts during construction

The use of land affected by temporary leases during construction would be temporarily disrupted or suspended for the duration of the lease. Any structures, facilities or infrastructure located on the affected lands would likely be demolished and/or relocated, in consultation with the landowner.

On completion of construction, any land not required for the project's long-term operation would be reinstated to its former use.

The construction works are not expected to restrict exploration activities in the vicinity of the project associated with the existing exploration licence (EL 8429).

Social impacts

Population and demography

During construction, the construction workforce would generally be sourced from across the wider Sydney region and is not expected to change population and demography in the study area. Any potential changes would be relatively minor in the context of construction associated with broader investment and development planned to occur in the wider Sydney region in coming years.

Social infrastructure

During construction, potential impacts on social infrastructure near the project may result from:

- Direct impacts through acquisition of community infrastructure

- Increased noise, dust and construction traffic, impacting on amenity for users and workers of some community services and facilities
- Changes in local access and traffic disruptions and delays due to construction activities.

Impacts on amenity may be experienced by users of community services and facilities located close to construction works and compounds due to increased noise and dust from construction activities and increased traffic, including heavy vehicles. These potential impacts are further assessed in the relevant chapter of the EIS including sections 7.1 traffic and transport, 7.2 noise and vibration and 8.6 air quality (dust) impacts.

Overall, potential impacts on social infrastructure from construction activities would be short-term and are not expected to be significant given that the majority of social infrastructure is located away from construction activities.

Community values

Construction of the project would impact positively on short-term local employment through the creation of direct construction related employment on the project and indirect employment in businesses and industries that support the construction works.

Potential impacts on community values during construction may be experienced due to:

- Temporary decrease in local amenity for residents, businesses facilities and natural areas near to construction worksites and work areas due to increased noise and dust from construction activities
- Temporary changes in local access and connectivity, including for motorists, public transport users, pedestrians and cyclists during construction resulting in delays and disruptions
- Increased construction traffic and temporary changes to local access and connectivity
- Temporary decrease in visual amenity due to the presence of construction works including light spill from any night-time construction works.

These impacts would be short-term and may potentially impact on the use and enjoyment of some homes, businesses and facilities, particularly of outdoor areas. Impacts on night-time amenity may also be experienced should works need to be carried out outside of standard day-time hours.

Further assessment of potential impacts, including night-time impacts, are included in the relevant chapters of the EIS including sections 7.1 traffic and transport, 7.2 noise and vibration, 8.5 urban design and visual, and 8.6 air quality (dust) impacts.

If unmanaged, noise, light spill, and dust from construction activities may impact on the health and wellbeing of some residents and occupants of buildings nearest to construction works. These impacts are most likely to occur where night-time work results in sleep disturbance over extended periods or where construction activities create extended periods of high noise or dust level, in particular, the potential for dust from construction activities to impact on health of some sections of the community (eg people who suffer asthma). However environmental management measures and procedures would be established to help manage potential impacts on communities near to construction works. Possible management measures are discussed in the relevant sections as listed above. While these impacts may be a concern for some individuals, overall they are not expected to be significant.

Increased traffic noise and light spill is also expected to impact on the night-time amenity, particularly for those residents near the project and not currently near current road alignment, particularly given the relatively low existing night-time noise and light environment.

The bypass of Luddenham would largely avoid construction-related impacts on amenity in the Luddenham town centre. During construction, traffic would continue to flow through the town, and some additional traffic would be attributable to construction activities. However, construction activities would have only minimal impact on amenity within the town, with the exception of a small number of dwellings situated on the edges of Luddenham (on Eaton Road and adjacent to the

Caltex service station). In Luddenham, the public domain would remain largely unaffected during the project's construction.

Economic impacts

Construction impacts on local businesses and employment

The project would impact positively on employment through the creation of direct employment opportunities through the construction phase. The project would also generate a number of indirect jobs in local, regional and national businesses and industries that support the construction phase, such as retailers who provide goods and services to support the day-to-day needs of the construction workforce, suppliers of construction materials and equipment, and transport operators.

It is estimated that the WSIP as a whole, of which the project is one element, would create about 4,000 direct and indirect jobs during the 10 year lifetime of the program. Based on the expected project cost, it is estimated that around 928 of these jobs would be associated with the project (indicative only). Furthermore, in accordance with the *NSW Government Policy on Aboriginal Participation in Construction* (NSW Finance and Services 2016) a percentage of the project value would be spent to support Aboriginal participation during construction.

Temporary leases of land for the project would impact only one non-agricultural business, being site C18 which accommodates construction equipment and machinery sales business. Potential impacts on businesses affected by temporary lease of land for construction would generally be associated with:

- Direct loss of business from properties being utilised for construction-related purposes
- Changes in access due to restriction of right turns to/ from The Northern Road, increasing travel distances for some customers, employees and delivery drivers.

During construction, potential impacts on local businesses in the study area may result from:

- Increased expenditure by construction workers on local goods and services, resulting in beneficial impacts for local businesses
- Changes in local access to businesses, and traffic disruptions and delays due to construction activities, resulting in adverse impacts for local businesses
- Increased noise, dust and construction traffic, impacting on business amenity at businesses near the project.

These impacts would be temporary and short-term in the context of the project.

Compensation for businesses to cover loss of trade during construction was raised as a concern during consultation for the project. Compensation for the project would be determined in accordance with the *NSW Property Acquisition (Just Terms Compensation) Act 1991*. Roads and Maritime does not pay compensation to properties that are not materially impacted (i.e. property or buildings physically or structurally affected). Effective mitigation measures would be implemented during construction to manage potential impacts on local businesses. Roads and Maritime would also continue to consult with affected business owners through detailed design and construction to inform further management measures.

The construction phase may have a positive effect for some local businesses through increased demand for local goods and services. This includes local shops and food outlets near construction works and in Luddenham town centre that may benefit from increased business in response to day-to-day needs of construction workers. Businesses supplying goods and services to construction are also likely to experience benefits from increased construction activities locally. These impacts would be short-term for the duration of construction.

Access to businesses near the project would be maintained during construction. Where temporary changes are required, these would be determined in consultation with individual business to ensure that potential impacts are appropriately managed. Without effective management, potential

impacts on local business access and amenity during construction may have a moderate level of impact for businesses near the project.

The location of directly affected businesses is outlined in Figure 7-13.

Agriculture impacts

During construction, potential short-term impacts on rural land may be associated with:

- Location of construction compounds, temporarily disrupting use and access to rural land
- Removal and/or relocation of farm infrastructure near to the construction footprint, such as farm dams, fencing and internal roads
- Changes in local access to rural properties, and traffic delays and disruptions due to construction activities
- Increased construction traffic and movement of construction vehicles within the construction footprint, potentially increasing the likelihood of the spread of weeds and pests between properties
- Increased noise, dust and construction traffic, temporarily impacting the amenity of agricultural properties near the project.

Access to rural properties near the project would be maintained during construction. Where temporary changes are required, these would be determined in consultation with individual property owners to ensure that potential impacts are appropriately managed. This includes short-term changes that may impact on access and movement of farm equipment, machinery and livestock between internal property areas or to other properties.

With the implementation of effective mitigation measures, potential impacts on rural properties are not expected to be significant.

The location of directly affected agricultural businesses is outlined in Figure 7-14.



- The Northern Road upgrade - Mersey Road to Glenmore Parkway
- The Northern Road (Existing)
- Operational boundary

- Affected businesses
- Western Sydney Airport site (Commonwealth Land)
- Defence Establishment Orchard Hills (Commonwealth Land)

0 50 100 m

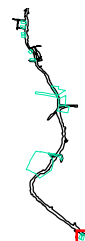
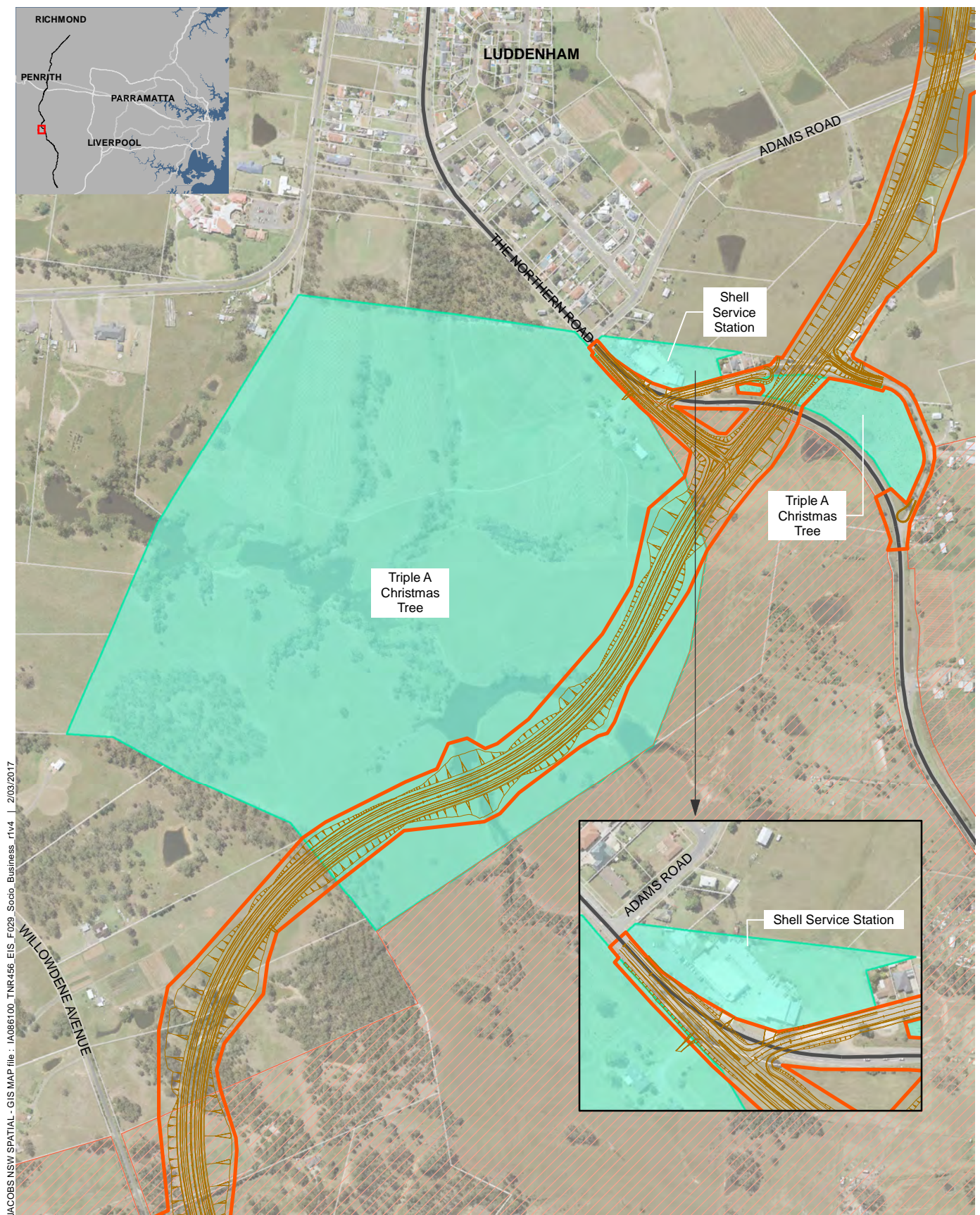


Figure 7-13 | Directly affected businesses



JACOBS NSW SPATIAL - GIS MAP file : IAC6100_TNR456 EIS F023 Socio Business r1v4 | 2/03/2017

- The Northern Road upgrade - Mersey Road to Glenmore Parkway
- The Northern Road (Existing)
- Operational boundary
- Affected businesses
- Western Sydney Airport site (Commonwealth Land)
- Defence Establishment Orchard Hills (Commonwealth Land)

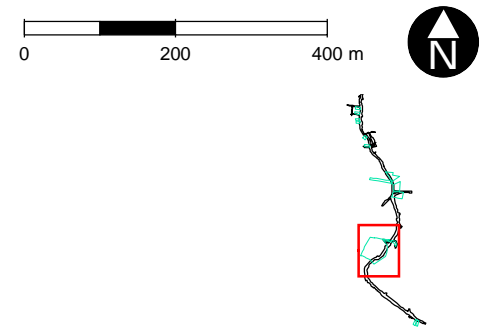


Figure 7-13 | Directly affected businesses

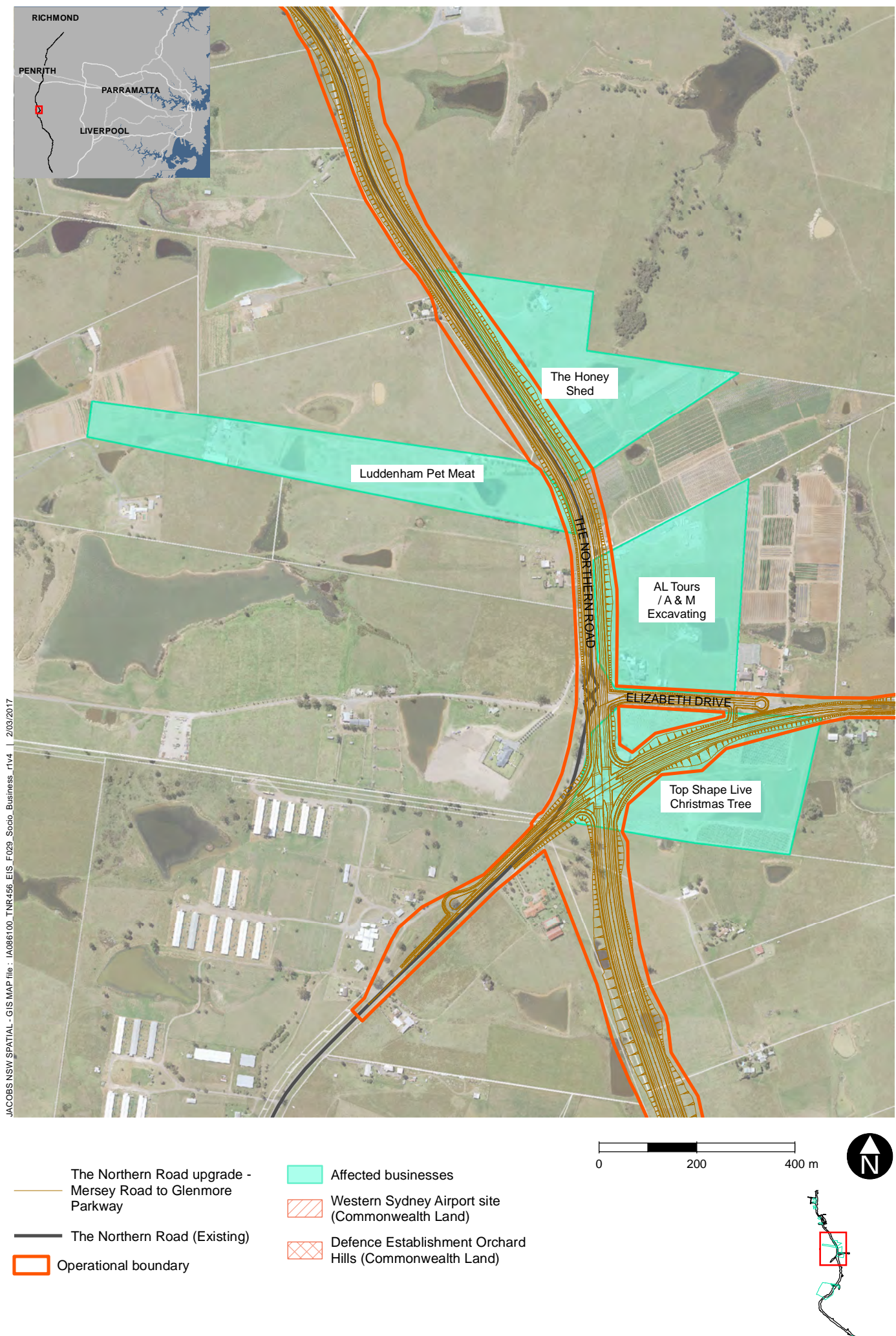
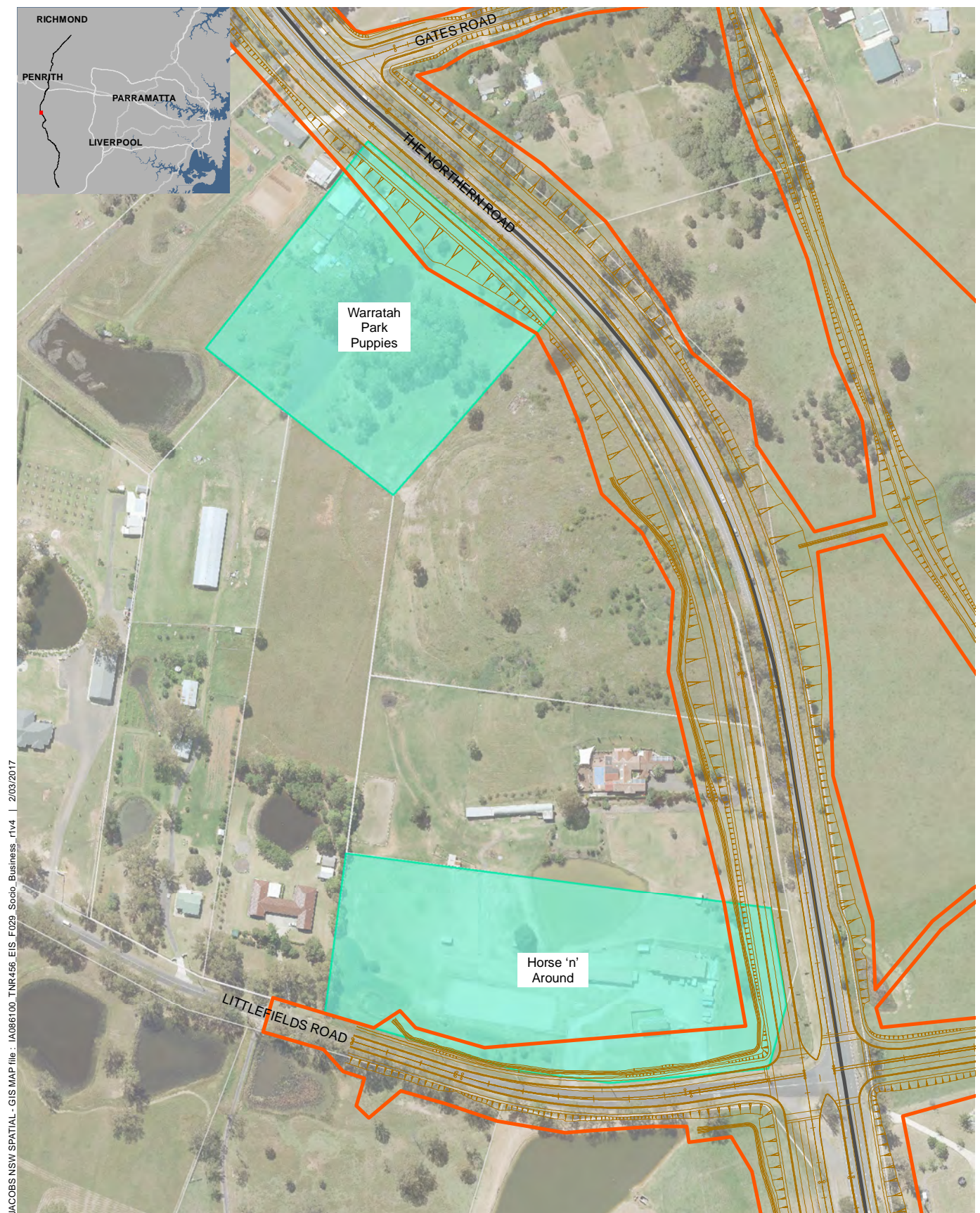


Figure 7-13 | Directly affected businesses



JACOBS NSW SPATIAL - GIS MAP file : JA086100_TNR456_EIS_F029_Socio_Business_r1v4 | 2/03/2017

- | | |
|---|---|
| — The Northern Road upgrade - Mersey Road to Glenmore Parkway | ■ Affected businesses |
| — The Northern Road (Existing) | ▨ Western Sydney Airport site (Commonwealth Land) |
| ▭ Operational boundary | ▨ Defence Establishment Orchard Hills (Commonwealth Land) |

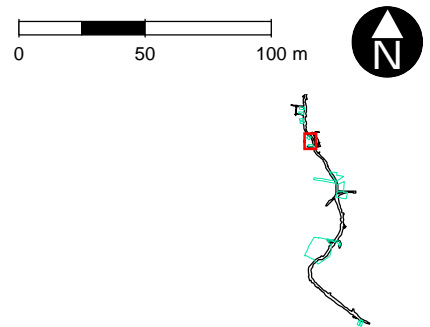
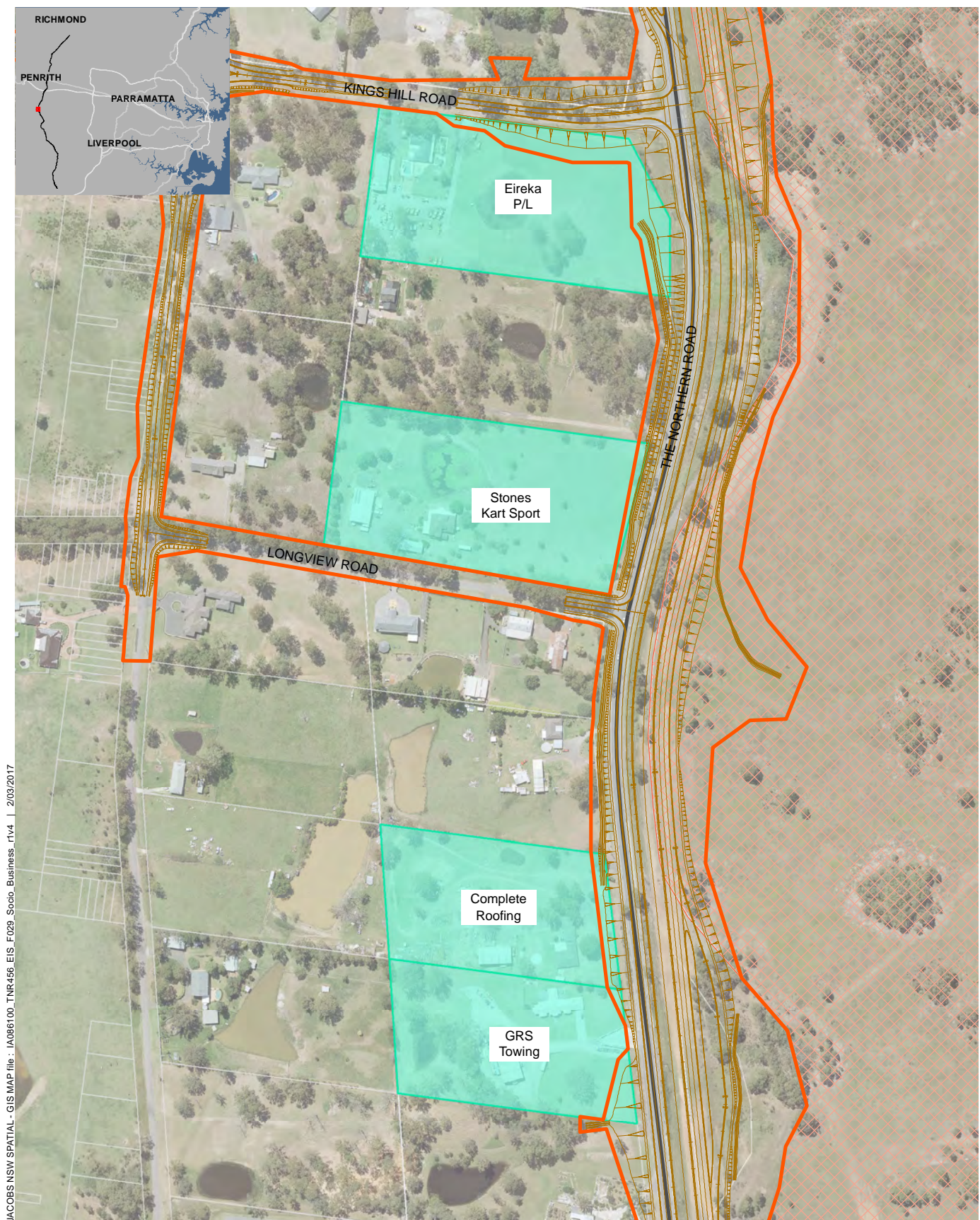








Figure 7-13 | Directly affected businesses



JACOBS NSW SPATIAL - GIS MAP file : JA066100_TNR456 EIS F025 Socio Business_r1v4 | 2/03/2017

-  The Northern Road upgrade - Mersey Road to Glenmore Parkway
-  The Northern Road (Existing)
-  Operational boundary
-  Affected businesses
-  Western Sydney Airport site (Commonwealth Land)
-  Defence Establishment Orchard Hills (Commonwealth Land)

0 50 100 m

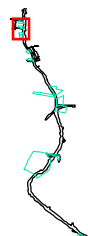
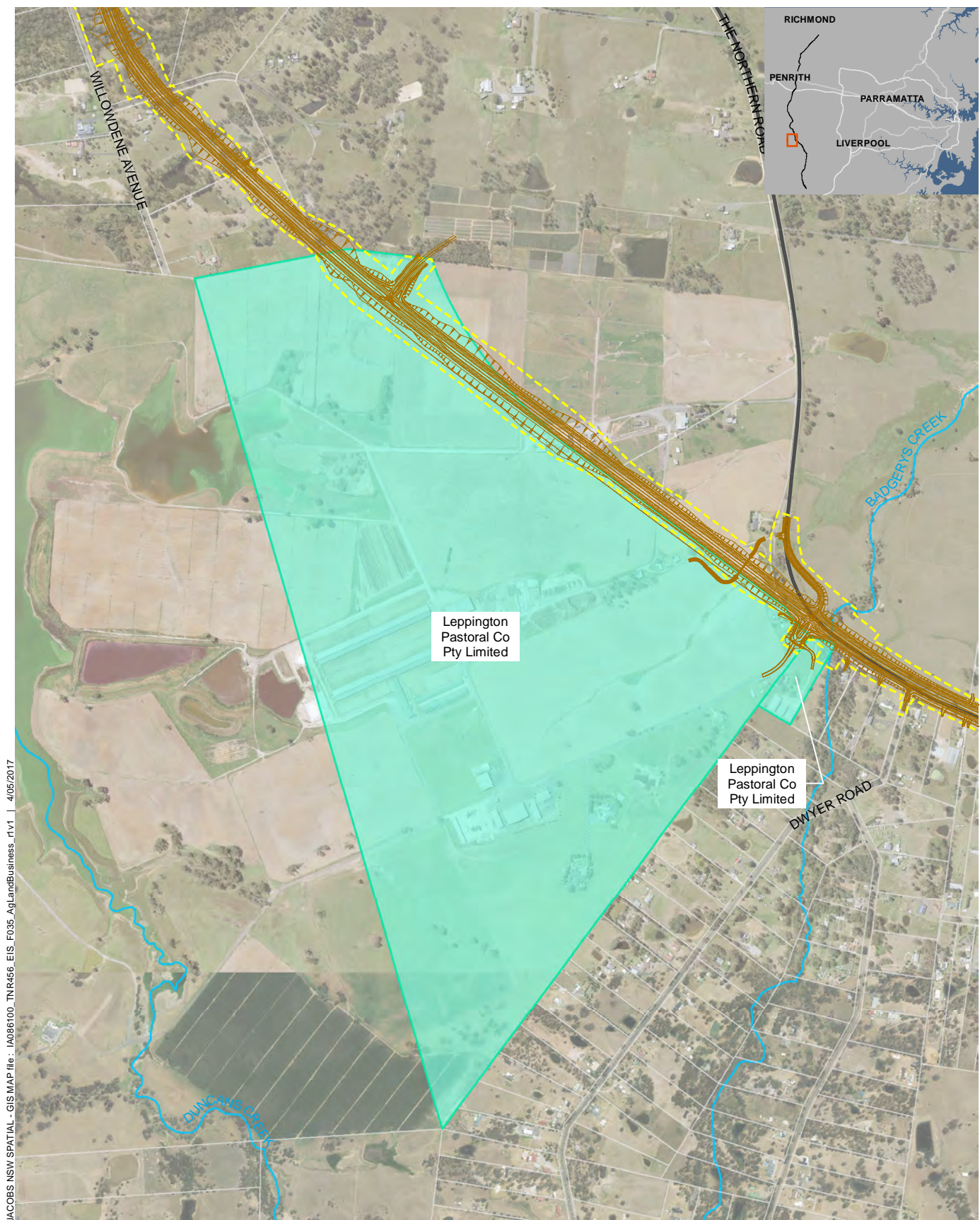
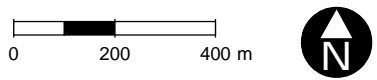


Figure 7-13 | Directly affected businesses



JACOBS NSW SPATIAL - GIS MAP file : JA066100_TNR456_EIS_F035_AgLandBusiness_r1v1 | 4/05/2017



- The Northern Road upgrade - Mersey Road to Glenmore Parkway
- The Northern Road (Existing)
- - - Operational boundary
- Affected agricultural businesses

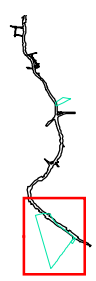
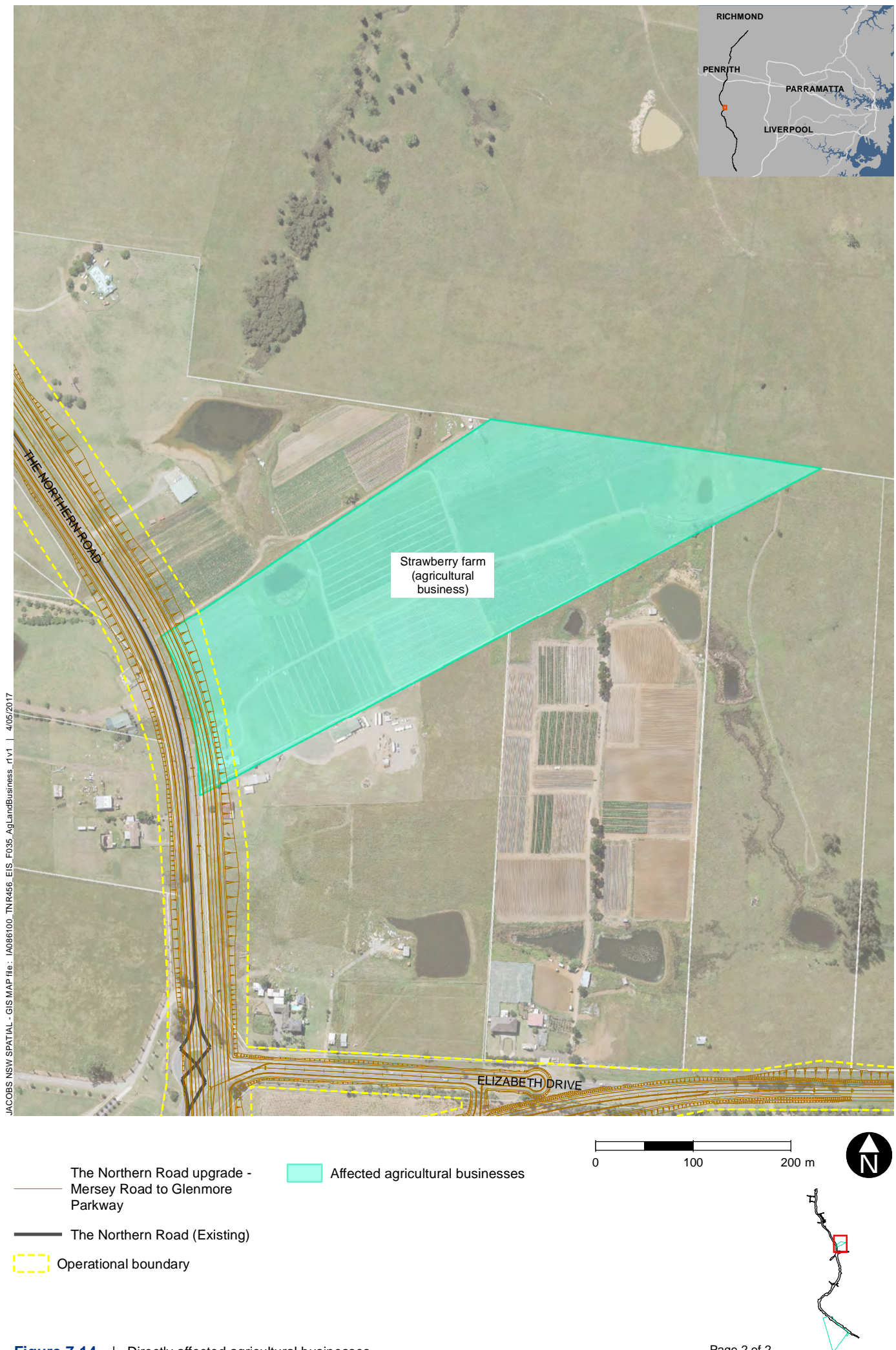


Figure 7-14 | Directly affected agricultural businesses



Access and connectivity

During construction, potential impacts on local access and connectivity would generally result from:

- Increased construction traffic on roads within the study area, including heavy vehicles used to deliver materials and equipment, and construction worker vehicles
- Temporary changes to road conditions near to construction works, including reductions in speed limits, temporary traffic lane closures, and temporary diversions and access changes, resulting in delays and disruptions for motorists and other road users
- Potential changes to bus services, including school bus services, from changes to road conditions and the temporary relocation of some bus stops near to construction works for safety, resulting in possible delays and disruptions for bus users and changes in bus access for some people
- Changes to pedestrian and cycle access near to construction works, resulting in possible disruptions for users.

Some residents in the study area currently have long commuting times to work. Any additional delays or disruptions are likely to be of concern for these people, although these impacts are not expected to be significant in the context of the project.

A detailed assessment of potential construction traffic impacts is included in the Traffic and Transport Working Paper (Appendix G), and summarised in Section 7.1.

7.4.4 Potential operation impacts

This section provides an assessment of the project's likely impacts on the socio-economic environment of the study area during operation.

Property and land use impacts

Property impacts

The operation of the project would require the acquisition of 10 houses and the partial acquisition of land from about 83 owners across 142 lots. These properties would include a combination of privately owned land, as well as land owned by Roads and Maritime, other NSW Government agencies and the Commonwealth Government. The majority of land to be partially or fully acquired for the project comprises residential uses. Other properties affected by property acquisition would include:

- Commonwealth land – Department of Defence uses, particularly land within the DEOH
- Commonwealth land (Department of Infrastructure and Regional Development) identified for the Western Sydney Airport
- Commercial and business uses, including agricultural businesses and home based businesses
- Vacant land
- Land used for water infrastructure.

Generally, affected properties would be partially acquired by Roads and Maritime where only part of the property would be directly impacted by the project. In some instances Roads and Maritime would give consideration to total acquisition (dual offer) or acquisition of any residual parcels created by the location and design of the project. This would provide affected property owners with a level of flexibility or choice during the property acquisition process in relation to property decisions. For example, some property owners may want to retain residual parcels for future use. Roads and Maritime would continue to consult with land owners through the detailed design about these land parcels. The acquisition of land required for the operation of the project would be permanent and would result in long-term impacts to property as a result of the project.

Negotiations to date have identified that severance of some properties would occur which would potentially impact the current use of those properties. This would mainly affects properties currently

used for agricultural uses. Access to residual property parcels would be maintained through the current design via either The Northern Road or the local road network, however some permanent changes may be required. Roads and Maritime would continue to consult with property owners to effectively mitigate potential land use and access impacts where possible through detailed design.

Where partial acquisition of rural properties would occur, infrastructure such as fencing, dams, sheds and other structures, within the project footprint would be demolished or relocated due to the project. Any relocation of rural infrastructure for the project would be undertaken in consultation with the property owner, prior to the removal of the infrastructure.

Some drainage channels would be provided extending from the project boundary to the first farm dam on a number of drainage lines where peak flows would be increased in privately owned land. Where inflows are likely to increase, Roads and Maritime would consult with property owners regarding upgrades to farm dam spillways as part of the project (e.g. with rock armour) to protect the structures. Easements for drainage would be created over each channel to facilitate access for future maintenance.

Disruption caused by changes due to property acquisition can result in a number of impacts including:

- Anxiety and stress about changes as well as uncertainty regarding the acquisition process. Consequential effects on health and well-being
- Disruption to community cohesion, social networks and community relationships, particularly if people need to move away from the local area and from existing social and support networks
- These impacts are likely to have the greatest effect on groups such as the elderly, people with disability, longer term residents and people on lower incomes who are often more reliant on personal and community networks.

During community consultation, it was identified that some properties in the study area have been held in the same family over several generations, particularly rural or farming properties. The owners of these properties are likely to have increased emotional attachment to their farms and the local area. This corresponds with the results of the 2011 Census which found that the study area demonstrated relatively low levels of population mobility, with higher proportions of people who had lived at the same address both 12 months and five years. As such, impacts associated with property acquisition and relocation may be felt more acutely, due to the associated loss of family heritage. These impacts are likely to be substantial for the particular individual families affected.

As well as concerns and uncertainty around the property acquisition process, community consultation also identified that property owners hold concerns about the project's potential impacts on (among other things) property values and property access (see Section 6.3).

Property values are driven by a range of factors. It is likely that external factors, such as the Western Sydney Airport and future urban development, would influence property values more than perceived or actual impacts as a result of road upgrades, including the project.

Table 7-60 provides a summary of property acquisition required for the operation of the project. Property acquisition is also discussed in Chapter 5, and in more detail in Appendix J, including maps showing the project's overall acquisition footprint.

Table 7-60 Summary of property acquisition

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
1	Lot 1 DP235845	Residential	Partial	-	-
2	Lot 97 DP27550	Residential	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
3	Lot 1 DP250684	Residential	Partial	-	-
4	Lot 96 DP27550	Residential/ business	Partial	-	-
5	Lot 95 DP27550	Residential/ business	Partial	-	-
6	Lot 94 DP27550	Residential	Partial	-	-
7	Lot 93 DP654182	Residential	Partial	-	-
8	Lot 92 DP27550	Business	Partial	-	-
9	Lot 102 DP812653	Rural/ residential	Partial	-	-
10	Lot 1 DP838361	Rural/ Western Sydney Airport / Commonwealth land	Partial	-	Yes (2)
11	Lot 11 DP1092165	Rural residential	Partial	-	Yes (2)
12	Lot 27 DP259698	Residential	Partial	-	-
13	Lot 28 DP259698	Residential	Partial	-	-
14	Lot 33 DP259698	Rural residential	Partial	-	-
15	Lot 22 DP258581	Rural residential	Partial	-	-
16	Lot 21 DP258581	Residential	Dual offer/ partial	Yes (1)	-
17	Lot 20 DP258581	Residential	Partial	-	-
18	Lot 2 DP851626	Business	Partial	-	-
19	Lot 1 DP851626	Rural	Partial	-	-
20	Lot 2 DP623457	Business	Partial	-	-
21	Lot 21 DP614481	Residential	Partial	-	-
22	Lot 1 DP250030	Residential	Dual offer/ partial	Yes (1)	Yes (1)
23	Lot 1 DP90157	Residential	Partial	-	-
24	Lot 2 DP250030	Residential	Partial	-	-
25	Lot 3 DP250030	Residential	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
26	Lot 2 DP519034	Residential	Partial	-	-
27	Lot 104 DP846962	Residential	Partial	-	-
28	Lot 3 DP827223	Residential	Partial	-	-
29	Lot 103 DP846962	Residential	Partial	-	-
30	Lot 102 DP846962	Residential	Partial	-	-
31	Lot 1 DP232996	Rural residential	Partial	-	-
32	Lot 101 DP846962	Residential	Partial	-	-
33	Lot 100 DP846962	Residential	Partial	-	-
34	Lot 5 DP232324	Crown land (road reserve)	Full	-	-
35	Lot 4 DP232324	Crown land (road reserve)	Full	-	-
36	Lot 3 DP911607	Crown land (road reserve)	Full	-	-
37	Lot 1 DP517853	Residential	Partial	Yes (2)	Yes (4)
38	Lot 2 DP517853	Rural residential	Partial	-	-
39	Lot 6 DP32026	Rural	Partial	-	-
40	Lot 5 DP32026	Rural	Partial	-	-
41	Lot 4 DP32026	Rural	Partial	-	-
42	Lot 1 DP1169433	Residential/ business	Partial	-	-
43	Lot 3 DP32026	Residential/ business	Partial	Yes (1)	-
44	Lot 504 DP581138	Residential	Partial	-	-
45	Lot 2 DP32026	Residential/ business	Partial	Yes (1)	Yes (1)
46	Lot DP160890	Residential/ business	Partial	Yes (1)	-
47	Lot 5 DP599382	Residential	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
48	Lot 1 DP200435	Residential/ business	Partial	-	-
49	Lot 501 DP580982	Residential	Partial	-	-
50	Lot 12 DP249113	Residential	Partial	-	-
51	Lot 11 DP249113	Residential	Partial	-	-
52	Lot 10 DP249113	Residential	Partial	-	-
53	Lot 9 DP249113	Residential	Partial	-	-
54	Lot 1 DP109697	Residential	Partial	-	-
55	Lot 8 DP249113	Residential	Partial	-	Yes (1)
56	Lot 7 DP249113	Residential	Partial	-	-
57	Lot 101 DP580082	Business	Partial	-	-
58	Lot 11 DP30775	Residential	Partial	-	-
59	Lot 12 DP30775	Sydney Water pumping station	Partial	-	-
60	Lot 9 DP232322	Rural**	Full	-	-
61	Lot 13 DP30775	Residential	Partial	-	Yes (1)
62	Lot 8 DP232322	Rural residential**	Full	-	-
63	Lot 14 DP30775	Residential	Partial	-	-
64	Lot 22 DP32053	Rural	Partial	-	-
65	Lot 15 DP30775	Residential	Partial	-	-
66	Lot 23 DP207317	Residential	Partial	-	-
67	Lot 2 DP32053	Residential/ rural	Partial	-	-
68	Lot 1 DP420840	Residential	Partial	-	-
69	Lot 16 DP30775	Residential	Partial	-	Yes (1)
70	Lot DP341893	Water NSW asset maintenance	Partial	-	-
71	Lot A DP341629	Crown land (road reserve)	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
72	Lot 22 DP843123	Residential	Partial	-	Yes (1)
73	Lot 68 DP651114	Residential	Partial	-	Yes (2)
74	Lot 71 DP668758	Residential	Partial	-	-
75	Lot 73 DP2120	Residential	Partial	-	-
76	Lot 1 DP1064093	Residential	Partial	-	-
77	Lot 1 DP232322	Crown land (road reserve)	Full	-	-
78	Lot 77 DP659462	Business	Partial	-	-
79	Lot 79 DP1085461	Residential	Partial	-	-
80	Lot 1 DP1085051	Residential	Partial	-	-
81	Lot 211 DP2255	Vacant	Partial	-	-
82	Lot 210 DP2255	Vacant	Full	-	-
83	Lot 80 DP2120	Residential	Partial	-	-
84	Lot 10 Sec H DP2234	Vacant	Full	-	-
85	Lot 3 DP202647	Residential	Partial	-	-
86	Lot 36 DP959167	Vacant	Partial	-	-
87	Lot 101 Sec H DP2234	Vacant	Partial	-	-
88	Lot 100 Sec H DP2234	Vacant	Partial	-	-
89	Lot 99 Sec H DP2234	Vacant	Partial	-	-
90	Lot 2 DP202647	Residential	Partial	-	-
91	Lot 98 Sec H DP2234	Vacant	Partial	-	-
92	Lot 97 Sec H DP2234	Vacant	Partial	-	-
93	Lot 96 Sec H DP2234	Vacant	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
94	Lot 37 DP959167	Vacant	Partial	-	-
95	Lot 84 Sec H DP2234	Vacant	Partial	-	-
96	Lot 83 Sec H DP2234	Vacant	Partial	-	-
97	Lot 38 DP959167	Residential	Partial	-	-
98	Lot 75 Sec H DP2234	Residential	Partial	-	-
99	Lot 74 Sec H DP2234	Residential	Partial	-	-
100	Lot 73 Sec H DP2234	Residential	Partial	-	-
101	Lot 72 Sec H DP2234	Residential	Partial	-	-
102	Lot 71 Sec H DP2234	Residential	Partial	-	-
103	Lot 70 Sec H DP2234	Residential	Partial	-	-
104	Lot 69 Sec H DP2234	Residential	Partial	-	-
105	Lot 1 DP202647	Business	Partial	-	-
106	Lot 68 Sec H DP2234	Residential	Partial	-	-
107	Lot 67 Sec H DP2234	Residential	Partial	-	-
108	Lot 66 Sec H DP2234	Residential	Partial	-	-
109	Lot 65 Sec H DP2234	Residential	Partial	-	-
110	Lot 64 Sec H DP2234	Residential	Partial	-	-
111	Lot 63 Sec H DP2234	Residential	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
112	Lot 42 DP878814	Residential	Partial	-	-
113	Lot 62 Sec H DP2234	Residential	Full	-	-
114	Lot 23 DP29081	Residential	Partial	-	-
115	Lot 61 Sec H DP2234	Residential	Full	-	-
116	Lot 60 Sec H DP2234	Residential	Partial	-	-
117	Lot 24 DP29081	Residential	Partial	-	-
118	Lot 28 DP29081	Rural residential	Partial	-	-
119	Lot 1 DP569729	Residential	Partial	-	-
120	Lot 11 DP29081	Rural residential	Partial	-	-
121	Lot 10 DP29081	Residential	Partial	-	-
122	Lot 3 DP238092	Commonwealth Department of Defence uses	Partial	-	-
123	Lot 31 DP244610	Residential	Partial	-	-
124	Lot 32 DP244610	Residential	Partial	-	-
125	Lot 30 DP244610	Rural residential	Partial	-	-
126	Lot 8 DP29081	Residential/ business	Partial	-	-
127	Lot 1 DP1088989	Rural residential	Partial	-	-
128	Lot 6 DP29081	Rural residential	Partial	-	-
129	Lot 2 DP224861	Rural residential	Partial	-	-
130	Lot 1 DP224861	Residential	Partial	Yes (1)	-
131	Lot 7 DP4832	Residential	Partial	-	-
132	Lot 500 DP1133119	Residential	Partial	-	-
133	Lot 1 DP551558	Residential	Partial	-	-

Property ID	Property (lot number)	Existing land use*	Acquisition type	Dwellings affected	Buildings (sheds) affected
134	Lot 1 DP238092	Commonwealth Department of Defence uses	Partial	-	-
135	Lot 5 DP26658	Rural residential	Partial	-	-
136	Lot 6 DP26658	Rural residential	Partial	-	-
137	Lot 7 DP26658	Rural residential	Partial	-	-
138	Lot 1 DP711076	Residential	Partial	-	-
139	Lot 2 DP711076	Vacant	Partial	-	-
140	Lot 132 DP1002668	Residential	Partial	-	-
141	Lot 113 DP1015911	Rural	Partial	-	-
142	Lot 3 DP711076	Rural residential	Partial	-	-

Notes:

* Information on existing land use is based on a review of aerial photography and visual inspection

** strip of land located along road reserve

Roads and Maritime would acquire properties for the project in accordance with the provisions of the NSW *Property Acquisition (Just Terms Compensation) Act 1991*. Among other things, the Act provides the basis for assessing compensation.

Permanent adjustments would be required to some private properties for the project. This would generally involve adjustments to driveways, fencing and farm infrastructure due to partial property acquisition. Roads and Maritime has commenced consultation with potentially affected property owners about the acquisition process and potential adjustments required to properties for the project. Consultation would continue during the detailed design and construction phases of the project. While adjustments to properties may be a concern for affected property owners, the impact is not expected to be significant in the context of the overall project.

Access to individual properties along The Northern Road would be maintained, regardless of whether a property is affected by acquisition. However, some permanent changes may be required including the removal of right turns to and from properties located along The Northern Road. While this would result in some property owners having to travel a short distance further to access their properties, the removal of right turns would improve safety around access points and would also help to maintain smooth traffic flows.

Land use impacts during operation

About 58.05 ha of the land impacted by the project's operational footprint comprise land that is currently zoned for infrastructure, mainly transport or other infrastructure corridors. This includes the existing The Northern Road corridor, local roads and land within the WaterNSW Supply Pipelines. Where this land lies within the footprint of the project design it would remain in use as infrastructure and would be zoned accordingly. After completion of construction, the section of the existing The Northern Road that lies within the site of the Western Sydney Airport land would no longer be used as a public road.

Primary production uses comprise the largest area of land directly impacted by the project, with over 100 ha of land used for primary production, zoned for rural uses (RU), impacted by the operational footprint. This represents about 0.48 per cent of land used for primary production in the Penrith and Liverpool region. This land would become transport infrastructure and would no longer be available for primary production. Some farm infrastructure within the operational footprint of the project, in particular between Dwyer Road and Elizabeth Drive where the project would create a new road alignment, would need to be relocated prior to construction.

Land identified as 'special category' comprises nearly 25 ha of directly affected land within the operational footprint. This would mainly include Commonwealth land within the DEOH used for recreation, conservation, dams, or open space buffer. This land would be transferred to road infrastructure and would no longer be available for Department of Defence use. This land is located along The Northern Road frontage and is not expected to impact on the ongoing operations of the DEOH.

The land purchased by the Commonwealth for the Western Sydney Airport at Badgerys Creek is also identified (and zoned) as 'special category'. A narrow strip of this land would be impacted by the upgrade of The Northern Road, between Mersey Road and Willowdene Avenue, south of Luddenham and west of the existing The Northern Road alignment. That part of the planned airport site which would be impacted by the road upgrade is mostly under cultivation or pastoral use (Leppington Pastoral Company). A very small portion of the affected land currently supports some naturally vegetated areas and drainage lines. The current uses would largely be unaffected by the project.

A discussion outlining the potential impacts on the natural heritage of the DEOH site and potential change are covered in Section 8.4.

While peak flood levels would be increased as a result of the project for events up to 100 year ARI, affected areas are limited to undeveloped pastoral land. Due to the relatively steep sided nature of the drainage lines that cross the project corridor, increases in peak flood levels attributable to the project do not translate into a significant increase in the spatial extent of flood affected land for events up to 100 year ARI. Further discussion on the potential impacts of changes in yield to properties is discussed in Section 8.1.

Table 7-61 provides an overview of land use directly impacted by the operational footprint for the project.

Table 7-61 Directly affected land use within the operational footprint

Land use	Penrith LGA		Liverpool LGA		Total region	
	Land in operational footprint (ha)	Proportion of land in LGA	Land in operational footprint (ha)	Proportion of land in LGA	Land in operational footprint (ha)	Proportion of land in the region (%)
Environmental uses	1.39	0.03%	6.34	0.48%	7.73	0.14%
Primary production uses	28.38	0.22%	77.34	0.83%	105.73	0.48%
Transport and other corridors	45.04	2.72%	13.01	0.94%	58.05	1.91%
Urban	4.58	0.03%	1.35	0.01%	5.93	0.02%
Special category	22.60	0.56%	2.25	0.03%	24.85	0.23%
Total	101.99	0.28%	100.28	0.34%	202.27	0.56%

About 102 ha of land zoned for rural uses (RU) would be directly affected by the operational footprint of the project. This includes land zoned for primary production (RU1), rural landscape

(RU2) and primary production small lots (RU4). Land zoned for residential uses (R) comprises about 4.72 ha of land within the operational footprint, the majority of which is land zoned for low density residential (R2). Areas zoned for low density residential that are impacted by the operational footprint are mainly located in the Liverpool LGA. This represents a very small proportion (about 0.10 per cent) of land within the Liverpool LGA zoned for low density residential.

About 30.17 ha of land zoned for environment protection (E) would be impacted by the operational footprint, all of which is located within the Penrith LGA. This mainly includes land zoned for environmental conservation (E2) located within the DEOH, and comprises land with varying density of native vegetation cover, and ephemeral natural drainage lines. Further discussion of the project's impacts on flora and fauna is provided in Section 7-3 - Biodiversity and a discussion on the potential impacts to natural heritage is provided in section 8-4 – Non-Aboriginal heritage.

The operational footprint of the project would not directly affect land zoned for recreational use, although land within the DEOH that is zoned for special activities and used for a nine-hole golf course would be directly affected by the operational footprint of the project. This land would be transferred to road infrastructure.

The project would involve the incorporation of new or modified drainage pathways, extending from the project boundary to the nearest farm dam on a number of drainage lines where peak flows would be increased in privately owned land. In such cases, easements for drainage would be created over each drainage channel to formalise access and facilitate future maintenance.

The project would also result in some localised land use changes but would not affect the broader distribution and supply of these land uses in the project area or broader region.

Operation of the project would not have any impact on the existing exploration licence (EL 8429) which is due to expire on 20 April 2018.

Social impacts

Population and demography

The relocation of residents associated with the acquisition of residential properties and rural properties with dwellings may result in minor changes to local populations. This may include residents who have lived in the area for long periods or whose families have held properties for several generations. While these changes may result in local changes, these changes are expected to be as minor as they would represent a very small proportion of the regional population and are not expected to impact on the population and demography of the study area as a whole. These impacts are likely to add to population changes in the study area associated with property impacts for the Western Sydney Airport and current and planned urban development.

Social infrastructure

The operation of the project would contribute to improved access and connectivity to community services and facilities at the regional, State and national level, within or near to the study area, through improved travel time savings and improved travel time reliability. This includes:

- Regional level community services and facilities, such as
 - Education uses such as the University of Western Sydney, TAFE Western Sydney Institute
 - Major medical and health care facilities, including hospitals and facilities at the Nepean Hospital campus
 - Regional open space, sport and recreation uses, at Western Sydney Parklands and within central Penrith
 - Community support services and service organisations at Penrith
- National level services and facilities, such as
 - The Western Sydney Airport
 - The DEOH site
- Schools near the project, including Penrith Anglican College, and schools at Glenmore Park and Luddenham

- Community services and facilities at Glenmore Park, including sport and recreation facilities, cultural facilities, and community support services
- Services and facilities within the Luddenham town centre, including open space, recreation and cultural facilities.

This would have long-term beneficial impacts for local communities as well as communities across the broader western Sydney region. Users of some social infrastructure located near to the project may experience impacts associated with changes in local access and amenity. This is discussed further in the Access and Connectivity section below.

These impacts would be felt at the regional and national levels, through improved access not only to the planned airport site, but also to the Western Sydney Priority Growth Area and the South West Priority Growth Area. Through improved access and connectivity, the project would help to stimulate economic development that would eventually benefit local communities in terms of improved social infrastructure in the project area. The potential socio-economic cumulative impacts are further discussed in Chapter 9.

The potential long-term impacts of acquisition on community infrastructure would generally be limited to the Orchard Hills Golf Course, located next to The Northern Road, within the DEOH. Although situated within Commonwealth (Defence) land, the golf club is privately operated and is a public recreation facility. Widening of The Northern Road would require the strip acquisition of land within the golf course fronting The Northern Road. This impact may require changes to the layout of some holes (for example, some tee blocks or greens). Roads and Maritime would continue to consult with the golf club and DEOH during the detailed design phase of the project and adjustments would be made as early as possible to minimise disturbance, if required.

Community values

During operation, at a regional level, improved access and more efficient travel has the potential to provide long-term benefits for community cohesion, facilitate social interactions and improve economic transactions across the wider region. Travel facilitates social interactions and economic transactions across the wider region. Where access on major routes is constrained, people avoid making trips that have unacceptable travel times. The project would assist in decreasing travel times for these trips, helping to facilitate community interaction.

The project would include the realignment of The Northern Road around the Western Sydney Airport site and east of Luddenham town centre as well as widening of the existing The Northern Road. Adverse changes to local amenity may be experienced at those properties where The Northern Road moves closer to homes, businesses or community facilities due to the realignment or widening of the road corridor. Increased traffic noise, light spill from the roadway, and changes to the visual environment may impact on the use and enjoyment of these properties, as well as the rural character and environmental and visual amenity of local areas. This impact is likely to have the greatest effect on residents and communities in those areas that are currently removed from The Northern Road or other major roads. These include residents of rural and rural residential properties at Greendale, west of the Western Sydney Airport site, and at Luddenham, south and east of the Luddenham town centre. These potential long-term impacts are further assessed in the relevant chapters of the EIS including sections 7.1 traffic and transport, 7.2 noise and vibration and 8.5 urban design and visual.

The bypass of Luddenham town centre would result in The Northern Road being further away from homes, businesses and facilities in the Luddenham town centre and reducing through traffic, including heavy vehicles, within the town centre. This would reduce traffic noise and improve local air quality, impacting positively on local amenity and the public domain within the town. A reduction in through traffic would also support an improved pedestrian environment and safer and improved access for pedestrians, cyclists and motorists within the town centre and to adjoining areas, further improving local amenity in the town.

Access to Luddenham town centre would include a northern and southern access, which would support access for communities from these directions. Communities to the west would continue to access the town via Park Road, while the realignment of Elizabeth Drive would provide improved

and more direct access for communities east of Luddenham. As such, many people who currently access businesses, services and facilities within the town centre, including schools, churches, medical facilities, shops, and personal services businesses, are likely to continue to do so and the project is not expected to have any significant long-term impacts on any community values associated with these places as community 'meeting places'.

Economic impacts

The project would potentially have a negative impact on some local businesses, particularly in Luddenham, where businesses in the town would no longer be exposed to passing traffic. The extent of the impacts on local businesses is discussed below.

During operation, the project would support improved access and connectivity to employment areas in the study area and the western Sydney region. Some short-term loss of local employment may be associated with the acquisition of some businesses for the project. This is most likely to affect those businesses that would experience changes to business operations or that would be required to relocate, particularly if alternative properties are not able to be found locally. While the potential loss of local employment would be a concern for employees of affected businesses, this is not expected to impact on the overall levels of employment in the study area. In the broader strategic context of the study area, other planned developments associated with the Western Sydney Airport, the Western Sydney Priority Growth Area, are likely to stimulate investment and new employment opportunities that would outweigh any short-term loss of employment resulting from the project.

Operational impacts on local businesses and employment

Acquisition of land for the project would impact about 16 properties that currently accommodate non-agricultural related businesses including construction related businesses, transport and equipment hire businesses, retail and tourist related businesses.

Potential long-term impacts on businesses affected by permanent property acquisition would generally be associated with:

- Direct loss of business from property acquisition
- Demolition of dwellings associated with some home based businesses and infrastructure such as sheds and dams
- Loss of some land used for business activities (for example, tree growing, display or storage of goods, etcetera)
- Changes in access due to restriction of right turns to or from The Northern Road, increasing travel distances for some customers, employees and delivery drivers.

For most businesses, property acquisition for the project is not expected to impact on ongoing business operations for individual businesses and impacts are generally not expected to be minor. However, there are a small number of businesses that may experience impacts associated with the demolition of dwellings and other infrastructure (for example sheds, growing areas, etcetera). This may require changes to business operations or the need for some businesses to relocate, potentially impacting on the viability of some businesses over the short-term or longer term.

Impacts on these businesses are expected to be greater, although the level of impact on individual businesses would be dependent on factors such as the ability of the business to continue operating in the existing location; the nature of the business; location and site requirements; and the ability to relocate to a new property locally (if required).

The level of impact on business viability would be dependent on factors such as the ability of the business to continue operating in the existing location; the nature of the business; requirements around business location and the ability to relocate locally (if required). Temporary disruption to business operations may also occur for businesses that are required to relocate due to acquisition or where infrastructure is required to be relocated within the property. Where business properties are impacted by property acquisition, compensation for reasonable disturbance costs likely to arise

would be considered by Roads and Maritime (Roads and Maritime, 2014). This would include compensation for any temporary disruption to business operations.

Table 7-62 summarises potential impacts on individual businesses that would be directly impacted by property acquisition. The table includes a summary of impacts on properties that accommodate agribusiness enterprises. The location of impacted businesses, including agribusinesses is shown in Figure 7-13 and Figure 7-14 respectively.

Table 7-62 Potential impacts on directly affected businesses

Business	Location	Summary of impact
Eireka Pty Ltd	Corner of Kings Hill Road and The Northern Road, Mulgoa	<p>Widening of The Northern Road and upgrade of the Kings Hill Road and The Northern Road intersection would require strip acquisition of land fronting The Northern Road and Kings Hill Road. Additional land would also be temporarily leased for a construction compound. Land affected by construction and not required for operation, would be reinstated following construction.</p> <p>Affected land mainly includes grassed areas along the boundary with Kings Hill Road and The Northern Road. The project would not impact on any buildings or structures.</p> <p>Access would be maintained to Kings Hill Road, with all movement access provided at the Kings Hill Road and The Northern Road intersection.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>
Stones Kart Sport	Longview Road, Mulgoa	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. This land mainly includes landscaping (grass/ trees).</p> <p>The existing property access arrangements to Longview Road would be maintained.</p> <p>Changes to The Northern Road intersection would restrict right turns to and from Longview Road. All turn access to The Northern Road would be provided at Kings Hill Road, which would be accessed via Longview Road and the Vineyard Road extension.</p> <p>This would increase the distance customers would be required to travel by about one kilometre.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>
Complete Roofing	The Northern Road, Mulgoa	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. This land mainly includes landscaping (grass/ trees).</p> <p>The existing driveway access would be maintained, although changes to The Northern Road would restrict right turns to and from the business. This would require a u-turn to be performed at either the Kings Hill Road or Littlefields Road dedicated u-turn facility. This would increase the distance required to be travelled by up to about 3.1 km. u-turn facilities would be designed to accommodate</p>

Business	Location	Summary of impact
		<p>movements by large vehicles.</p> <p>These impacts are not expected to impact the ongoing operation of the business.</p>
GRS Towing	The Northern Road, Mulgoa	<p>Widening of The Northern Road would require the acquisition of land at the north-east and south-east corners of the property. This land mainly includes grassed areas.</p> <p>The existing driveway access would be maintained, although changes to The Northern Road would restrict right turns to and from the business. This would require a u-turn to be performed at either Kings Hill Road or Littlefields Road. This would increase the distance required to be travelled by up to about 2.9 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>These impacts are not expected to affect the operation of the business.</p>
Warratah Park Puppies	The Northern Road, Mulgoa	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. None of the businesses buildings or facilities would be directly impacted by the planned acquisition.</p> <p>These impacts are not expected to affect the operation of the business.</p>
Horse N Around	Corner of Littlefields Road and The Northern Road, Mulgoa	<p>The upgrade of the intersection at Littlefield Road and The Northern Road would require the strip acquisition of land fronting Littlefields Road and The Northern Road. Affected land is located along the property boundary with Littlefields Road and The Northern Road. This land mainly includes landscaped areas (grass/ trees).</p> <p>Partial acquisition would not impact on buildings or car parking areas. Widening would result in the northbound lanes being within about 30 m of the nearest building on the property. This building is used as a retail outlet.</p> <p>Changes to property access would be needed for the project. In particular, the driveway at Littlefields Road closest to The Northern Road intersection would need to be closed for safety. Roads and Maritime would continue to consult with the property owner and business owner about possible management measures, including alternative access if required.</p> <p>Full access would be provided at the Littlefields Road and The Northern Road intersection.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p> <p>Roads and Maritime is continuing to consult with the business owner about specific management measures to be considered in the detailed design phase.</p>
The Honey	The Northern	Widening of The Northern Road would require the strip

Business	Location	Summary of impact
Shed	Road, Luddenham	<p>acquisition of land fronting The Northern Road. The business is accommodated on a portion of a much larger agricultural property used for livestock grazing and cropping. The affected land is currently used for cropping and grazing purposes.</p> <p>Access to The Northern Road would be maintained, including for tour buses, although changes to The Northern Road would restrict right turns to and from the business. This would require u-turns to be performed at either the existing The Northern Road or Littlefields Road dedicated u-turn facility. This would increase the distance customers would be required to travel by up to about 3.2 km.</p> <p>It was suggested during consultation for this assessment that between 25-50 per cent of customers and farm gate sales were associated with passing trade. While the additional travel may be a deterrent for some 'passing' customers this is likely to be outweighed by the projected increase in traffic using The Northern Road in the future.</p> <p>A number of issues were raised during consultation for this assessment about potential impacts of the project on this business. These included uncertainty relating to the project and impacts of this uncertainty on future business decisions. Impacts on access during construction were also raised as an issue, particularly as the business attracts both domestic and international tourists, including tour buses.</p> <p>Access to the business would be maintained during construction, including for tour buses. Where temporary changes are required, consultation would be undertaken with the business owner to ensure potential impacts are managed.</p> <p>Overall, these impacts are not expected to impact on the ongoing operation of the business.</p>
Luddenham Pet Meat	The Northern Road, Luddenham	<p>Widening of The Northern Road would require strip acquisition of land fronting The Northern Road. This would potentially require the demolition of a dwelling located on the property as well as loss of landscaped areas (grass/ trees). The adjoining shed would not be impacted by the project.</p> <p>Access to The Northern Road would be maintained, although changes to The Northern Road would restrict right turns to and from the business. This would require u-turns to be performed at the existing The Northern Road and Littlefields Road. This would increase the distance customers would be required to travel by up to about 3.8 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>Consultation would continue during the detailed design and construction phases of the project about potential impacts and possible management measures.</p>

Business	Location	Summary of impact
Strawberry farm	The Northern Road, Luddenham (north of Elizabeth Drive)	<p>Strip acquisition of land fronting The Northern Road would impact on a dwelling, shed and growing area next to The Northern Road. This infrastructure would need to be demolished and where practicable, relocated within the property prior to construction. This may have a temporary impact on farm gate sales.</p> <p>Less than 5 per cent of the farm's growing area would be acquired for the project. Growing areas within the remaining part of this property, not within the project's operational footprint, would remain available for growing purposes.</p> <p>Property access to The Northern Road would be maintained although changes would be made, in consultation with the property owner. Right turns to and from The Northern Road into the property would be restricted. This would require u-turns to be performed at Elizabeth Drive and Littlefields Road. This would increase the distance required to be travelled by up to about 4.4 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p>
AL Tours and A & M Excavation	The Northern Road, Luddenham	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. This would potentially impact a dwelling located on the property as well as grassed areas. The sheds on the property would not be impacted by the project.</p> <p>Access to The Northern Road would be maintained, although changes to The Northern Road would restrict right turns to and from the business. This would require u-turns to be performed at the existing The Northern Road and Littlefields Road. This would increase the distance to be travelled by up to about 4.4 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>Consultation would continue during the detailed design and construction phases of the project about potential impacts and possible management measures.</p>
Top Shape Live Christmas Trees	Corner of The Northern Road and Elizabeth Drive, Luddenham	<p>Partial acquisition of this property would be required for the realignment of Elizabeth Drive. The realignment would sever land containing two dwellings, sheds and areas used for tree growing. Land affected by construction and not required for operation, would be reinstated following construction. This would result in the permanent loss of land used for growing trees. Dwellings and sheds within the operational footprint would also be demolished prior to construction.</p> <p>Additional land may also be temporarily leased for a construction compound. Land affected by construction and not required for operation, would be reinstated following construction. These impacts are likely to affect business operations. Roads and Maritime would continue discussions with the business owner to identify measures to</p>

Business	Location	Summary of impact
		manage any disruptions to business operations associated with any requirement to relocate.
Primary production	2422-2430 The Northern Road, Luddenham	<p>The route alignment around the Luddenham town centre would require the partial acquisition of land used for the primary production (cattle). The affected land mainly comprises grazing land and dam infrastructure.</p> <p>Access to each lot would be directly onto the realigned The Northern Road via a left in left out driveway arrangement.</p>
Primary production	28 Eaton Road, Luddenham	<p>The route alignment around the Luddenham town centre would bisect the lot and require the partial acquisition of land used for the primary production (cattle). The affected land mainly comprises grazing land and dam infrastructure.</p> <p>Access to the main parcel of land would be maintained via Eaton Road. Access to the residual parcel of land would be directly onto the realigned The Northern Road via a left in left out driveway arrangement.</p>
Shell service station	The Northern Road, Luddenham	<p>The realignment of Eaton Road may require the strip acquisition of a small area of land fronting Eaton Road. This land does not appear to be used apart from a small area of garden bed. Strip acquisition may result in the loss of part of the garden bed. The loss of this land is not expected to impact on the ongoing operation of the business.</p> <p>Access to the service station would be maintained to the existing The Northern Road alignment in Luddenham town centre.</p>
Triple A Christmas Tree Farm/Naro Pty Ltd	Between The Northern Road and Eaton Road, Luddenham	<p>The route alignment around the Luddenham town centre would require the partial acquisition of land used for growing trees at Eaton Road. This would result in the permanent loss of this land for tree growing. The remaining part of this property not within the operational footprint would continue to be available for tree growing.</p> <p>The route realignment south west of the existing The Northern Road would also impact on an associated property adjacent to the Luddenham town centre. The affected land mainly comprises grazing land and dam infrastructure. This would result in the loss of this grazing land. Dam infrastructure affected by the project would need to be relocated. The project is not expected to impact on areas used for tree growing or Christmas tree sales on this property.</p> <p>The project would change access between Eaton Road and Luddenham town centre, with the existing right turn to/ from Eaton Road no longer possible. Access from Eaton Road to Luddenham town centre would be via a new intersection at the southern end of Luddenham. Access from Luddenham town centre to Eaton Road would be via the intersection at Elizabeth Road at the northern end of the town. This would increase travel distance by up to about 4.7 km. This may</p>

Business	Location	Summary of impact
		increase transport costs for the business owner.
Market garden and cattle	350-370 Willowdene Avenue, Luddenham	<p>The route alignment around the Western Sydney Airport site would bisect the lot and require the partial acquisition of land used for a market garden and cattle. The affected land mainly comprises grazing land and dam infrastructure.</p> <p>The project would remove direct access between the remaining two parcels. Access from residual parcel to another would be via left in left out access from the realigned The Northern Road. This would increase the travel distance by up to about 3.8 km to access the residual lot.</p>
Leppington Pastoral Company (LPC)	The Northern Road, Greendale	<p>Acquisition of land for the project would result in severance of two areas of land within the LPC Base Farm, and would also result in the demolition of three sheds and relocation of some irrigation, communications and other utilities infrastructure.</p> <p>The facilities and infrastructure would be demolished and where practicable, relocated within the Base Farm, prior to construction and in consultation with the farm owners.</p> <p>The severed parcels of land would be re-connected through the inclusion of an underpass of The Northern Road to the main Base Farm, to provide access for dairy cattle. Farm machinery and other vehicles would be able to cross The Northern Road via the signalised southern access for the Western Sydney Airport, providing all movement access for motorists entering the property.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>
Southern Cross Truck Rentals	Corner Dwyer Road and The Northern Road, Bringelly	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. Affected land mainly includes grassed areas. The project would not impact on any buildings or structures.</p> <p>Access would be maintained to Dwyer Road. Right turn access to and from The Northern Road would be restricted at Dwyer Road. This would require u-turns to be performed at either the Western Sydney Airport access or Mersey Road dedicated u-turn facility. This would increase the distance to be travelled by up to about 4.6 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>
Grassington Alpacas	Corner Dwyer Road and The Northern Road, Bringelly	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. Affected land mainly includes grassed areas. The project would not impact on any buildings or structures.</p> <p>Access would be maintained to Dwyer Road. Right turn</p>

Business	Location	Summary of impact
		<p>access to and from The Northern Road would be restricted at Dwyer Road. This would require u-turns to be performed at either the Western Sydney Airport access or Mersey Road dedicated u-turn facility. This would increase the distance to be travelled by up to about 1.6 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>
Pressure Welding Australia	1615 The Northern Road Bringelly	<p>Widening of The Northern Road would require the strip acquisition of land fronting The Northern Road. Affected land mainly includes grassed areas. The project would not impact on any buildings or structures.</p> <p>Access would be maintained via The Northern Road. Right turn access to and from The Northern Road would be restricted from the property. This would require u-turns to be performed at either the Western Sydney Airport access or Mersey Road dedicated u-turn facility. This would increase the distance to be travelled by up to about 1.6 km. U-turn facilities would be designed to accommodate movements by large vehicles.</p> <p>These impacts are not expected to impact on the ongoing operation of the business.</p>

During operation and at a regional State and national level, the project would have long-term beneficial impacts on business and industry through improved access and connectivity to growth areas in Western Sydney. The upgraded corridor would cater for traffic growth expected along The Northern Road corridor associated with increased residential and commercial development in the South West Priority Growth Area, Western Sydney Priority Growth Area and nearby areas, by improving road and intersection capacity. Additionally, the project would provide connectivity to the Western Sydney Airport through the provision of high capacity traffic and freight links between the airport and the M4 Western Motorway, and south western Sydney, (including Campbelltown, the F5 Freeway / M5 South-West Motorway, and the planned M12 Motorway).

This would have long-term beneficial impacts for regional and national business and industry, as improved connectivity associated with the project would add to the economic stimulus that would be generated by the Western Sydney Airport and the planned development of the surrounding strategic growth areas. The project would also improve road safety and provide long-term improvements to public and active transport facilities, promoting sustainable and efficient journeys. The potential socio-economic cumulative impacts are further discussed in Chapter 9.

Locally, once operational, the project would improve road safety and accessibility, supporting general improvements to local business and industry in the study area. However, the project would restrict right turn access to businesses along The Northern Road. Access to businesses along The Northern Road would be restricted to left-in and left-out access only. U-turn facilities would be provided at locations along The Northern Road alignment or on nearby roads. This would require changes in how some customers access individual businesses in the study area and would result in increases in travel distances for some businesses and business customers and suppliers.

For many businesses, the additional travel distance required would be up to about 3.0 km (or about three minutes), although for some businesses, this would be up to about 5.9 km (or about five minutes). Outside of Luddenham town centre, the majority of businesses affected by access changes include home based businesses. They comprise of construction related businesses,

transport services, plant and equipment hire, agricultural businesses, recreational uses, and specialist retail (for example, equestrian, pet and rural supplies), which are likely to be less reliant on passing trade. While the additional travel may be a deterrent for some 'passing' customers of businesses outside of Luddenham town centre, any possible reduction in passing trade is likely to be minor and would be off-set in part by the increased exposure to potential customers associated with the projected increase in traffic using The Northern Road in the future. Business and car park surveys indicated that businesses in the Luddenham town centre attract customers from across the study area and wider region. The majority of customers are generally drawn from localities within about 20 km of Luddenham, although some customers travel much further to access particular businesses.

Feedback from the survey of business owners identified passing trade as important to a number of businesses, such as service stations and cafes. It was estimated by these business owners that passing trade accounted for more than about 75 per cent of their customers. These businesses may potentially be affected by a reduction in through traffic within the Luddenham town centre. Following the implementation of the bypass, businesses in the town are likely to continue to be attractive for customers from across the study area and wider region. Access to Luddenham town centre would be maintained from the new The Northern Road alignment from the north and south. This would allow motorists, including potential passing trade, to continue to travel through the town centre, without needing to 'back-track', which would support access for customers from these areas. In addition, the realignment of Elizabeth Drive would provide improved and more direct access for customers east of Luddenham. This is likely to contribute to businesses in the Luddenham town centre remaining accessible and attractive to customers who prefer to access services within the town centre and assist in maintaining a level of passing trade.

A small number of businesses also indicated that 'passing trade' made up a relatively small proportion of their customers. These mainly included service industries. Feedback from the business survey also suggested that people often preferred to access some services in Luddenham rather than Penrith as businesses tend to provide easier parking, are more accessible and the town is less busy. A reduction in through traffic, particularly heavy vehicles, would help to enhance business amenity and improve local access within the town. This was seen as a benefit for customer access by some business owners, as was improved road safety provided by the project.

With the project, traffic volumes within the Luddenham town centre are expected to reduce in the short-term (2021) from existing traffic volumes. However, over the longer term (2031), traffic volumes are expected to return to levels similar to existing traffic volumes, mainly due to growth and development associated with the Western Sydney Airport and urban development within the region. Without the bypass, traffic levels in Luddenham town centre would continue to increase, impacting on business amenity within the town centre and customer access to local businesses. This may reduce the attractiveness of businesses within the town for some customers, who currently value the ease of access offered by local businesses. Further information about traffic impacts during operation is provided in Section 7-1.

A reduction in traffic within the town centre may reduce levels of trade for those businesses that currently rely on passing traffic for their customers. Businesses surveyed for this assessment that felt most at risk from a reduction in traffic included service stations, cafés and some retail uses. Reduced trade associated with reductions in traffic could potentially have flow on effects on local employment for some businesses. The extent of impact on individual businesses is unknown and would depend on a range of factors for example, existing business operations and viability, any proposed future plans, and the nature of the business.

Reduced trade associated with a reduction in traffic in the short-term may be off-set in part by increased construction activity within the study area associated with the development of the second Sydney airport and urban development projects. This would result in an increase in construction workers in areas within or near the study area and potentially demand for goods and services locally and regionally.

The increased development and population growth occurring more broadly in the study area may have a positive long-term impact on businesses and support increased customers over time. In the longer term, this would assist in offsetting in part the impacts of the bypass. In the short-term, ensuring local communities and business customers are aware of changes in access to local businesses would be important to minimising potential business impacts associated with local road changes. It is likely that any potential impacts on businesses associated with changes in customer access would reduce over time as customers and local and regional communities become familiar with the new access arrangements, and are not expected to be significant in the context of the project as a whole.

Agricultural impacts

The project would directly impact a total of about 104.2 ha of agricultural land in the study area, including land used for cropping, grazing, horticulture and intensive animal production. This represents about 0.5 per cent of agricultural land in the wider Penrith and Liverpool region.

Acquisition for the project would impact on land used for dairy farming, honey production, grazing, cropping and horticulture. Potential impacts on directly affected agricultural businesses would generally be associated with:

- Loss of productive land, including land used for pasture, feed crop and horticulture production
- Impact on farm infrastructure such as dams, irrigation, fencing, sheds and storage areas, and other facilities
- Severance or fragmentation of larger agricultural properties, potentially isolating some parts of agricultural properties and impacting on the efficiency of farm management, and farming operations associated with the movement of livestock and/ or farm machinery and equipment
- Potential impacts on the movement of farm equipment and livestock, including between different areas of farming properties
- Changes to farm access, including for vehicles transporting produce or delivering farming equipment and supplies.

Urban development is placing pressure on the agricultural industry in the study area and wider region and reducing agriculture land availability. Acquisition of land for the Western Sydney Airport has also impacted on farming land in the region. While this land continues to be used for farming purposes, future development of the airport would result in the loss of land currently being used for agricultural purposes. This is discussed further in Chapter 9 – Cumulative impacts.

The project would result in the severance or fragmentation of some larger rural properties particularly around the Luddenham bypass where the project moves away from the existing The Northern Road corridor. Severance impacts have mainly been avoided by locating the realigned road corridor near property boundaries, however, were unavoidable near the Luddenham bypass due to the realignment of The Northern Road for the Western Sydney Airport. The main location where the realigned corridor has resulted in the severance of agricultural land is at the LPC property at Bringelly. The project would maintain internal property access to the isolated land parcel east of The Northern Road corridor through the provision of a livestock underpass of The Northern Road. While these changes are likely to be important to the operators of LPC Base Farm, the impacts are not expected to be significant in the context of the project as a whole.

Where partial acquisition of agricultural properties occurs, farm infrastructure such as fencing, dams, sheds and other structures, within the project footprint would need to be demolished due to the project. While adjustments to properties may be a concern for affected property owners, the impact is not expected to be significant in the context of the overall project. Consultation would be undertaken with agricultural property owners about potential impacts on farm infrastructure and adjustments required to things such as fencing, farm infrastructure and relocation of impacted structures.

Access to agricultural properties would be maintained by the project, although permanent changes may be required for some properties due to intersection changes and restrictions on some turning movements.

Access and Connectivity

During operation, the project would improve regional access and connectivity for motorists and other road users, through reduced travel times and improved connections to the regional road network, major centres and key growth areas in the western Sydney region; and improved road safety and driving conditions. This would have positive long-term impacts for private motorists as well as commercial and business travellers.

At a local level, the project would improve access and connectivity to and from areas surrounding the project, including within the Luddenham town centre. The existing The Northern Road would continue to provide local access for residents, businesses and visitors and for motorists wanting to connect to the new road. The realignment of The Northern Road to bypass Luddenham town centre would help to reduce through traffic within the town centre. This would support improved access and connectivity to homes, businesses and facilities within the town centre and to surrounding areas, including for motorists, pedestrians and cyclists.

The project would involve the bypass of Luddenham town centre, restrictions to right turns to and from businesses along The Northern Road and some local streets, and upgrade of some intersections. Access to businesses along The Northern Road would be provided by left-in and left-out access only. U-turn facilities would be provided at locations along The Northern Road alignment or on nearby roads. This would require changes in how some customers access individual businesses in the study area and would result in increases in travel distances for some businesses and business customers.

Once operational, the project would improve active transport opportunities within the study area by providing a new shared path for pedestrians and cyclists on the western side of the road and new pedestrian footpath on the eastern side of the road where warranted. Pedestrian crossings would also be provided at upgraded intersections, which would also support improved access and safety outcomes for pedestrians and cyclists. The bypass of Luddenham would also provide opportunities to improve access for pedestrians and cyclists within the town centre.

7.4.5 Summary of impacts to the environment of Commonwealth land

A summary of potential socio-economic impacts to the environment of Commonwealth land as a result of construction and operation of the project is provided in this section. Affected Commonwealth land includes the DEOH land, and land that has been acquired by the Commonwealth for the purposes of developing the Western Sydney Airport at Badgerys Creek.

Potential construction impacts

During construction, the project's construction footprint would encroach into DEOH land, along most of this site's boundary with The Northern Road, within a strip of land of varying width. While the extent of encroachment of construction into the DEOH land would be large, the main facilities within the DEOH site are not situated within the construction footprint and would not be directly affected. Construction of the project would impact upon the natural and physical resources within the construction footprint of the DEOH site, including the removal of Cumberland Plain Shale Woodland and Riverflat Eucalyptus Forest communities and their associated habitat. The impact to biodiversity on Commonwealth land is discussed further in Section 7.3. While construction noise and dust would potentially impact on the DEOH land, these impacts are considered to be minor and would not require additional management measures over and above those listed in Section 7.4.6.

Construction would also encroach into DEOH land that is currently part of the Orchard Hills Golf Club, resulting in impacts to the recreational value of the land from the loss of some playable land comprising some greens and fairways. The extent of these impacts is illustrated in the property acquisition maps attached to Appendix J. In addition, construction would result in some loss of

amenity on the golf course due to potential construction noise and dust issues. The construction impacts on the environment of Commonwealth land within the golf club are considered to be moderate, and would be managed through the implementation of measures outlined in Section 7.4.6.

During construction the project would also potentially impact on Commonwealth land at the site of the Western Sydney Airport. A small area of airport land, most of which is currently primarily used for rural purposes, would be impacted by construction. Similar to the DEOH site, the project would impact upon the natural and physical resources within the construction footprint of the site, including the removal of Cumberland Plain Woodland and Riverflat Eucalyptus Forest communities and their associated habitat. The impact to biodiversity on Commonwealth land is discussed further in Section 7.3. A discussion on the potential impacts to natural heritage is provided in Section 8.4 – Non-Aboriginal heritage. The nature of the impact would be in relatively narrow strips of land, the impact of which would be minor in socio-economic terms. Two construction compound sites (C5 and C7; see Figure 5-12) would potentially impact on airport land however the use of these two sites would be temporary and the land would revert to its current (or planned) use after the project's construction is complete. The nature and significance of the project's likely socio-economic effects on the environment of Commonwealth land at the Western Sydney Airport site during construction would be the same as the impacts described and assessed above in Section 7.4.3.

Potential operation impacts

During the project's operation, acquisition of Commonwealth land within the DEOH (including the Orchard Hills Golf Club) and the site of the Western Sydney Airport would result in permanent change to the use of the affected land, most of which is currently used for either rural or recreational (golf club) purposes. Within the DEOH land, land acquisition would comprise a strip of land of varying width. In the long-term the project's operation would result in little or no impact to the socio-economic environment of Commonwealth land, as the current uses (Defence, recreation) would continue and the planned future use of land for the Western Sydney Airport would not be affected or compromised.

7.4.6 Environmental management measures

Table 7-63 outlines environmental management measures that have been developed to specifically manage potential socio-economic impacts of the project.

Expected environmental outcomes

Project-specific environmental management measures have been developed with the aim of minimising or mitigating, as far as practical, potential socio-economic impacts of the project's construction and operation. These are described in Table 7-63.

Broadly, the expected environmental outcomes of the environmental management measures are to avoid or minimise impacts on communities, businesses and social infrastructure from the construction and operation of the project. Broad outcomes that would be achieved through:

- Implementation of environmental management measures, for example noise and dust mitigation, and traffic management strategies
- Early and ongoing consultation and communication to ensure local and regional communities, businesses, transport users and managers of community facilities are informed about the project's construction and operation
- Relocation of affected farm infrastructure in consultation with affected property owners.

Expected effectiveness

Roads and Maritime have experience in managing potential impacts on local and regional communities and businesses as a result of road developments of a similar scale and scope to this project.

Many of the mitigation measures outlined involve effective and ongoing communications with the community and affected land owners. Should the project be approved, it is anticipated conditions of approval for the project would require preparation of a Draft Community Involvement Plan (CIP), Community Communications Strategy (CCS) or similar document for the construction phase of the project. Community and stakeholder involvement would be tailored to each phase of the project enabling appropriate consideration and balancing of community and stakeholder's social, economic, environment and functional issues to achieve best for project outcomes. A key approach to consultation would be to provide two-way communication channels enabling timely intervention aimed at resolving issues raised by the community and stakeholders.

As such, the environmental management measures outlined in Table 7-63 are expected to be effective, given the communities ability to provide feedback on their effectiveness to Roads and Maritime.

Roads and Maritime will, in consultation with Liverpool Council, provide appropriate support for preparation of plans to revitalise Luddenham town centre, for the purpose of encouraging motorists to continue to pass through or visit the town. Any streetscape and landscape treatments would be determined after finalisation of any town centre revitalisation plans. The effectiveness of this consultation would only be measured once any actions or recommendations that are discussed are implemented. As such, at this stage it is difficult to accurately assess the likely effectiveness of this mitigation.

The Construction Environmental Management Plan (CEMP) prepared prior to construction would also address the requirements of the project approvals, the environmental management measures outlined in the EIS and all applicable legislation. With regard to socio-economic aspects, mitigation measures are expected to minimise and manage impacts on community life throughout the construction phase. The local and broader community would be notified in advance of construction activities, temporary arrangements, traffic management arrangements and any special construction activities of short duration. As such, impacts to the community are expected to be relatively minor and temporary.

Audits and reporting on the effectiveness of environmental management measures is generally carried out to show compliance with management plans and other relevant approvals and would be outlined in detail in the CEMP prepared for the project.

Table 7-63 Socio-economic and land use environmental management measures

Impact	Ref #	Environmental management measures	Responsibility	Timing	Effectiveness of measures
General impacts	SE-1	<p>A Draft Community Involvement Plan would be prepared to guide community engagement during construction of the project and would be updated throughout construction. Communication would be with the local community, stakeholders and the wider region. The Draft Community Involvement Plan includes:</p> <ul style="list-style-type: none"> • Guiding principles overall approach to community and stakeholder involvement • A comprehensive list of identified stakeholders • A register of specific issue communications strategies • Requirements for the project regarding access to information, complaints and inquiries procedures and community consultation • A range of communication tools applicable to the project • Contact names and details • Complaints procedures 	Construction contractor / Roads and Maritime	Construction	<p>Proven to be effective.</p> <p>To ensure flexibility in the communications approach to the project, communications and engagement activities would be monitored, assessed and reported regularly.</p>
	SE-2	Areas affected by construction would be reinstated and restored in accordance with the urban design and landscape strategy	Construction contractor	Construction	See Chapter 8.5

Impact	Ref #	Environmental management measures	Responsibility	Timing	Effectiveness of measures
Noise and vibration during construction and operation	SE-3	Mitigation measures specific to construction noise and vibration can be found in Section 7-2 of the EIS for this project	Construction contractor/ Roads and Maritime	Pre-construction and during construction	See Chapter 7.2
Air quality during construction and operation	SE-4	Mitigation measures specific to construction air quality can be found in Section 8-6 of the EIS for this project	Construction contractor/ Roads and Maritime	Pre-construction and during construction	See Chapter 8.6
Property acquisition	SE-5	Provide appropriate compensation in accordance with the (NSW) <i>Land Acquisition (Just Terms Compensation) Act 1991</i> for properties to be partially or fully acquired for the project	Roads and Maritime	Pre-construction	N/A
	SE-6	Impact from the acquisition on owners' remaining holdings would be considered in the acquisition process. As required and in consultation with owners, Roads and Maritime would engage the use of appropriately qualified professionals to carry out property assessments and identify alternate opportunities for any remaining land holdings	Roads and Maritime	Pre-construction	N/A
	SE-7	Undertake property adjustments and relocation of infrastructure (for example, fencing, dams, property access) in consultation with the property owner	Construction contractor	Construction	Expected to be effective if carried out in accordance with consultation requirements
	SE-8	Undertake any adjustments to the Orchard Hills golf course, in consultation with the managers of the Orchard Hills Golf Club	Roads and Maritime/ Construction	Construction	Expected to be effective if carried out in accordance with consultation requirements.

Impact	Ref #	Environmental management measures	Responsibility	Timing	Effectiveness of measures
			contractor		
Business and economic activity	SE-9	On-going consultation with local business owners, including owners of agricultural businesses, located close to construction works about the timing, duration and likely impact of construction activities on their business operations would be carried out	Construction contractor/ Roads and Maritime	Construction	Expected to be effective. To ensure flexibility in the communications approach to the project, communications and engagement activities would be monitored, assessed and reported regularly.
	SE-10	Relocate and/or remove farm infrastructure, including farm dams, as required and in consultation with affected land owners	Construction contractor	Construction	Expected to be effective if carried out in accordance with consultation requirements.
	SE-11	Maintain a business impact risk register to identify and manage the specific impacts associated with construction related works for individual businesses	Construction contractor	Construction	Expected to be effective. Monitoring and exporting would be required to measure the effectiveness.
	SE-12	Access to existing businesses would be provided on a continuous basis throughout the construction of the project	Construction contractor	Construction	Proven to be effective. Access arrangements would be outlined in the TMP, the effectiveness of those arrangements and the need for any alternative and/or temporary access arrangements would be agreed with affected property owners.

Impact	Ref #	Environmental management measures	Responsibility	Timing	Effectiveness of measures
	SE-13	Appropriate road signage would be provided in accordance with the Roads and Maritime Services guidelines Tourist Signposting (2012) to provide guidance to passing patrons on access to shops and services, including within Luddenham town centre	Construction contractor	Construction	Proven to be effective.
	SE-14	Roads and Maritime will, in consultation with Liverpool Council, provide appropriate support for preparation of plans to revitalise Luddenham town centre, for the purpose of encouraging motorists to continue to pass through or visit the town. Any streetscape and landscape treatments would be determined after finalisation of any town centre revitalisation plans	Roads and Maritime	Operation	Expected to be effective. Roads and Maritime have experience with similar bypass projects in NSW, effectiveness of this consultation would only be measured once any actions or recommendations that are discussed are implemented
	SE-15	Roads and Maritime would undertake the project in accordance with the NSW Government Policy on Aboriginal Participation in Construction (NSW Finance and Services 2016)	Roads and Maritime / Construction contractor	Construction	Expected to be effective. Contractors for all projects covered by this policy must provide an Aboriginal Participation Plan to the contracting agency within 60 days of the contract being awarded.
Access and connectivity	SE-16	The Traffic Management Plan would include a signage strategy (consistent with Roads and Maritime policy) to provide guidance to passing patrons on access to shops, services and businesses during construction	Construction contractor	Construction	Proven to be effective. Monitoring and reporting requirements of the TMP to confirm effectiveness of measures.

Impact	Ref #	Environmental management measures	Responsibility	Timing	Effectiveness of measures
	SE-17	Access to properties would be provided on a continuous basis throughout the construction of the project Where temporary changes to property access are required, alternate access should be determined in consultation with affected property owners and tenants	Construction contractor	Construction	Proven to be effective. Access arrangements would be outlined in the TMP, the effectiveness of those arrangements and the need for any alternative and/or temporary access arrangements would be agreed with affected property owners.
	SE-18	Access for pedestrians and cyclists near construction works would be maintained, including consideration of pedestrian access needs for elderly people, children and people with disability	Construction contractor	Construction	Proven to be effective. Monitoring and reporting requirements of the TMP to confirm effectiveness of measures.
	SE-19	Mitigation measures specific to Traffic and Transport can be found in Section 7-1 of the EIS for this project	Construction contractor	Construction	See Chapter 7.1
Cumulative impacts	SE-20	Mitigation measures specific to cumulative impacts can be found in Chapter 9	Refer to Chapter 9	Refer to Chapter 9	See Chapter 9

7.4.7 Residual Impacts

Residual impacts are defined as those impacts that remain following the implementation of mitigation measures. A summary of residual socio-economic impacts is presented below, including reasoning as to why avoidance or mitigation of these impacts would not be achieved.

Construction

Potential residual socio-economic impacts that may occur as a result of construction include:

- Short-term changes to traffic and access, including reduced travel speeds, increased delays near construction works and temporary changes to accessibility for pedestrians and cyclists. This may require some motorists, pedestrians or cyclists to travel further to reach their destination. This would be necessary to ensure construction work is carried out safely. This impact would be minor and is not considered to be significant.
- Short-term changes in local amenity for some residents, businesses and visitors near the project, associated with increased noise and dust. Overall, these impacts would be temporary and are expected to be managed to an acceptable level, although, some people may experience ongoing amenity impacts that affect the use and enjoyment of their property. This impact is not considered to be significant.

Due to the application of effective environmental management measures, especially ongoing communications, residual, negative socio-economic effects to the community and business in Luddenham and along the entire proposed alignment from construction activities are considered to be temporary and of an acceptable nature.

Construction of the project would also result in short-term beneficial residual impacts to businesses in the Luddenham area.

Operation

Potential residual socio-economic impacts that may occur during the project's operation may include:

- Impacts on community cohesion through disruption to social networks and community relationships. This impact would be associated with property acquisition for the project and would mainly relate to individuals who are required to move away from the area. However, there are unlikely to be residual impacts on community cohesion in the socio-economic study area as a whole, and the overall impact on community cohesion is not considered to be significant.
- Impacts on the amenity and well-being of individuals who are required to move from their property as a consequence of property acquisition. This impact is considered to be substantial in terms of the effect on some individuals who would be directly affected.
- Permanent loss of some land used for agricultural, commercial and residential uses, associated with acquisition of property and change in land use to transport corridor. This would be necessary due to the design of the project and is not expected to be significant in the context of the region as a whole.
- Changes in local access and connectivity for local residents, businesses and visitors. These changes may require some motorists to travel further to access residential properties, businesses and other facilities near the project and within surrounding areas. This would be necessary due to the design of the project, and is not considered to be a significant impact.
- The median would assist in improving road safety by removing the need for opposing-lane overtaking and the associated risk of head-on crashes. The additional travel distance is considered to be moderate, for those motorists affected by traffic detours, but is not considered to be significant.

- Short term and long-term impacts on local businesses and employment, resulting from acquisition of land that is currently used for business purposes.

As discussed above in Section 7.4.4 however, in the longer term the developments planned for this part of western Sydney, including the Western Sydney Airport, are likely to stimulate new business and employment opportunities that would outweigh any residual short-term negative economic impacts resulting from the project.

BLANK PAGE