Newell Highway Coonabarabran Bypass

Preliminary Site Investigation

April 2020 | Version: 3

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1 Introduction

Transport for NSW (TfNSW)is undertaking planning for an upgrade of the Newell Highway at Coonabarabran in the north west of New South Wales (NSW). The Newell Highway is a major freight route between Victoria and Queensland through regional NSW. Coonabarabran is located within the Warrumbungle Shire Council local government area about 120 kilometres north-east of Dubbo central business district (CBD) and 335 kilometres north-west of Sydney CBD. This work is part of the Newell Highway upgrade program.

Construction of the bypass is expected to support more efficient and productive movement of freight along the Newell Highway corridor. The bypass is also anticipated to improve regional connectivity, improve road safety in the area and increase travel efficiency for local and regional road users.

This Preliminary Site Investigation (PSI) has been prepared to assess the potential contamination impacts of the proposal. It will inform the proposal design and a Review of Environmental Factors (REF) currently being prepared by Roads and Maritime under Division 5.1 of the *Environmental Planning and Assessment Act 1979.*

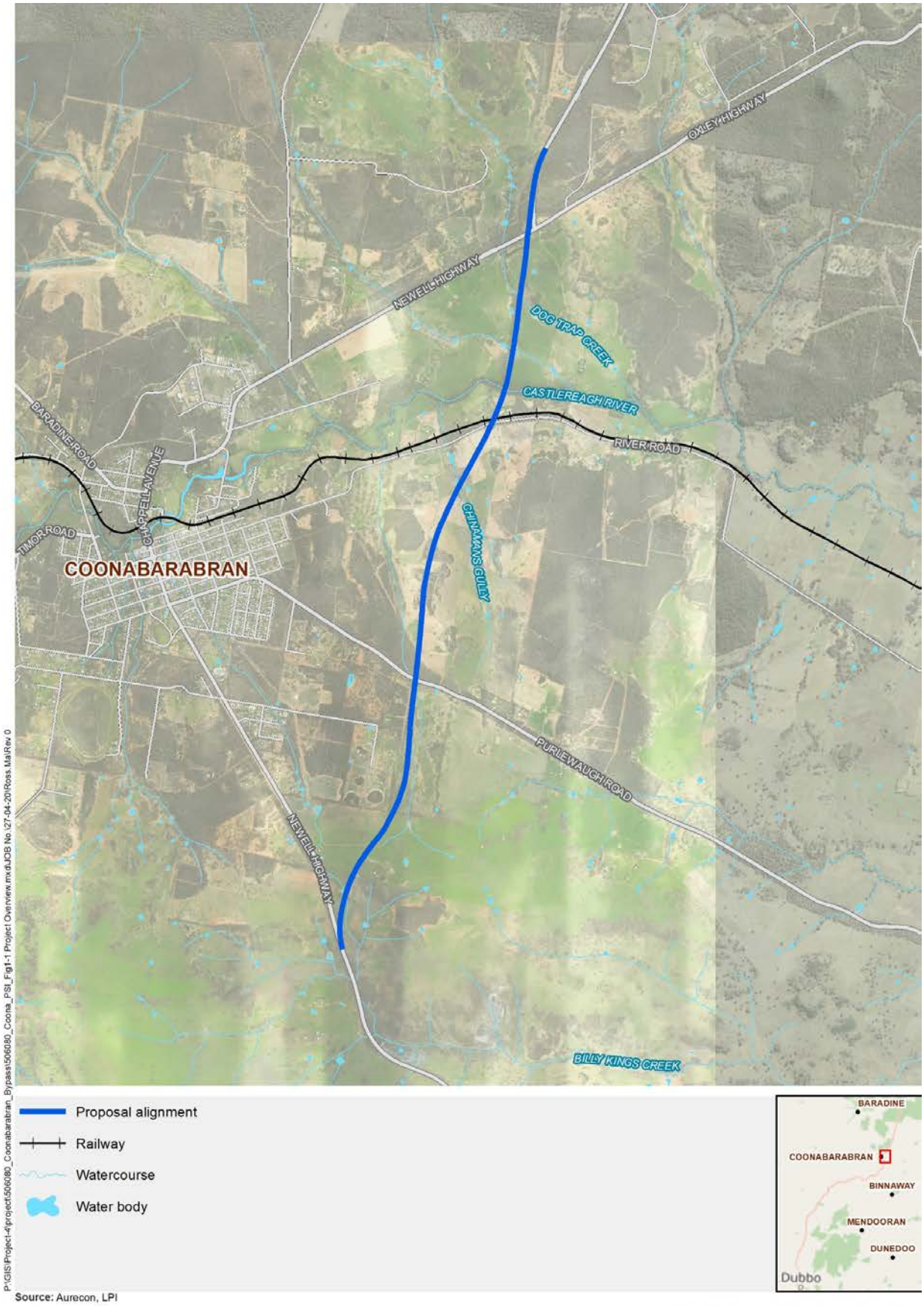
1.1 Proposal overview

The proposed Newell Highway Coonabarabran Bypass (the proposal) is a new road east of the existing Newell Highway alignment which runs through the town.

Key features of the proposal would include:

- a new two-lane, two-way road, about eight kilometres long to the east of Coonabarabran, between the Newell Highway and Oxley Highway with a posted speed limit of 110 kilometres per hour
- changes to the intersection arrangement of the Newell Highway and Oxley Highway to the north of Coonabarabran
- intersections and local road adjustments at Purlewaugh Road and River Road
- a bridge crossing of the Castlereagh River
- stock culvert under the highway just south of Purlewaugh Road
- property acquisitions and adjustments (including to some property access)
- drainage adjustments and utility relocations
- temporary ancillary facilities during construction including water quality controls, site offices and stockpile sites.

Refer to Figure 1-1 for the proposal overview.


OXLEY HIGHWAY
NEWELL HIGHWAY
DOG TRAP CREEK
CASTLEREAGH RIVER
RIVER ROAD
BARADINE ROAD
CHAPPELL AVENUE
TIMOR ROAD
COONABARABRAN
CHINAMANS GULLY
PURLEWAUCH ROAD
NEWELL HIGHWAY
BILLY KINGS CREEK
Proposal alignment
Railway
Watercourse
Water body
BARADINE
COONABARABRAN
BINNAWAY
MENDOORAN
DUNEDOO
Dubbo
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Newell Highway Upgrade Coonabarabran Bypass Preliminary Site Investigation
Projection: GDA 1994 MGA Zone 55
FIGURE 1.1: Project Overview

1.2 Objectives of the investigation

TfNSW is preparing an REF for the construction and operation of this proposal. TfNSW is concurrently undertaking the proposal's concept design and planning.

This report has been prepared to:

- inform the REF for the proposal of the potential contamination impacts of the proposal in accordance with the relevant environmental assessment requirements of Division 5.1 of the EP&A Act. This includes areas of potential environmental concern (APEC) and contaminants of potential concern (CoPC)
- support planning and design activities for the proposal including identifying environmental risks, constraints and areas of sensitivity and making recommendations for the avoidance or minimisation of potential impacts.

1.3 Scope of works

This PSI included the following scope of works:

- collation of site descriptions including Lot and deposited plans (DP) (where required) of the alignment for road infrastructure
- review of available historical aerial imagery
- review contamination databases including NSW EPA Contaminated Land Records and NSW Government per- and polyfluoroalkyl substances (PFAS) Program for risk sites
- review geology, soil, topography and registered groundwater bore maps
- review acid sulfate soil (ASS) and salinity risk maps
- review Department of Defence unexploded ordnance (UXO) risk mapping
- review of previous contamination or pertinent reports prepared for the study area
- review of naturally occurring asbestos risk mapping
- review of NSW Livestock Dip sites
- identification of CoPC and APEC within the study area
- identification of any further work or management measures required.

1.4 Guidance documents

Key assessment guidelines considered during the preparation of the PSI included:

- Australian and New Zealand Environment Conservation Council (ANZECC), 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*
- NSW EPA, 2017, *Guidelines for the NSW Site Auditor Scheme* (3rd edition)
- National Environment Protection Council, 2013, *National Environment Protection (Assessment of Site Contamination) Measure 1999*
- State of NSW and the NSW Environment Protection Authority, 2020, *Consultants reporting on contaminated land, Contaminated land guidelines*
- DEC, 2007, *Guidelines for the Assessment and Management of Groundwater Contamination*
- NSW EPA, 2014, *Waste Classification Guidelines Part 1 Classifying Waste.*

2 Site description

2.1 Site identification

The study area is approximately eight kilometres to the east of Coonabarabran, located 451 kilometres north-west of Sydney's central business district (CBD). This PSI has assessed areas within a one kilometre buffer around the proposed alignment (the study area, Figure 1-1).

2.2 Site setting

The study area is located within the Warrumbungle Shire Council and the relevant local environmental plan (LEP) is the Warrumbungle LEP 2013. Land use zoning include the following:

- SP2 - Infrastructure
- RU1 - Primary Production
- R1 - General Residential
- RU5 - Large Lot Residential.

Nearby main road corridors include Oxley Highway (B56), Purlewaugh Road and Newell Highway. Infrastructure within the study area includes residential buildings, farm sheds and a disused freight rail line located to the north of River Road.

The surrounding land uses are predominantly rural living and farms, containing large areas of cleared land.

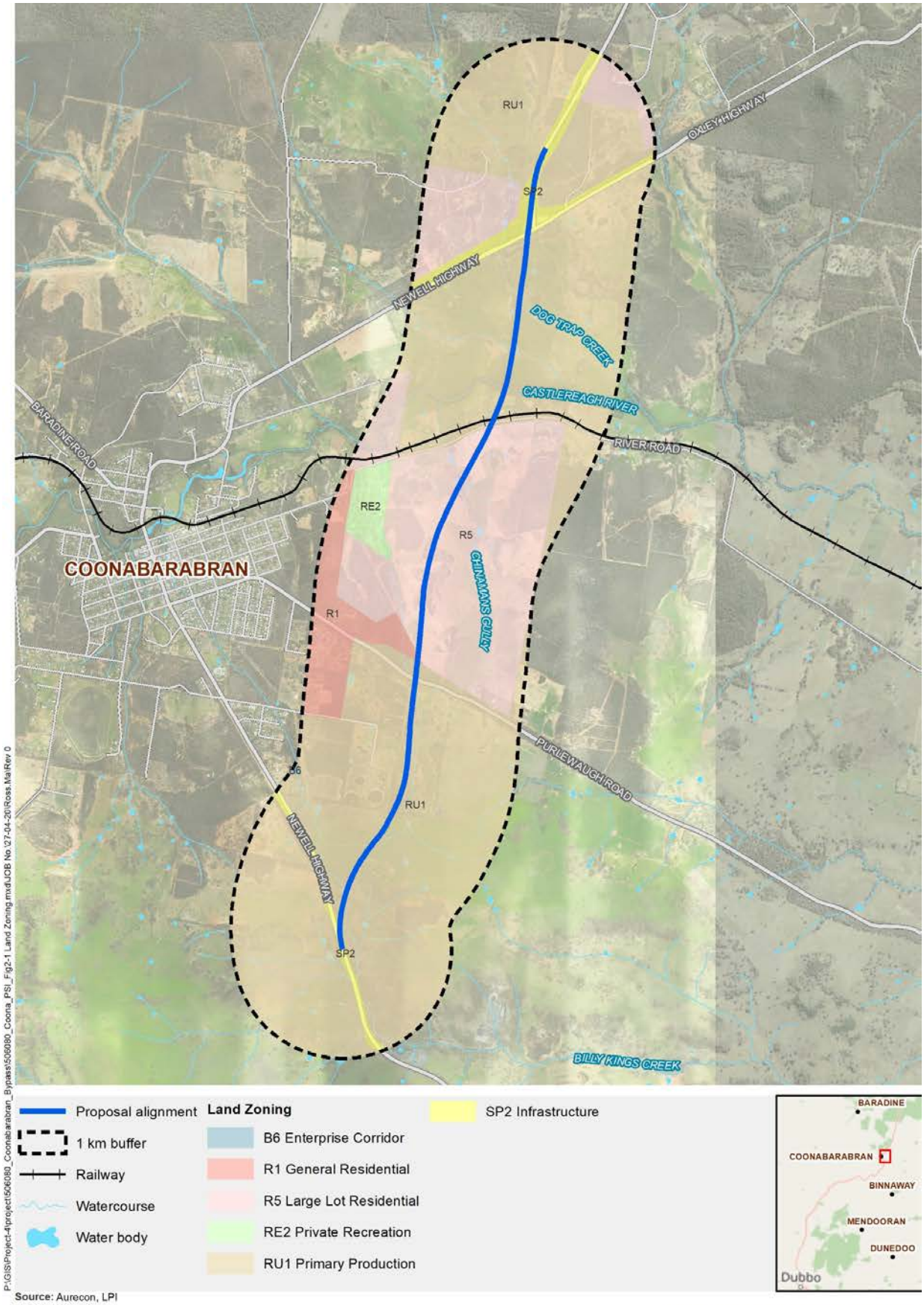
2.3 Surrounding land uses

The study area boundary was set as one kilometre radially from the centre of the alignment. Surrounding land uses and zonings within this boundary have been summarised in Table 2-1 and shown in Figure 2-1 based on recent aerial imagery, local government and NSW Department of Planning Industry and Environment information.

Table 2-1 Surrounding land uses

Direction	Land use details	Land use zonings
North	• Large rural living lots containing residential buildings and farming infrastructure • Dense vegetation present on several lots	RU1 - Primary Production R5 - Large Lot Residential
East	• Large rural living lots containing residential buildings and farming infrastructure • Large areas of cleared land with dense vegetation present in selected areas • Disused freight rail track	RU1 - Primary Production R5 - Large Lot Residential

Direction	Land use details	Land use zonings
South	• Large rural living lots containing residential buildings and farming infrastructure • Large areas of cleared land with dense vegetation present in selected areas	RU1 - Primary Production
West	• Small lots within Coonabarabran town • Large rural living lots containing residential buildings and farming infrastructure to the west of Coonabarabran town	RU1 - Primary Production RE2 - Private Recreation R1 - General Residential R5 - Large Lot Residential B6 - Enterprise Corridor



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Projection: GDA 1994 MGA Zone 55

FIGURE 2.1: Land Zoning

3 Physical environment

3.1 Topography

Coonabarabran is located between the Central West and North West Slope regions of New South Wales. Topography within the study area features gentle undulating hills, with elevation ranging from 490 metres Australian Height Datum (mAHD) at the intersection with Castlereagh River, to 580 mAHD at the intersection with Newell Highway. The study area intersects a number of creeks and drainage lines, the most notable being the Castlereagh River, Dog Trap Creek and Chinamans Gully (refer to Figure 1-1).

3.2 Geology and soils

3.2.1 Geology and soil classification

Geology

The study area is located on the Gilgandra 1:250 000 Geological Map (SH/55-16). Five different geologic formations from Cenozoic to Mesozoic time frames are present within the study area, with the Purlawaugh Formation being the most predominant. A map of geology throughout the study area is presented in Figure 3-1. A description of each geological formation is summarised in stratigraphic order in Table 3-1.

Table 3-1 Relevant geologic formations

Period	Geologic formation	Geologies present	Basin	Description
Quaternary	Quaternary (Q)	Alluvium, gravel, sand, silt, clay	Surat	Extremely variable ranging from sands to clays. Alluvium is a general term for clay, sit, sand, gravel or similar unconsolidated detrital material, deposited by a stream or other body of running water.
Tertiary	Tertiary Volcanics (Nm)	Basalt, dolerite	Surat	Dolerite is a medium grained mafic intrusive rock composed of calcic plagioclase and clinopyroxene. Basalt is a mafic (magnesium and iron rich) extrusive igneous rock formed from the rapid cooling of lava.
Jurassic	Pilliga Sandstone (J_p)	Quartz sandstone, conglomerate, claystone	Surat	Medium to very coarse grained, well sorted, angular to subangular quartzose sandstone and conglomerate. Minor interbeds of mudstone, siltstone and fine-grained sandstone and coal. Common carbonaceous fragments and iron staining. Rare lithic fragments.

Period	Geologic formation	Geologies present	Basin	Description
	Purlawaugh Formation (Jinp)	Lithic sandstone, shale, claystone, conglomerate, lignite, includes Comiala shale	Surat	Fine to medium grained lithic to labile sandstone thinly interbedded with siltstone, mudstone and thin coal seams. Abundant carbonaceous fragments, thin beds of flint clay.
	Garrawilla Volcanics (J_g)	Dolerite, basalt, tuff, trachyte, breccia	Gunnedah	Basal unit of the Surat Basin and overlies the top units of the Gunnedah Basin beneath. Overlaid by Purlawaugh Formation and Pilliga Sandstone.

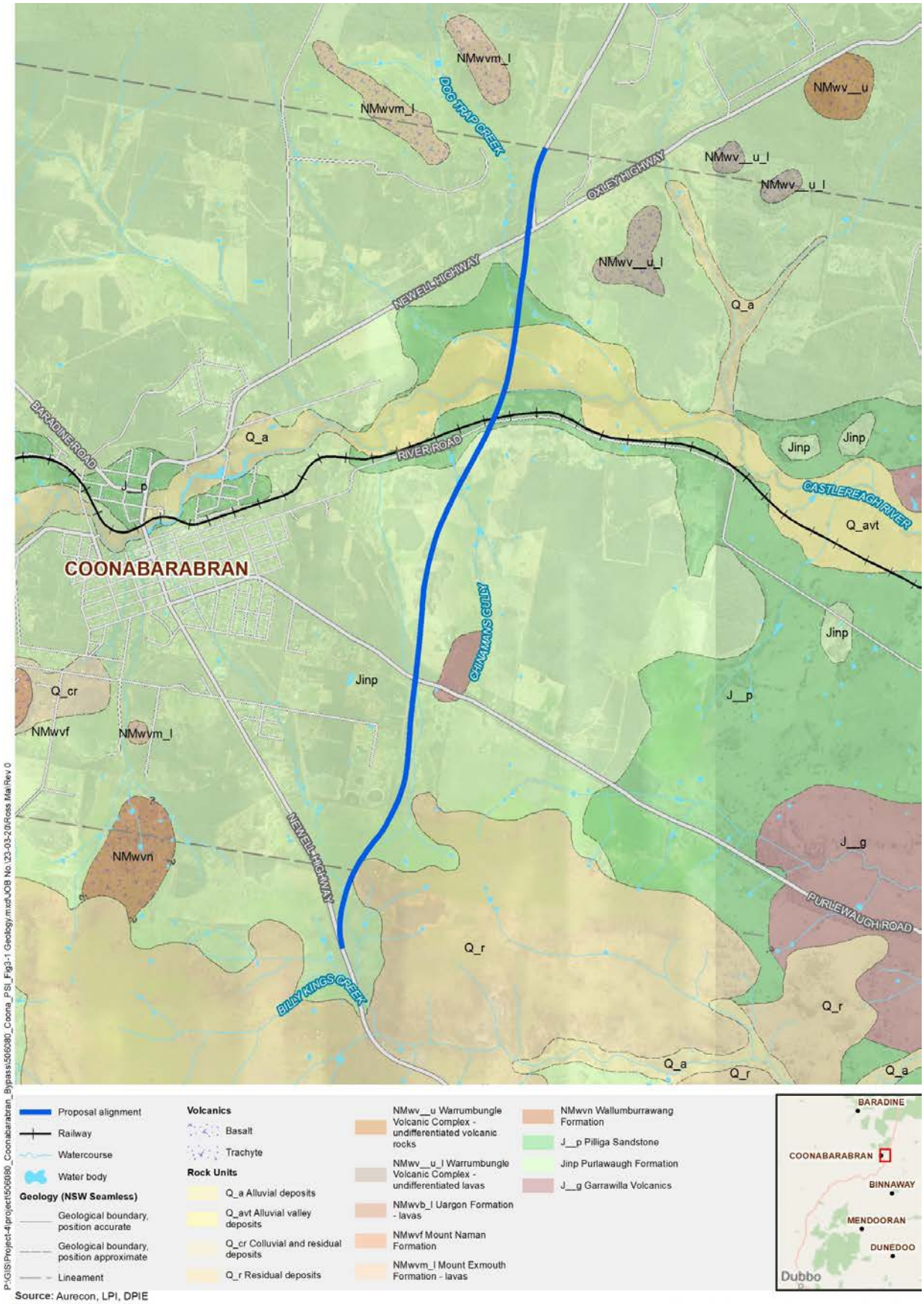

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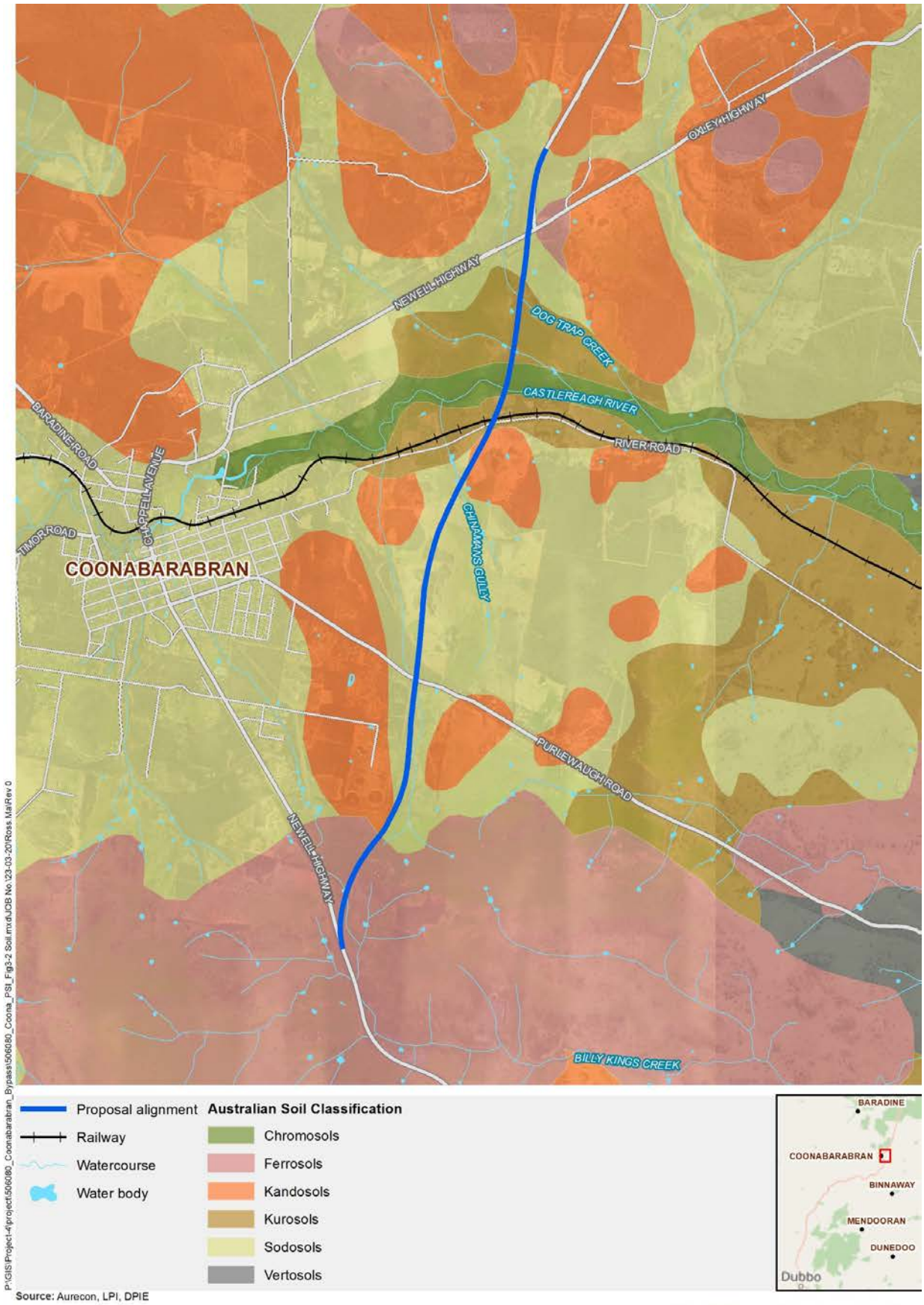
FIGURE 3.1: Geology

Soil

Soil classifications were assessed using the Office of Environment and Heritage eSPADE 2.0 Web Application (eSPADE) and the Australian Soil Classification. The study area spans over a variety of soil classifications including Kandosols, Sodosols, Ferrosols, Kurosols and Chromosols (Figure 3-2). Descriptions of each soil classification is summarised in Table 3-2.

Table 3-2 Relevant soil classifications

Soil Classification	Soil Description
Kandosols	Structureless soils, with little or gradual increase in clay content with depth. Mostly well-drained permeable soils. Low to moderate agricultural potential with moderate chemical fertility and water-holding capacity.
Sodosols	Soils high in sodium with an abrupt increase in clay down the soil profile (strong soil texture contrast). Very low agricultural potential with high sodicity leading to high erodibility, poor structure and low permeability. Low to moderate chemical fertility and can be associated with soil salinity.
Ferrosols	No strong texture contrast. B2 horizon has high free iron oxide content. Found in well drained sites. Agricultural potential due to good structure, moderate to high chemical fertility and water holding capacity. High rainfall events can cause acidification.
Kurosols	Strong texture contrast with acidic surface and sodic soils. Low agricultural potential with high acidity, low chemical fertility and low water-holding capacity.
Chromosols	Strong texture contrast soils found in imperfectly drained sites for yellow and grey chromosol and well drained sites for brown and red chromosol. Moderate agricultural potential with moderate chemical fertility and water-holding capacity. Susceptible to soil acidification.



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Projection: GDA 1994 MGA Zone 55

FIGURE 3.2: Soil

3.2.2 Naturally Occurring Asbestos (NOA)

A review of the NSW Government Naturally Occurring Asbestos (NOA) GIS database, which maps areas into low, medium or high potential NOA, indicated the study area is not located with an NOA potential area.

3.2.3 Acid sulfate soils

Acid sulfate soils (ASS) are natural sediments that contain iron sulfides, formed from the process of sulfate reduction that naturally occurs in lakes, rivers, wetlands and oceans. ASS are most commonly found in coastal and estuarine wetlands, however can also occur inland in waterways, wetlands and drainage channels. ASS develop in waterlogged, saline and anaerobic conditions. ASS are benign when left undisturbed in a waterlogged environment. When ASS are exposed to air, the iron sulfides react with atmospheric oxygen and water to produce sulfuric acid. Exposure to air occurs in response to a reduction in water levels within the hydromorphic zone of soils (e.g. during droughts and dredging operations). The production of sulfuric acid can cause major cations and anions (including Na^{+}, Mg^{2+}, Ca^{2+}, Cl^{-}, SO_4^{2-}), trace elements and metal ions (including Fe^{3+} and Al^{3+}) to be released and become mobile.

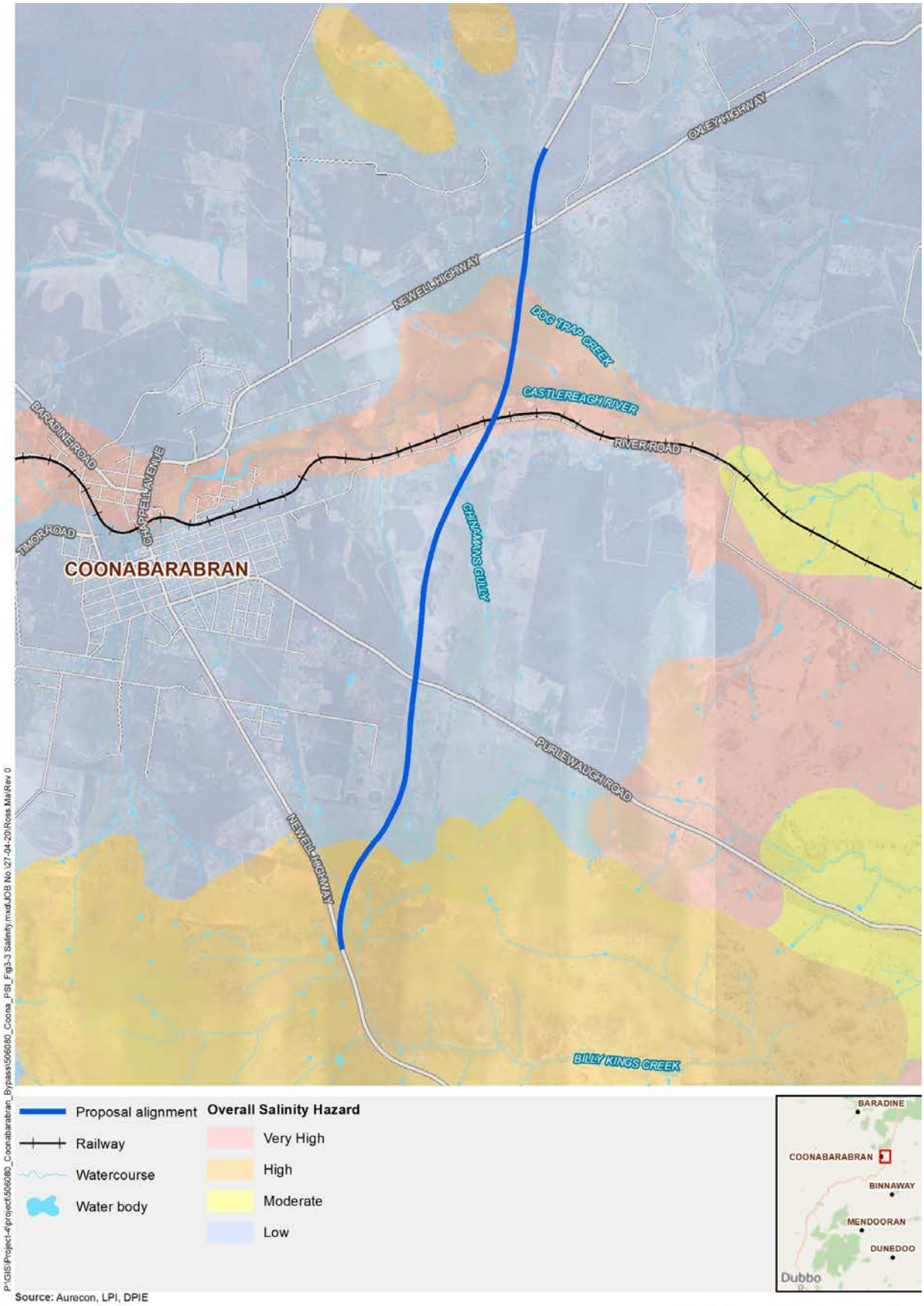
Inland ASS risk is determined by presence of waterways, wetlands and drainage channels and dryland salinity. The alignment is considered low risk for inland ASS, given the presence of extensive floodplain soils and absence of extensive waterway channels and wetlands. A review of the eSPADE and the Department of Planning and Environment ASS Risk Map indicates that the study area is not located within an area of potential ASS.

3.2.4 Salinity risk mapping

Salinity refers to the movement and concentration of salt in soil and natural waters. Saline soils are generally rich in chlorides, sulfates or carbonates. Sources of salt include retreating seas, rain, wind and rocks. In cases of retreating seas, where areas were historically covered by an inland sea and underwent evaporation, large quantities of salt remained in the sediment resulting in saline soils. Ocean salt is carried by strong winds, which fall in rain and are absorbed into soils and sediments. Salts are present within rocks which can be released into sediments through weathering, where the action of rainwater, temperature and biological activity break down and dissolve rocks. Soil salinity affects the structure, water movement, microbial and plant diversity of soils.

A review of information available through eSPADE indicates the study area is located within the following salinity hazard areas, presented in in Figure 3-3:

- low salinity hazard in the northern and mid portion of the study area
- very high salinity hazard in the mid portion of the study area, following Castlereagh River and Dog Trap Creek watercourses
- high salinity hazard in the most southern portion of the study area.



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Projection: GDA 1994 MGA Zone 55

FIGURE 3.3: Salinity

3.3 Hydrology and hydrogeology

3.3.1 Hydrology and drainage

Hydrology refers to the physical properties of surface freshwater including lakes and rivers. Drainage refers to the movement of water within drainage basins (also known as catchment areas), areas of land where precipitation collects and drains into a common outlet such as a river or bay.

The hydrology and drainage features in the area is shown in Figure 1-1. Given the watercourses present and the topography of the area, surface water is expected to flow from the drainage lines into Castlereagh River, running east-west through the study area. Table 3-3 summarises each watercourse and its relevance to the study area.

Table 3-3 Watercourses

Watercourse	Description
Dog Trap Creek	Ephemeral watercourse approximately 5 km in length that intersects the study area at the northern end of the alignment. Dog Trap Creek flows south east into the Castlereagh River approximately 1.4 km south east of the alignment juncture.
Unnamed inflow to Castlereagh River (passes under Purlewaugh Road)	Ephemeral watercourse that intersects the study area at the northern end of the alignment. Inflow flows south east into the Castlereagh River approximately 700 m south east of the alignment juncture.
Castlereagh River	Perennial watercourse that intersects the study area at the northern/central portion of the alignment. River runs east-west through the study area. Part of the Macquarie-Castlereagh catchment within the Murray-Darling basin. Unregulated river (contains no dams to regulate flows) that is approximately 550 km in length. Originates 20 km west of Coonabarabran at an elevation of 850 m, flowing east through Coonabarabran.
Chinamans Gully	Ephemeral watercourse that intersects the study area at the central portion of the alignment. Outflow of Castlereagh River approximately 2.7 km in length.
Tributary of Castlereagh River	Ephemeral watercourse that intersects the study area at the midsection of the alignment. Outflow of Castlereagh River approximately 4 km in length.
Unnamed inflow to Billy Kings Creek	Ephemeral watercourse that intersects the study area at the southern end of the alignment. Inflow of Billy Kings Creek which runs west to east and is approximately 7 km in length.

3.3.2 Hydrogeology

Hydrogeological landscapes

A review of information available through eSPADE indicates the study area is located in the hydrogeological landscape (HGL) of Coonabarabran (HGL_CW_111), Purlewaugh/Napperby (HGL_CW_37) and Goorianawa (HGL_CW_117) as shown in Table 3-4.

Coonabarabran HGL extends from Coonabarabran to the west to Gowang area and the catchment area is Belar Creek. The area borders the steep rugged area of the Warrumbungle National Park, to the north of the study area. The Purlewaugh/Napperby HGL includes the localities of Wongarbon, Ballimore, Saxa

and Cobbora. The area features an open rolling landscape with long flat to low angle colluvial slopes. The Goorianawa HGL extends from Tooraweenah to the north of the Goorianawa Valley. The area includes the steep, rugged area of the Warrumbungle National Park, Mt Bullaway and west to the flatter landforms of Tenandra. A summary of the HGL features of the three flow systems is summarised in Table 3-4.

Table 3-4 Hydrogeological features

Landscape	Aquifer type	Depth to water table	Typical sub-catchment size	Groundwater salinity
Coonabarabran	Unconfined in fractured rock and unconsolidated colluvial sediments. Semi-confined in deeper fractured rock. Vertical and lateral flow components.	Intermediate to deep Range >2m	Small to medium (<1000 Ha)	Fresh Range <800 µS/cm
Purlewaugh/ Napperby	Unconfined in fractured rock and saprolite. Semi-confined and confined in deeper fractured rock. Minor lateral flow in colluvial slopes.	Typical 16m Range 2 - 60m	Medium (100-1000 Ha)	Moderate to High Range 5 – 18 dS
Goorianawa	Unconfined in fractured consolidated basaltic rocks and unconsolidated residual and colluvial sediments. Local perching above clay rich layers, seasonal.	Intermediate to deep Range 2 – 10m	Small to medium (<1000 Ha)	Fresh to brackish Range <1600 µS/cm

The HGL pattern is identical to the overall salinity hazard as shown in Figure 3-3 and Figure 3-4 with the following correlations present:

- Coonabarabran HGL and low overall salinity hazard
- Purlewaugh/Napperby HGL and very high overall salinity hazard
- Goorianawa HGL and high overall salinity hazard.

Generally high soil salinity is associated with low lying areas with shallow and stagnant groundwater table. The relation between the HGL and overall salinity hazard exists as the HGL is influenced by the flow dynamics of the groundwater system (including surface and subsurface flows) and the landscape elements of the soil

including how water interacts with salt stores in the landscape, vegetation formation, class and community types present and land use practices (Moore et al., 2017).

Registered groundwater bores

A review of information available through the Bureau of Meteorology Australian Groundwater Explorer indicates a number of registered groundwater bores within the study area (refer to Figure 3-4). Table 3-5 summarises general information for the groundwater bores. Groundwater elevation data was not available for the registered groundwater bores. Refer to Section 4.2 for groundwater observations from the geotechnical study conducted for the proposal.

Table 3-5 Registered groundwater bores

Groundwater Bore ID	Distance from alignment	Approximate elevation (mAHD)	Bore depth (mbgl)	Drilled date
GW003203.1.1	560m NW	505	19.5	1/12/1933
GW003222.1.1	215m W	580	76.5	1/01/1934
GW007689.1.1	150m E	570	85.3	1/04/1949
GW009499.1.1	650m W	528	2.4	Unknown
GW009501.1.1	717m E	500	6.1	Unknown
GW009505.1.1	95m NW	570	74.7	1/01/1940
GW009563.1.1	120m W	570	81.9	Unknown
GW015839.1.1	740m W	530	45.4	1/04/1960
GW015845.1.1	70m E	560	39.6	1/09/1960
GW024524.1.1	670m W	535	29	1/10/1965
GW024525.1.1	265m NW	540	30.5	1/09/1965
GW029807.1.1	750m SE	560	22.9	1/02/1969
GW031426.1.1	260m W	550	91.4	Unknown
GW044591.1.1	280m NW	580	91.4	1/12/1974
GW048312.1.1	45m E	560	45.7	1/01/1978
GW050255.1.1	470m NW	580	80.8	1/01/1980
GW050822.1.1	655m E	570	75.9	1/10/2979
GW055791.1.1	940m NW	580	57.9	1/08/1982
GW059512.1.1	840m W	530	47.5	1/10/1983
GW064505.1.1	930m E	570	72.8	1/01/1988
GW068746.1.1	470m E	570	70	10/10/1990
GW098010.1.1	40m W	522	23.2	6/02/2008
GW802815.1.1	695m S	580	42	18/04/2004
GW803596.1.1	550m W	540	43	27/03/2008
GW804614.1.1	260m E	560	54.9	12/04/2010
GW805532.1.1	75m W	505	38.7	27/08/1994

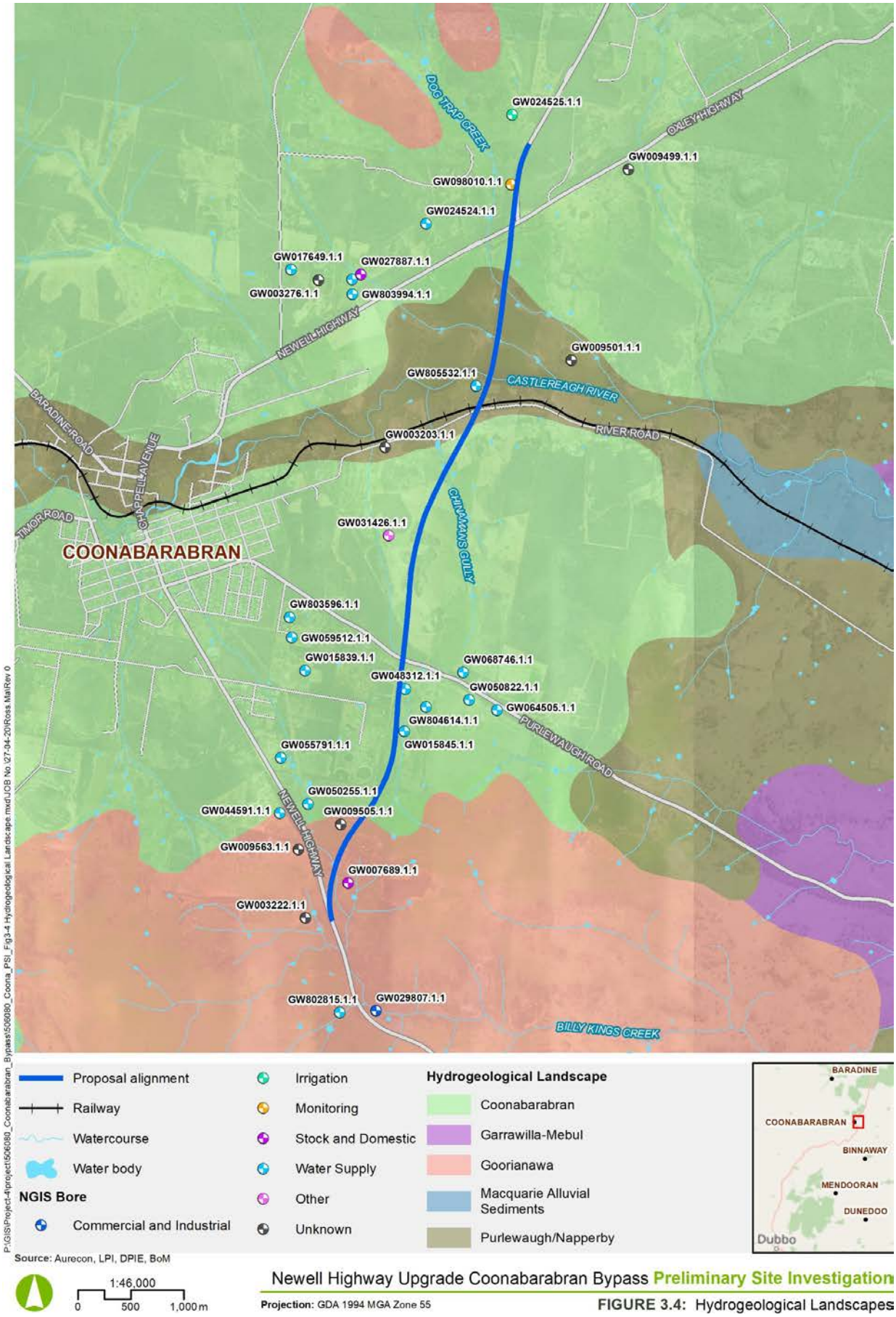

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FIGURE 3.4: Hydrogeological Landscapes

4 Site history

4.1 Historical aerial imagery

Historical aerial photographs were obtained from a previous report commissioned by Roads and Maritime on earlier stages of the Newell Highway Upgrade: Coonabarabran bypass by Lotsearch (2017) (Appendix 1). This report contained photography from 1955 to 2016, which were reviewed. Historical aerial imagery prior to 1955 is not available for the study area.

The study area boundary was set as one kilometre radially from the centre of the alignment, and historical land uses within this boundary were assessed (Table 4-1).

Table 4-1 Historical aerial imagery land use observations

Aerial Image	Study area land use observations	Surrounding land use observations
1955	Study area contains well defined lots with areas of cleared land in the northern and central portion of the alignment and areas of dense vegetation in the central to southern portion and top most portion of the alignment.	Areas of dense vegetation are present to the north (including north west and north east), east and south. Pockets of cleared land are present within these areas. To the west, lies the town of Coonabarabran. All major roads are present including Newell Highway and Oxley Highway to the north and south, Purlewaugh Road to the east and Baradine Road to the west.
1965	Study area has undergone vegetation clearance predominantly at the central portion, north of Purlewaugh Road. Northern and southern portions of the alignment are unchanged from 1955 image.	Land clearing present north west of Oxley Highway, south east of Purlewaugh road. Dense vegetation to the north west and east remains unchanged from 1955 imagery.
1972	Study area in the northern section available on aerial imagery shows little change from 1965 aerial. No imagery present for the mid or southern portions.	Land clearing evident in the north west, for the future development of Baradine Road. Little change in vegetation density to the east of the study area.
1982	Land clearing present to the south west of Newell Highway. No imagery present for the northern or mid portions.	Land clearing present to the south east and south west of the study area.
1989	Minor land clearance in the southern end of the study area. Majority of study area has not undergone change.	Evidence of road construction and land clearing in the east of the study area, within the dense vegetated area. Land clearing to the south east and south west.
1994	Minor land clearance to the north of where the study area meets Purlewaugh Road.	Surrounding area unchanged.
2003	Study area unchanged.	Surrounding area unchanged.
2011	Construction of a residential home in the study area in the northern to mid-portion to the west of the proposal alignment.	Surrounding area unchanged.
2016	Study area unchanged.	Surrounding area unchanged.

4.2 Previous reports and risk registers

4.2.1 Newell Highway, Coonabarabran Bypass Concept Design Geotechnical Data Report

Aurecon were engaged to conduct geotechnical and pavement investigations for the Newell Highway Upgrade Coonabarabran bypass (Aurecon, 2020). The investigations involved ten pavement test pits, 35 test pits, five excavator test pits and six boreholes. Seismic refraction lines (five) and non-destructive pavement condition assessments were also undertaken. ASS and salinity testing were not conducted.

Geotechnical investigations (test pits and pavement test pits) revealed geological formations consistent with Table 3-1, with test pits exhibiting the following formation:

- Quaternary (Qa) including silty sand, sandy clay, silty clay, clayey gravel, gravelly sand, clayey sand
- Tertiary Volcanics (Tb) and Garrawilla Volcanics (Jg) including basalt and volcanic tuff
- Pilliga Sandstone (Jp) and Purlawaugh Beds (Jpu) including sandstone and siltstone

Groundwater was not encountered during test pitting, pavement test pit and borehole investigations. Borehole investigations reached a maximum target depth of 25.03 metres (Table 4-2).

Table 4-2 Groundwater observations

Borehole ID	Target Depth (m)	Groundwater observations
1	15.22	Not observed
2	17	Not observed
3	13.15	Not observed
4	15.4	Not observed
5	24.2	Not observed
6	21.2	Not observed
7	25.03	Not observed
8	15.22	Not observed

Subsequent groundwater monitoring was conducted at boreholes 2, 5 and 6 through the installation of standpipes. Groundwater was not observed at boreholes 2 or 5. Groundwater was observed at Borehole 6 on 26 November 2019 and 19 December 2019 at 6.85 metres and 7.04 metres below ground level respectively.

5 Regulatory database search

5.1 NSW Environment Protection Authority

5.1.1 Contaminated sites

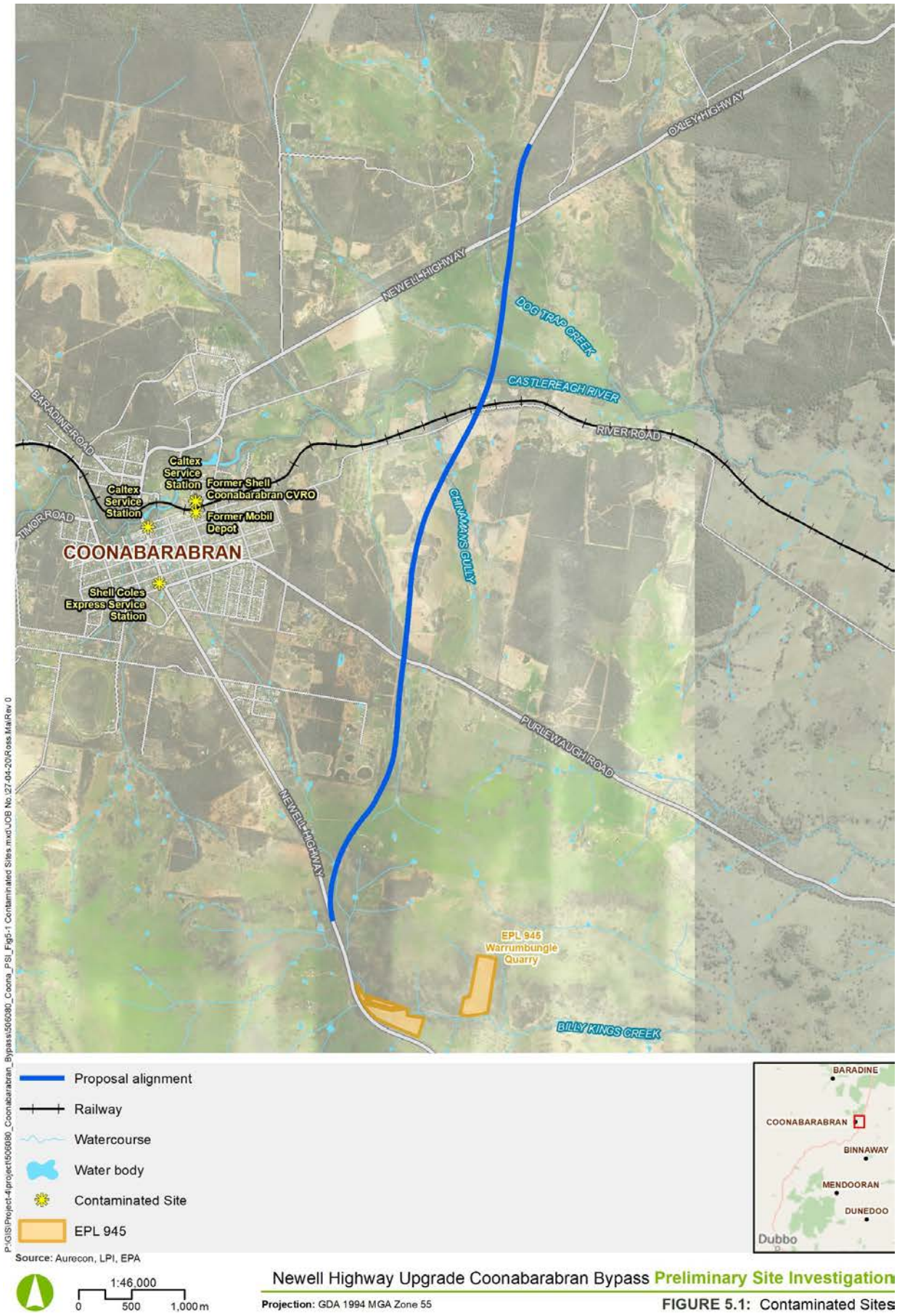
Under Section 60 of the *Contaminated Land Management Act 1997* (CLM Act), a person whose activities have contaminated land or a landowner whose land has been contaminated, is required to notify the Environment Protection Authority (EPA) when they become aware of the contamination and it meets the criteria as listed in Section 60, 3a-c.

Contaminated lands notified to the EPA are registered under the 'List of notified sites' on the NSW EPA website. A search of this revealed five registered sites within Coonabarabran, all of which are petrol stations (Figure 5-1). The five sites include:

- Former Mobil Depot, 49 Cowper Street, 2 km from alignment
- Shell Coles Express Service Station, 2-6 John Street 2.3 km from alignment
- Former Shell Coonabarabran, formerly 51 Cowper Street 2.1 km from alignment
- Caltex Service Station, Corner Dawson and Drummond Street 2.1 km from alignment
- Caltex Service Station, 85-87 John Street 2.5 km from alignment

Given the distance from the above sites to the study area, contamination risk associated with these sites is considered to be low.

A search of the Contaminated Land Record NSW EPA Search Register revealed no records of current or formerly regulated contaminated land in Coonabarabran.



Newell Highway Upgrade Coonabarabran Bypass **Preliminary Site Investigation**

Projection: GDA 1994 MGA Zone 55

FIGURE 5.1: Contaminated Sites

5.1.2 Environmental Protection Licences

A review of Environment Protection Licences (EPL) issued by the EPA under the *Protection of the Environment Operations Act 1997* (POEO Act), found one EPL within Coonabarabran. EPL 945 is held by Warrumbungle Shire Council for Warrumbungle Quarry located on 9010 Newell Highway, Coonabarabran (Figure 5-1). The EPL applies to Lot 1 DP 603692 (the location of the quarry) and Lot 61 DP 871914 (the location of the stockpile site). Associated lots are located 1.3 kilometres and 700 metres south of the study area.

The quarry is active, supplying approximately 100,000 tonnes of crushed basalt aggregate used in bitumen sealing of roads and road-based material. The licence was issued on 24 November 2003, with the next review due on 7 April 2021. The EPL covers the activities of crushing, grinding, or separating (>30,000 – 100,000 tonnes annual processing capacity) and land based extractive activities (>50,000 – 100,000 tonnes annual capacity to extract, process and store).

Contamination hazards from the quarry operations are managed in accordance with the EPL Limit and Operation Conditions. These hazards and associated EPL conditions are summarised in Table 5-1 below. Further detail is provided in the Pollution Incident Response Management Plan (PIRMP) for the Coonabarabran Quarry, required under Part 5.7A of the POEO Act.

Table 5-1 Contamination hazards and EPL conditions

Contamination hazard	Measurement measures
Discharge of sediment laden water	• Installation of sediment control basins • Water quality testing to meet suspended solids Department of Environment guidelines • Reuse of water from sedimentation ponds for dust control
General water pollution	• Refuelling in designated areas • Fuel and precoating material storage in bunded areas • Spill kit regularly inspected and maintained • Contaminated material disposed off-site to a registered disposal area
Dust pollution	• Blasting in accordance with guidelines and implementation of blast suppression measures • Water usage from sediment ponds when necessary to minimise dust generation from stockpiles and trafficable areas • Cover loads during transport off site
Land pollution	• Maintain fencing and access controls to prevent unauthorised access and illegal dumping • Maintain warning signage

Given the distance from the quarry to the study area and the PIRMP management measures, the contamination risk to the study area is considered to be low.

5.2 National Pollution Inventory

The Commonwealth Department of the Environment and Energy National Pollution Inventory (NPI) is an online database providing information on pollutants emitted to the environment. Examples include industrial and commercial sources such as manufacturing sites, dry cleaners, hospitals etc. Facilities are required to report annual emissions for exceedances of the NPI reporting thresholds (detailed in the NPI Guide, Version 6.1 2015).

The current national dataset (2017-2018) contains more than 4,000 facilities. A search of the dataset revealed no facilities within the study area or Coonabarabran. The nearest facility, Baiada Poultry Pty Limited, is located at 4860 Purlewaugh Road, Colly Blue. It is located approximately 82 kilometres from the study area and is a listed facility due to ammonia emissions.

5.3 NSW Government PFAS Investigation Program

PFAS are a family of human-made chemicals historically used in stain and water-resistant fabrics, carpeting, cleaning products, paints and fire-fighting foams. There are around 5,000 types of PFAS, many of which are resistant to grease, oil, water and heat. PFAS are stable chemicals made up of a chain of linked carbon and fluorine atoms which bioaccumulate in the environment.

PFAS is regulated under the PFAS National Environmental Management Plan 2018 (NEMP). The PFAS NEMP provides guidance on site assessments and remediation.

The NSW Government PFAS Investigation Program is a state-wide program that identifies the use and impacts of PFAS. The program investigates PFAS at PFAS registered sites. The closest PFAS site, Quirindi Airport is located 118 kilometres away from the study area. As such it has not been further assessed due to distance from the study area.

5.4 Department of Defence Unexploded Ordnance

UXO refers to military ammunition or explosive ordnance which has failed to function as intended. UXO includes sea mines and shells used by the Navy, mortar bombs, mines, artillery shells or hand grenades used by the Army, bombs, rockets or missiles used by the Air Force. If UXO are disturbed including moved, excavated, picked up, played with, kicked or thrown, UXO can explode.

A review of the Department of Defence Unexploded Ordnance (UXO) mapping application indicates no UXO records within 10 kilometres of the study area. As such, there is a low risk of UXO being present within the study area.

5.5 NSW Livestock Dip Site Locator

The NSW Government Department of Primary Industries Cattle Dip Site Locator revealed zero dip sites within the town of Coonabarabran. Dip sites are used in the agricultural industry to immerse livestock in liquid pesticide. The use of pesticides leads to the contamination of soil and groundwater.

6 Areas of potential environmental concern and contaminants of potential concern

APEC refer to areas of potential contamination based on the desktop review of information. CoPC refer to contaminants which may or may not pose a risk to human and ecological health. APEC and CoPC were identified through the review of available site history information, public databases and historical aerial photographs and summarised in Table 6-1.

A preliminary risk assessment has been conducted for the identified APEC and CoPC. A risk matrix (Appendix 2) was applied to assessing the hazards of APEC. A risk rating has been development based on hazard classification, distance to study area, significance of contamination risk and environmental setting.

Table 6-1 APEC and CoPC

Contamination hazard	APEC	CoPC	Potential receptors	Potential pathways	Risk rating
Associated emissions from vehicle exhausts and runoff sediments in roads and railway corridors	Oxley Highway, Newell Highway, Dalgarno Street, Edwards Street / Purlewaugh Road, Harveys Lane, disused railway line	• Polycyclic aromatic hydrocarbons (PAH) • Heavy Metals • Carbon monoxide (CO) and carbon dioxide (CO_2) • Sulfurous compounds	Construction workers and operations (maintenance)	• Direct (dermal) contact with contaminated soils • Inhalation of gas / vapour •	Low
Herbicides and pesticides associated with agricultural land use	Surrounding agricultural and pasture land	• Organochlorine pesticide (OCP) and Organophosphorus pesticide (OPP) • Herbicides	Construction workers and operations (maintenance) Aquatic ecosystems	• Direct (dermal) contact with contaminated soils • Incidental ingestion of soils • Groundwater migration	Low
Storage and maintenance of equipment and consumables including fuel, oil and chemicals for agricultural production	Site sheds and maintenance areas in surrounding agricultural and pasture land	• PAH • Heavy Metals • Total Recoverable Hydrocarbons (TRH) • Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN) • Herbicides, OCP and OPP	Construction workers and operations (maintenance) Aquatic ecosystems	• Direct (dermal) contact with contaminated soils • Incidental ingestion of soils • Inhalation of contaminated exhausts or gas / vapour • Groundwater migration • Groundwater or creek / floodplain inflows to excavations (dermal)	Low

Contamination hazard	APEC	CoPC	Potential receptors	Potential pathways	Risk rating
Illegal dumping	Areas within remnant bushland, road corridors, private and public recreation areas	• Asbestos containing material (ACM) • Heavy metals • Polychlorinated biphenyl (PCB) • BTEXN • Phenolic compounds	Construction workers and operations (maintenance)	• Direct (dermal) contact with contaminated material • Inhalation of contaminated dusts or gas / vapour	Low - moderate
Use of hazardous materials in buildings (asbestos and lead paints)	Buildings including residential homes and farm buildings	• ACM • Lead paint • PCB • Ozone depleting substances (ODS) • Synthetic Mineral Fibres (SMF)	Construction workers and operations (maintenance)	• Direct (dermal) contact with contaminated material • Inhalation of contaminated dusts or gas	Low
Uncontrolled filling	Infilled farm dams, rural and farming residences, agricultural lots, open recreational areas, animal disposal pits	• ACM • Heavy metals • OCP, OPP • Herbicides, • PAH • BTEXN	Construction workers and operations (maintenance) Aquatic ecosystems	• Direct (dermal) contact with contaminated material • Inhalation of contaminated dusts or gas./ vapour • Groundwater migration • Groundwater inflows to excavations (dermal)	Low - moderate

7 Conclusions and findings

Based on the desktop review of information, findings from previous reports, historical aerial photograph review and environmental constraints mapping, the following conclusions and findings relate to contamination risks for the proposed Coonabarabran Bypass alignment:

- The potential for elevated concentrations of CoPCs to be present throughout the proposed alignment as a result of past and present land use activities is considered to be low to moderate.
- Moderate risk hazards of elevated concentrations of CoPCs for the study area have been identified as illegal dumping in remnant bushland, along road corridors and other areas, and uncontrolled filling within rural, farming and agricultural lots, and within open recreational areas.
- The remainder of the study area is generally considered to present a low risk of CoPCs being present due to generally consistent historical land use along the majority of the alignment.
- Areas of high to very high land salinity hazard have been identified along the proposed alignment (Refer to Figure 3-3) and pose a moderate landscape influenced risk. Salinity hazard should be considered as part of future engineering designs including durability for concrete and steel and hydrologic design of road drainage lines, sediment basins and element that may have a detrimental effect on salinity expression in the surrounding landscape.

7.1 Recommendations

Based on the conclusions and findings above, the following recommendations are made for the Newell Highway Coonabarabran Bypass proposal:

- Confirmation of ground conditions along alignments and assessment of contamination should be considered as part of future geotechnical and concurrent contamination investigations when engineering designs are known. The focus of which should be risk based and principally around cuttings, piles, culverts and key excavation sites.
- The risk of contamination migration from excavation and dust generation can be minimised with the use of dust suppression, preparation of construction environmental management plans (CEMP), proper use of work health and safety (WH&S) equipment and monitoring of works where asbestos or other contamination is identified.
- Where no further intrusive ground investigations are undertaken prior to future construction, the CEMP for the works must have an unexpected finds protocol (UFP) for incidental potential contamination finds during earthworks and road construction (such as illegally dumped wastes and stockpiles).
- The contractor CEMP must detail the works methodology to identify, manage, handle and dispose of any contaminated materials or wastes as part of the works.

8 References

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NSW Government Naturally Occurring Abestos GIS Database, viewed 27 March 2020, https://www.resourcesandgeoscience.nsw.gov.au/miners-and-explorers/safety-and-health/topics/NOA

NSW Government PFAS Program, viewed 20 March 2020, https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program

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Roads and Maritime Services, 2018, *Newell Highway upgrade at Coonabarabran, Preliminary Environmental Investigation.*

9 Limitations

This report has been prepared for Transport for NSW. This report has not been prepared for use by parties other than the Client, and the Client's respective consulting advisers and construction contractors.

This report has been written with the express intent to inform the concept design. Subsurface conditions relevant to future construction works should be assessed by contractors who can make their own interpretation of the factual data provided and perform any additional tests as necessary for their own purposes and determine the suitability of particular techniques and equipment for the conditions.

In preparing the report, Aurecon has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, Aurecon has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Aurecon will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Aurecon.

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Appendix 1 Historical aerial imagery report

Lotsearch

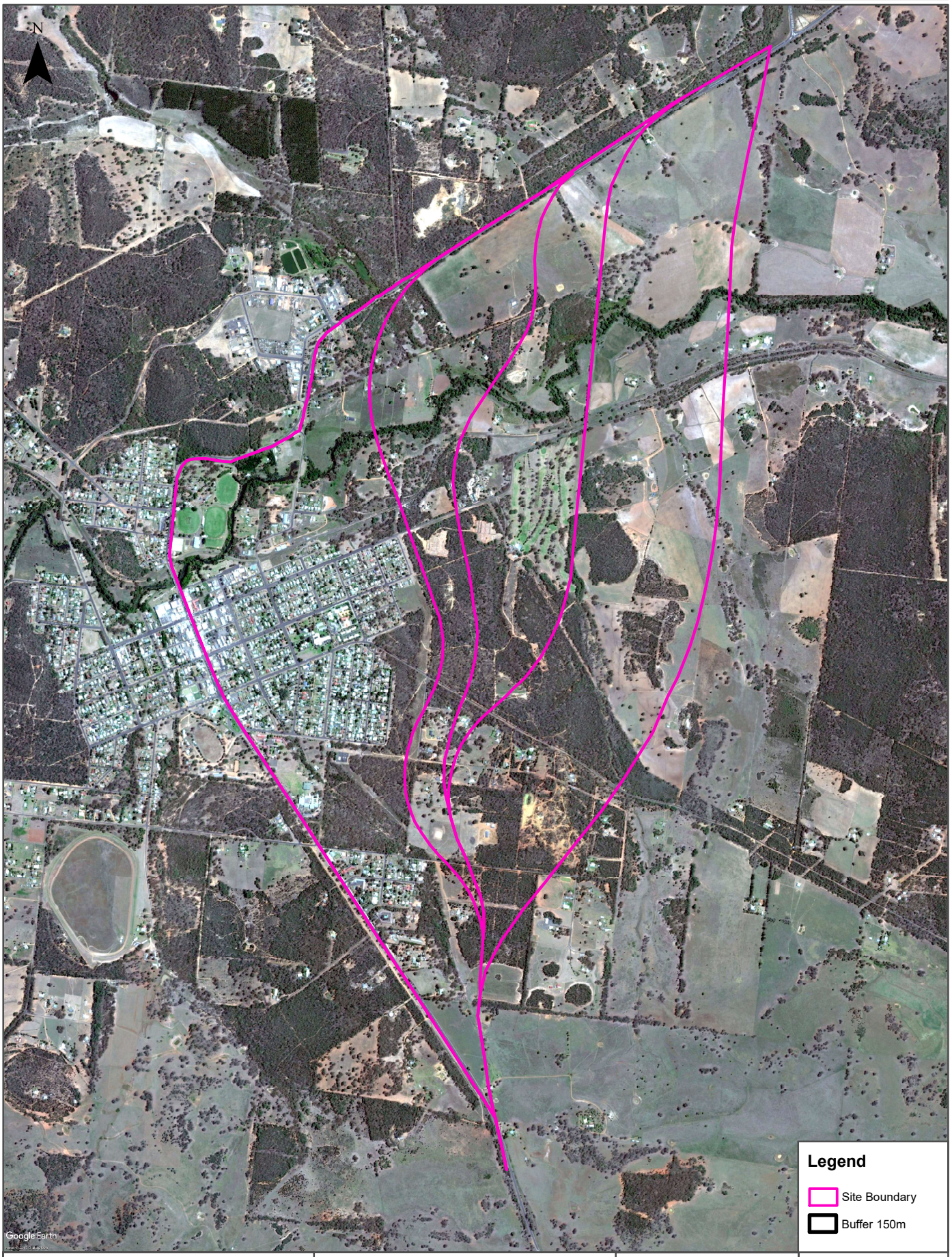
Aerial Imagery Report

Coonabarabran Bypass, Coonabarabran, NSW 2357

Report Date: 12 October 2017

Aerial Imagery 2016

Coonabarabran Bypass, Coonabarabran, NSW 2357



Scale:
0 375 750 1,500
Meters

Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 10 October 2017

Aerial Imagery 2011

Coonabarabran Bypass, Coonabarabran, NSW 2357

Scale:
0 375 750 1,500
Meters

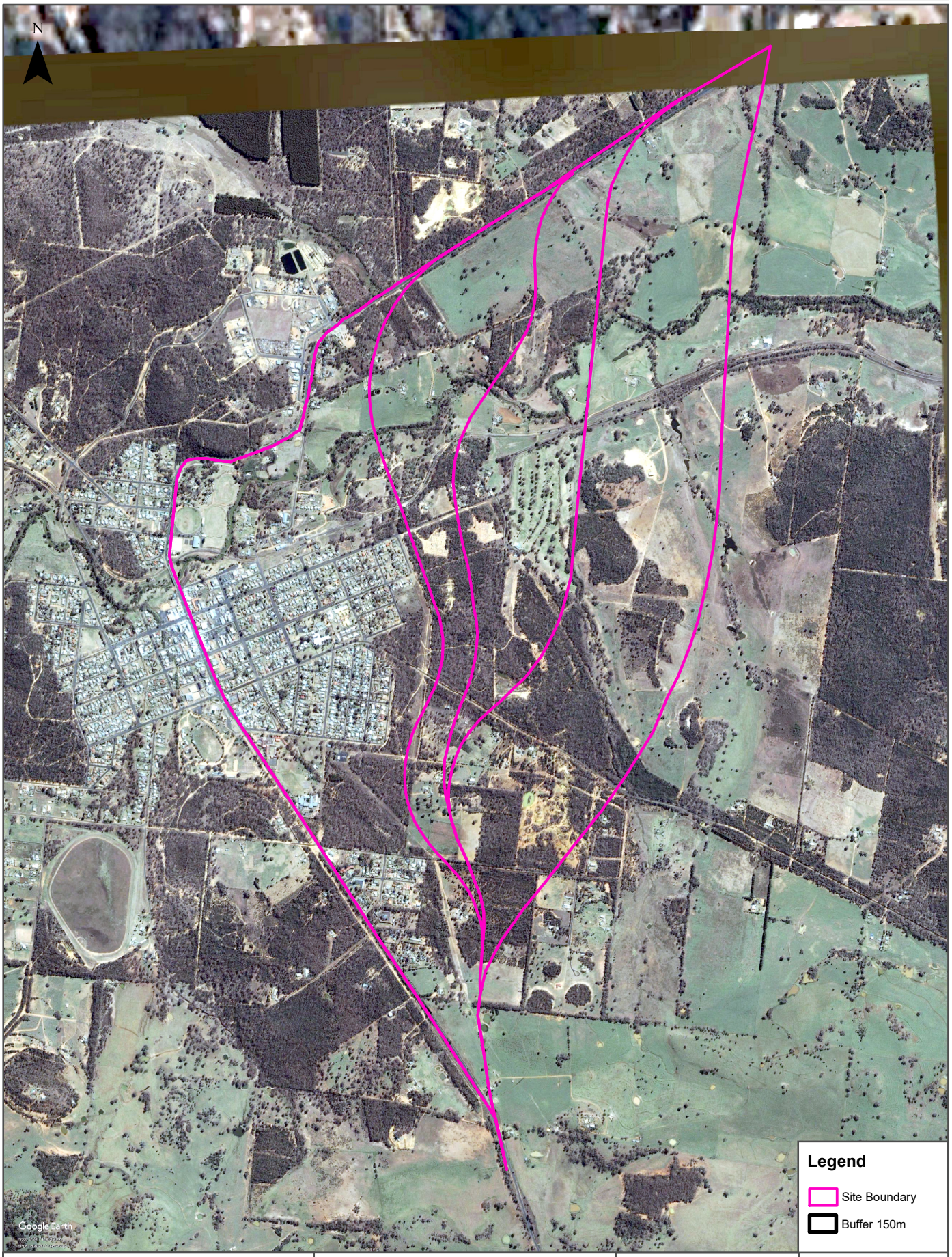
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 10 October 2017

Aerial Imagery 2003

Coonabarabran Bypass, Coonabarabran, NSW 2357



Legend

Site Boundary

Buffer 150m

Scale:

0 375 750 1,500

Meters

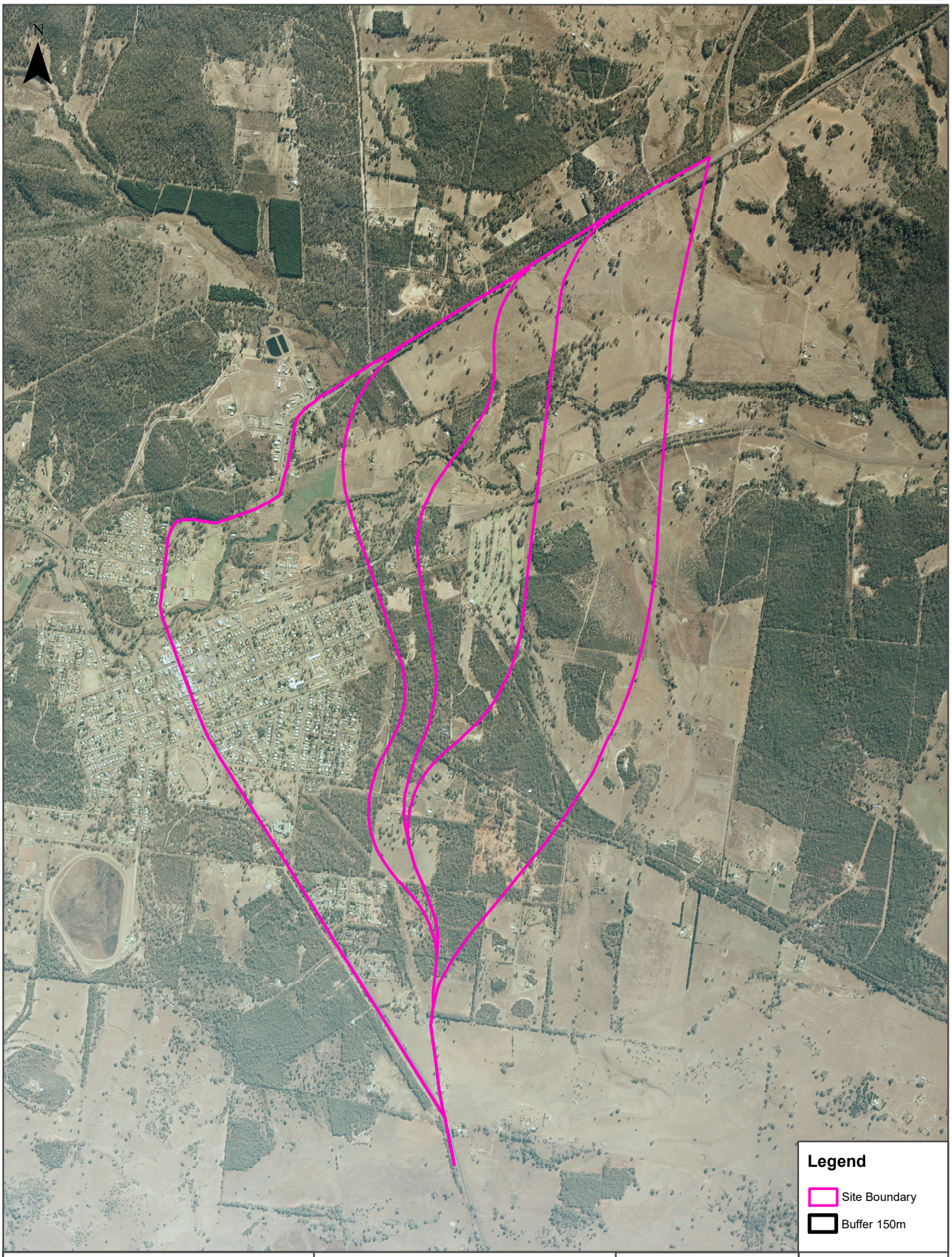
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 10 October 2017

Aerial Imagery 1994

Coonabarabran Bypass, Coonabarabran, NSW 2357



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Meters

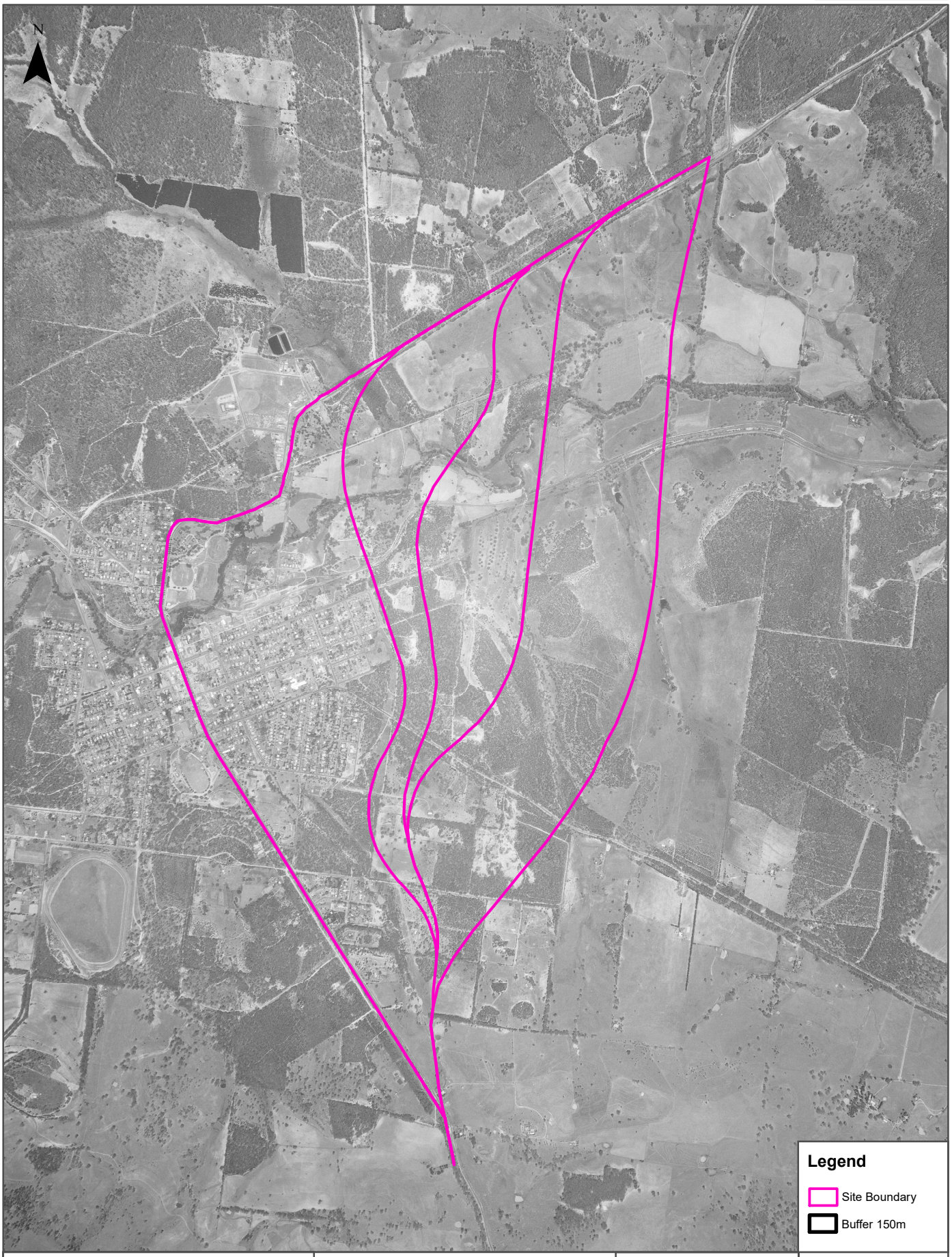
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1989

Coonabarabran Bypass, Coonabarabran, NSW 2357



Scale:
0 375 750 1,500
Meters

Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1982

Coonabarabran Bypass, Coonabarabran, NSW 2357

Scale:
0 375 750 1,500
Meters

Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1972

Coonabarabran Bypass, Coonabarabran, NSW 2357

Scale:
0 375 750 1,500
Meters

Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1965

Coonabarabran Bypass, Coonabarabran, NSW 2357

Scale:
0 375 750 1,500
Meters

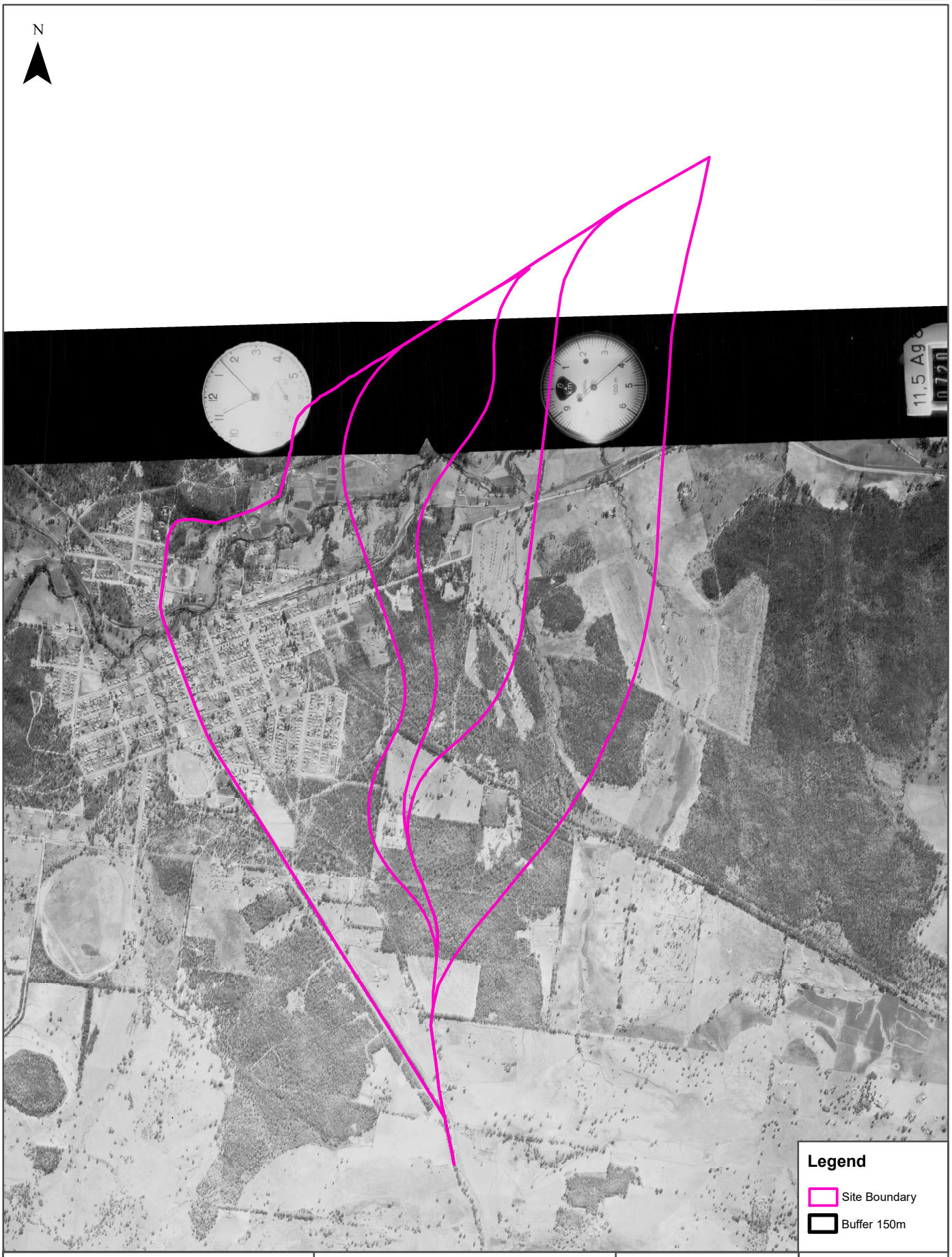
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1965

Coonabarabran Bypass, Coonabarabran, NSW 2357



Scale:
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Meters

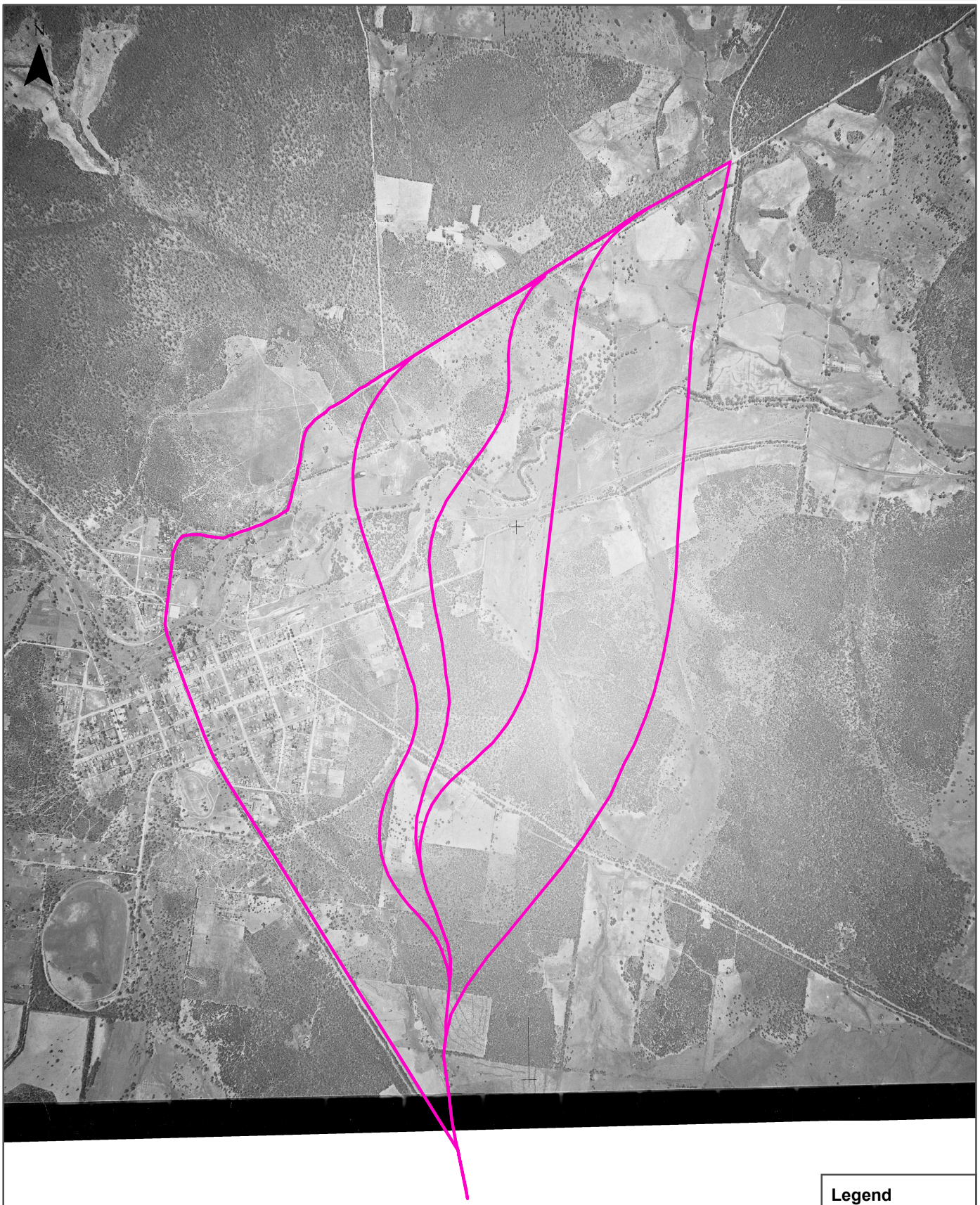
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1955

Coonabarabran Bypass, Coonabarabran, NSW 2357



Legend

Site Boundary

Buffer 150m

Scale:

0 375 750 1,500
Meters

Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Aerial Imagery 1955

Coonabarabran Bypass, Coonabarabran, NSW 2357

Scale:
0 375 750 1,500
Meters

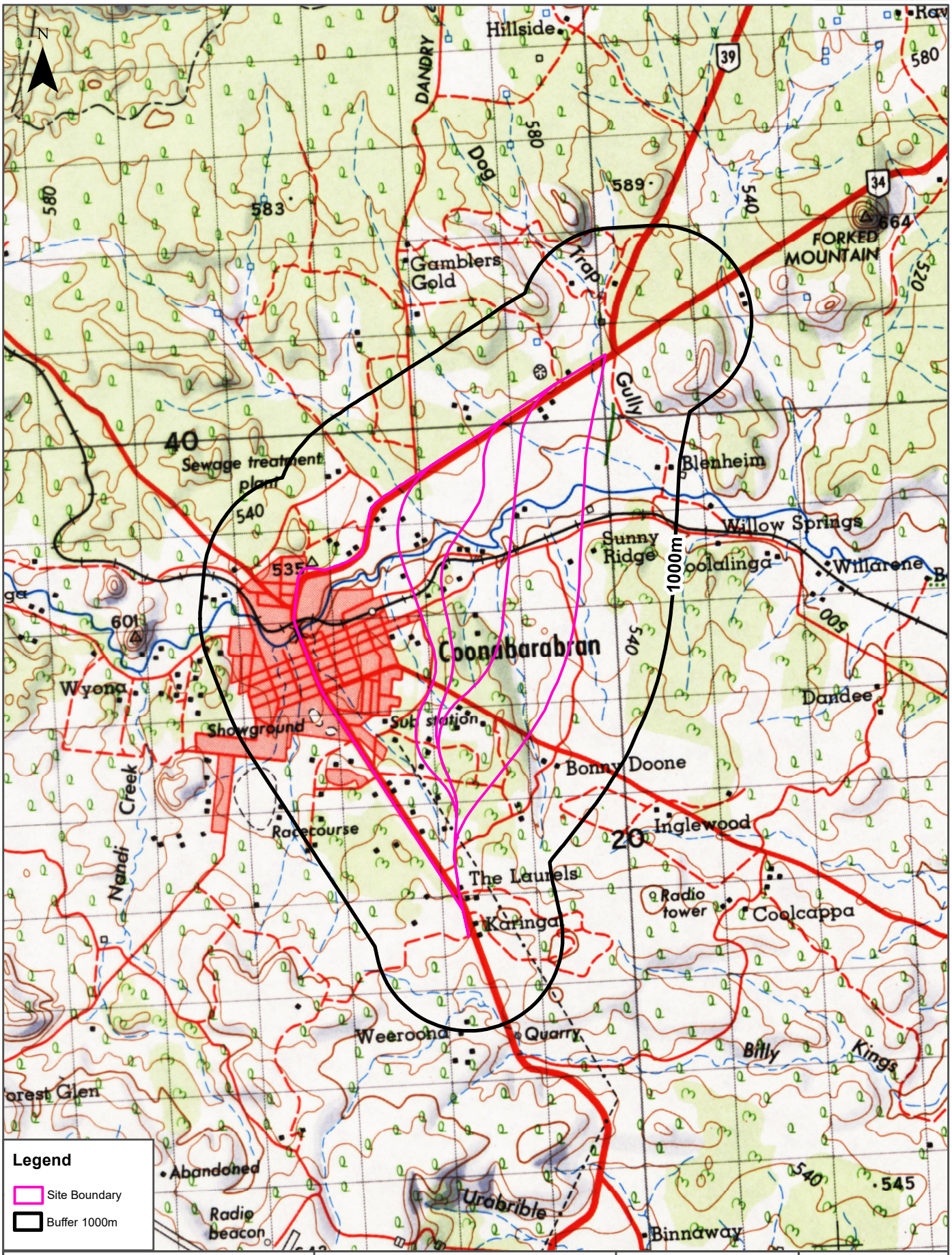
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

Historical Map 1971

Coonabarabran Bypass, Coonabarabran, NSW 2357



Scale: 0 750 1,500 Meters 3,000

Data Sources: Sheet 9735, Edition 1, Coonabarabran, NSW
National Topographic Map Series
Commonwealth of Australia

Coordinate System:
GDA 1994 MGA Zone 56

Date: 11 October 2017

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Appendix 2 Risk Matrix

Table 9-1 Risk Matrix for Assessing APEC

	Likelihood				
Consequence	**Rare**	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
Severe	Low	Low to Moderate	Moderate to High	Very High	Very High
Moderate	Negligible to Low	Low	Moderate	Moderate to High	High
Mild	Negligible	Low	Low	Low to Moderate	Moderate
Negligible	Negligible	Negligible	Negligible to Low	Low	Low

Risk ratings are defined as:

Negligible – The presence of the identified source does not give rise to the potential to cause significant harm.

Low – It is possible that harm could arise to a designated receptor from an identified source though this is likely to be mild.

Moderate – It is possible that harm could arise to a specific receptor, but it is unlikely that such harm would be significant.

High – A designated receptor is likely to experience significant harm from an identified source without remedial action.

Very high – There is a high probability that severe harm could arise to a designated receptor from an identified source without appropriate remedial action.