



Preliminary Environmental Assessment Western Slopes Pipeline Project

© Copyright APA Group 2017

energy. connected.

Table of contents

1.	INTRODUCTION	6
1.1	Purpose	6
1.2	Scope	6
1.3	Structure	6
1.4	Proponent	9
1.5	Abbreviations and References	9
2.	NEED FOR THE PROJECT	13
2.1	Justification	13
2.2	Objectives	14
2.3	Alternatives	14
2.3.1	Do nothing	14
2.3.2	Alternative Alignments	14
3.	PROPOSAL DESCRIPTION	15
3.1	General	15
3.2	Preliminary Pipeline Alignment Description	16
3.3	Alignment Selection	17
3.4	Pipeline Design	18
3.5	Construction & Commissioning	18
3.5.1	Construction Activities	18
3.5.1.1	Overview of Construction Process	18
3.5.1.2	Rehabilitation	20
3.5.1.3	Other Construction Activities	20
3.5.1.4	Construction Equipment	21
3.5.1.5	Construction Spreads	21
3.5.1.6	Construction Workforce	21
3.5.1.7	Construction Timing	21
3.5.2	Commissioning Activities	22
3.6	Operational Activities	22
3.7	Decommissioning	22
4.	PLANNING AND APPROVALS PROCESS	23
4.1	NSW Assessment Framework	23
4.1.1	Environmental Planning and Assessment Act 1979	23

4.1.1.1	Approvals that do not apply	23
4.1.1.2	Approvals that must be applied consistently	24
4.1.2	Pipelines Act 1967	24
4.1.3	Roads Act 1993	25
4.1.4	Protection of the Environment Operations Act 1997	25
4.1.5	National Parks and Wildlife Act 1974	26
4.1.6	Aboriginal Land Rights Act 1983.....	26
4.1.7	Local Government Area Permissibility	26
4.2	Commonwealth Assessment Framework.....	29
4.2.1	Environmental Protection and Biodiversity Conservation Act 1999.....	29
4.2.2	Native Title Act 1993.....	29
5.	COMMUNITY AND STAKEHOLDER ENGAGEMENT	30
5.1	Guiding Principles	30
5.2	Stakeholder Plan Overview	30
6.	ASSESSMENT APPROACH	33
6.1	Risk-Based Approach	33
6.2	Detailed Assessment	33
6.3	General Assessment	33
6.4	Outcomes	33
7.	PRELIMINARY ENVIRONMENTAL ASSESSMENT	35
7.1	Key Environmental Issues	35
7.1.1	Biodiversity.....	35
7.1.1.1	Existing Environment.....	35
7.1.1.2	Potential Impacts	39
7.1.1.3	Proposed management measures	40
7.1.2	Soils and Geology.....	40
7.1.2.1	Existing environment	40
7.1.2.2	Potential Impacts	43
7.1.2.3	Proposed management measures	43
7.1.3	Water Quality and Hydrology	44
7.1.3.1	Existing environment	44
7.1.3.2	Potential Impacts	45
7.1.3.3	Proposed management measures	45

7.1.4	Traffic and Transport Infrastructure	47
7.1.4.1	Existing environment	47
7.1.4.2	Potential Impacts	47
7.1.4.3	Proposed management measures	47
7.1.5	Land use and Agriculture	47
7.1.5.1	Existing environment	47
7.1.5.2	Potential Impacts	48
7.1.5.3	Proposed management measures	48
7.1.6	Heritage.....	48
7.1.6.1	Existing environment	48
7.1.6.2	Potential Impacts	49
7.1.6.3	Proposed management measures	49
7.1.7	Hazard and Risk.....	49
7.2	Other Environmental Issues.....	50
7.2.1	Noise and Air Quality.....	50
7.2.1.1	Existing environment	50
7.2.1.2	Potential Impacts	50
7.2.1.3	Proposed management measures	50
7.2.2	Waste Management.....	51
7.2.2.1	Existing environment	51
7.2.2.2	Potential Impacts	51
7.2.2.3	Proposed management measures	52
7.2.3	Land Contamination	52
7.2.3.1	Existing environment	52
7.2.3.2	Potential Impacts	52
7.2.3.3	Proposed management measures	52
7.2.4	Infrastructure.....	52
7.2.4.1	Existing environment	52
7.2.4.2	Potential Impacts	53
7.2.4.3	Proposed management measures	53
7.2.5	Greenhouse Gas.....	53
7.2.5.1	Existing environment	53
7.2.5.2	Potential Impacts	53
7.2.5.3	Proposed management measures	54

7.2.6	Socio-economic.....	54
7.2.6.1	Existing environment	54
7.2.6.2	Potential Impacts	54
7.2.6.3	Proposed management measures	55
7.2.7	Visual Amenity	55
7.2.7.1	Existing environment	55
7.2.7.2	Potential Impacts	55
7.2.7.3	Proposed management measures	55
ATTACHMENT 1 - THREATENED SPECIES LISTS.....		57
Likelihood of Occurrence within the Study Area.....		58
ATTACHMENT 2 - PROTECTED MATTERS SEARCH TOOL RESULTS.....		84

List of tables

Table 1-1	Abbreviations.....	9
Table 1-2	Referenced Documents	11
Table 3-1	Pipeline Characteristics.....	15
Table 3-2	Criteria for Identification of Potential Gas Pipeline Alignments.....	17
Table 4-1	Other NSW Legislation not relevant for State Significant Infrastructure.....	24
Table 4-2	LGAs Land Use Zones Associated with the Preliminary pipeline alignment	27
Table 5-1	Stakeholder Plan Overview	31
Table 6-1	Review of Environmental Issues	34
Table 7-1	Pipeline Waste	51

List of figures

Figure 1-1	Preliminary Pipeline Alignment and Study Area	8
Figure 3-1	Typical construction corridor or right of way (ROW)	19
Figure 4-1	Local Government Areas (LGAs)	28
Figure 7-1	Vegetation and Bioregions	37
Figure 7-2	Soils	42
Figure 7-3	Watercourses and Catchments	46

1. Introduction

1.1 Purpose

APA Western Slopes Pipeline Pty Limited, a wholly owned subsidiary of the APA Group (together referred to as APA), is proposing to construct a 400-450mm diameter, buried, steel, high pressure gas pipeline approximately 450 kilometres (km) in length to connect the Narrabri Gas Project (NGP) to the New South Wales (NSW) gas transmission network (refer Figure 1-1).

This document has been prepared to provide information on the Western Slopes Pipeline Project (the Project) in support of an application to the Minister for Planning for environmental assessment requirements for an Environmental Impact Statement (EIS) under Part 5.1 of the *Environmental Planning and Assessment Act 1979 (EP&A Act) and Regulations 2000* of NSW.

The following terminology is used in this report:

- The Project – Western Slopes Pipeline Project
- Study area - a 10km wide buffer from the preliminary pipeline alignment (20km wide total width) adopted in order to describe existing environmental values and define the extent of relevant database searches.
- Preliminary pipeline alignment – Preliminary alignment for a 30m wide Right of Way (ROW). The preliminary pipeline alignment will be subject to further refinement as informed by detailed EIS studies and stakeholder consultation.

1.2 Scope

This Project relates only to the gas transmission pipeline. Development of the gas fields in the Narrabri area is to be undertaken as a separate project by the relevant tenement holders.

This Preliminary Environmental Assessment (PEA) identifies potential key issues associated with the Project and outlines standard and consistent methodologies for evaluating potential construction and operation impacts associated with the proposal. This report is intended to guide the assessment process for the EIS. The role of the EIS is to assess potential impacts based on a detailed understanding of the proposal, which would be informed through detailed site investigations and stakeholder consultation.

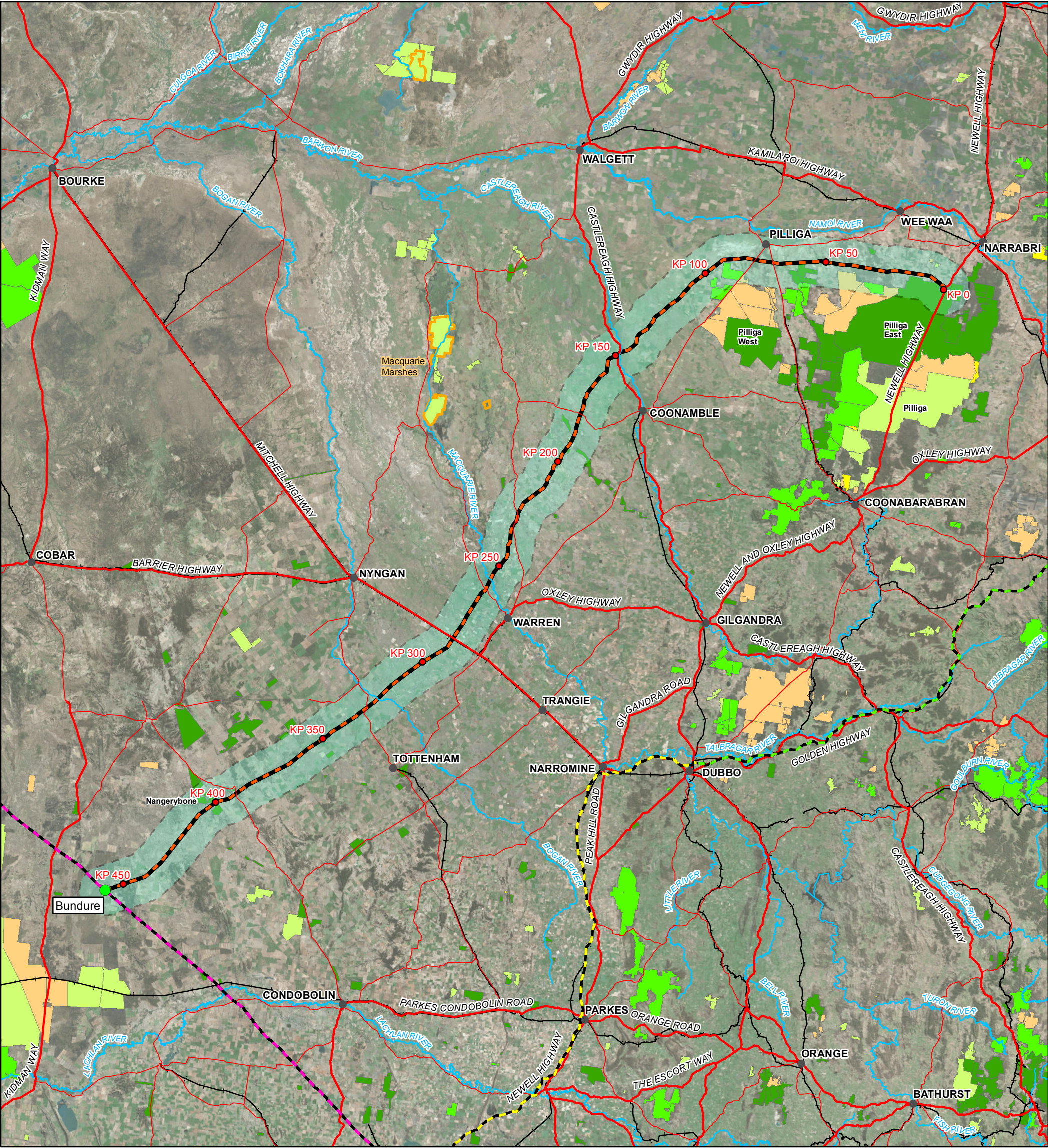
1.3 Structure

This document has been set out as follows:

- Chapter 2 Need for the Project, including justification, objectives and alternatives.
- Chapter 3 Proposal Description, to guide an initial review of the potential key environmental issues.
- Chapter 4 Planning and Approvals Process, setting out the likely planning and approval processes for the proposal including NSW and Commonwealth assessment requirements.



- Chapter 5 Community and Stakeholder Engagement, outlining the proposed methodology to ensure comprehensive engagement of all relevant stakeholder groups.
- Chapter 6 Assessment Approach, setting out how the Proponent will carry out assessment of the proposal.
- Chapter 7 Preliminary Environmental Assessment, detailing the potential impacts and management measures for key and other issues.



AREA OF DETAIL:

Scale: 1:1,500,000 @ A3
GDA 1994 MGA Zone 55

0 10 20 40 60 80
Kilometres

LEGEND:

- Populated Place
- KP point
- MSP Mainline Valve
- WSP Preliminary Alignment
- Moomba Sydney Pipeline
- Central West Pipeline
- Central Ranges Pipeline
- Principal Road
- Secondary Road
- Railways
- Major Rivers
- Environmental Study Area

Conservation Estate

- State Forests
- Miscellaneous
- Nature Reserve
- National Park
- State Conservation Area
- Ramsar Site

PROJECT: WESTERN SLOPES PIPELINE

TITLE: Preliminary Pipeline Alignment and Study Area

SUBTITLE: Figure 1-1

DATE: 14/02/2017

DATA SOURCE:
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DOCUMENT NUMBER: 560-MAP-P-013

Revision	Description	MB Drawn	SRA Checked	TH QC	JF Approved	14/02/17 Date
0.1	ISSUED FOR USE					

1.4 Proponent

APA Group is Australia's largest natural gas infrastructure business, owning and/or operating more than 15,000km of pipeline infrastructure. Its gas transmission pipelines span every State and Territory in mainland Australia, delivering approximately half of the nation's gas usage.

APA Group also has ownership interests in, and operates, the Allgas gas distribution network as well as operating the Australian Gas Networks (formerly Envestra Limited) assets, which together have approximately 27,000km of gas mains and approximately 1.3 million gas consumer connections. APA also owns other energy infrastructure assets such as gas storage facilities, gas-fired power stations and a wind farm.

APA Group has direct management and operational control over the majority of its assets and investments.

1.5 Abbreviations and References

Table 1-1 Abbreviations

Item	Definition
AEMO	Australian Energy Market Operator
AHIP	Aboriginal Heritage Impact Permit
ALARP	As Low As Reasonably Practical
APA	APA Western Slopes Pipeline Pty Limited and APA Group
APGA Code	Australian Pipeline and Gas Association Code of Environmental Practice, Onshore Pipelines
AS	Australian Standard
DIWA	Directory of Important Wetlands in Australia
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
FM Act	Fisheries Management Act 1994
GIS	Geographic Information Systems
HDD	Horizontal directional drilling
IBRA	Interim Biogeographic Regionalisation of Australia

Item	Definition
KP	Distance in kilometres from the commencement of the pipeline at Narrabri gasfield
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
MLV	Mainline valve
MSP	Moomba Sydney Pipeline
NES	National Environmental Significance
NGP	Narrabri Gas Project
NPW Act	National Parks and Wildlife Act 1974
NSW	New South Wales
PEA	Preliminary Environmental Assessment
PIG	Pipeline Inspection Gauge
RMS	Roads and Maritime Services
ROW	Right of Way
TEC	Threatened Ecological Communities
TJ	Terajoule
TSC Act	Threatened Species Conservation Act 1995
TSR	Travelling Stock Route

Table 1-2 Referenced Documents

Referenced Document	
Australian Standards	
<i>AS reference</i>	<i>Document Name</i>
2885	Pipeline Gas and Liquid Petroleum
Other	
Australian Bureau of Statistics, 2011 Census QuickStats	
Bell, D. M., Hunter, J. T and Montgomery, L. 2012. Ephemeral wetlands of the Pilliga Outwash, northwest NSW. <i>Cunninghamia</i> 12(3): 2012	
DEC 2006a. Reconstructed and extant distribution of native vegetation in the Central West Catchment. NSW Department of Environment and Conservation, Dubbo	
DEC 2006b. Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. NSW Department of Environment and Conservation, Dubbo.	
DEWHA 2008a. Ramsar Wetlands in Australia. Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra.	
DEWHA 2008b. Directory of Important Wetlands in Australia (DIWA) Spatial Database. Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra.	
DotEE 2016a. Protected Matters Search Tool. Commonwealth Department of the Environment and Energy. Retrieved from http://www.environment.gov.au/epbc/protect/index.html on 26 September 2016	
DotEE 2016b. Species Profile and Threats Database. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl .	
DPE 2016. The Dark Sky Planning Guideline. Department of Planning and Environment. June 2016	
DPI 2016a. What is currently listed: Key threatening processes. Retrieved from http://www.dpi.nsw.gov.au/fisheries/species-protection/conservation/what-current#Key-threatening-processes on 26 September 2016	
Ecological 2017. Biodiversity Input for PEA. Report to APA Group by Ecological Australia Pty Ltd.	

Referenced Document
LPI 2015. Digital Topographic Database (DTDB). NSW Land and Property Information, Sydney.
NSW Government, 2013. NSW energy summit: communique. Sydney.
NSW Government, 2014. NSW Gas Plan. Protecting What's valuable, securing our future. Sydney
NSW Office of Water, 2011. Water resources and management overview by catchment http://www.water.nsw.gov.au/water-management/basins-and-catchments .
OEH 2015. Border Rivers Gwydir / Namoi Regional Native Vegetation Map Version 2.0. NSW Office of Environment and Heritage, Sydney South
OEH 2016a. NSW BioNet Atlas of NSW Wildlife. NSW Office of Environment and Heritage. Retrieved on 26 September 2016 from http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas.watlas.jsp
OEH 2016b. What is a bioregion? Retrieved from http://www.environment.nsw.gov.au/bioregions/BioregionsExplained.htm

2. Need for the Project

2.1 Justification

The Western Slopes Pipeline Project has a key role to play in assisting NSW to achieve greater energy security and economic sustainability by supporting the development of the emerging gas reserves in north-western NSW and reducing reliance on existing interstate sources of supply. Specifically, the Project will enable gas produced by the proposed Narrabri Gas Project to be delivered into the east coast gas market through connection to the existing Moomba Sydney Pipeline.

A detailed justification for the proposed Narrabri Gas Project can be found within the Environmental Impact Statement (EIS) for that Project. The following key observations of relevance to the Western Slopes Pipeline Project are made in the Narrabri Gas Project EIS:

Natural gas is used in more than one million family homes in NSW and around 33,000 businesses. About 500 heavy industrial users consume approximately 75% of the gas supplied to NSW and it is estimated that about 300,000 jobs rely on a safe and secure supply of natural gas.

NSW, which imports more than 95 per cent of its natural gas from other States, is at risk of supply shortages and increasing prices, largely due to Australia's changing natural gas market.

The NSW Government has acknowledged that energy affordability and supply is a key concern to the government and community. It has identified the need to increase gas supply within the State as a key element in increasing energy security and putting downward pressure on prices (NSW Government 2013, 2014). The NSW Gas Plan reaffirmed that 'to put downward pressure on energy prices and secure supply, we need the growth of viable gas projects' (NSW Government 2014).

Santos' proposed Narrabri Gas Project can produce sufficient gas to meet up to half of NSW's natural gas demand. The ability of the Narrabri Gas Project to contribute substantially to the amount of gas available for the NSW market saw it designated as a strategic energy project by the State Government in 2014.

A detailed justification for the Western Slopes Pipeline Project will be provided in the EIS, taking into consideration the overall benefits and impacts of the proposal.

2.2 Objectives

The objectives of the Project are to:

- Provide transportation for additional gas supply to meet NSW's future needs.
- Facilitate enhanced competition in the national gas market.
- Design a pipeline alignment that provides for the most efficient and economically feasible construction method whilst taking into account the social, land use, heritage, environmental, geotechnical, and topographical constraints.
- Design and construct a pipeline to minimise its impact on both the natural and built environment.

2.3 Alternatives

2.3.1 Do nothing

If the Project is not developed:

- The ability to provide additional gas capacity to meet NSW's future needs will be diminished.
- The ability to transport domestically produced gas from emerging resources in the Narrabri region will be reduced.
- Opportunities for increased competition in the national gas market may not be realised.

2.3.2 Alternative Alignments

A number of alignment options have been considered in the area taking into account the location of gas supply and gas markets, existing gas infrastructure with viable capacity, topographical features, land use and environmental factors, as discussed in Section 3.3.

Whilst a preliminary pipeline alignment has been identified (refer Figure 1-1), the final alignment will be refined based on extensive consultation with landholders and other stakeholders as well as the results of technical and environmental field surveys. Field surveys will assess the preliminary pipeline alignment for constructability as well as the environmental constraints and cultural heritage such that impacts can be minimised.

3. Proposal Description

3.1 General

The proposed infrastructure involves the construction and operation of an approximately 450km buried, steel, gas transmission pipeline between the Narrabri Gas Project and the existing Moomba Sydney Pipeline (MSP). The pipeline is anticipated to have a CAPEX value in excess of \$450M. The key characteristics of the proposed gas pipeline are set out in Table 3-1.

The proposal may also include the following above-ground infrastructure/facilities:

- Mainline valves, used to shut down the pipeline in emergency or upset conditions.
- Scraper stations, used for access to the pipeline for internal cleaning and inspection.
- Meter stations, for monitoring of gas flow for commercial purposes.
- Pressure let-down facilities for interconnection with the MSP.
- Communication towers.
- Marker signs that delineate the location of the pipeline.
- Temporary construction workforce campsites.
- Temporary laydown areas for pipe stockpiling.

In addition to the buried pipeline and above-ground infrastructure/facilities, there may be a requirement for buried ground beds to support the cathodic protection system for the pipeline.

Table 3-1 Pipeline Characteristics

Design Element	Details
Length	Approximately 450km
Material	Epoxy coated high strength steel line pipe
Size Range	400-450mm diameter
Minimum depth of cover (based on AS2885 requirements)	<ul style="list-style-type: none"> • Generally 900mm (min 750mm) • Deep Cultivated Areas 1200mm • Road / Rail Crossings 1200mm • Watercourse crossings 1200mm - 2000mm
Nominal capacity	Up to 200 TJ/day

Design Element	Details
Easement	Nominally 30m wide. Additional working width may be required at various locations and this will be identified in the EIS.
Gas Type	All gas transported will be of a standard compliant with AS 4564-2011

3.2 Preliminary Pipeline Alignment Description

The preliminary pipeline alignment (refer Figure 1-1) runs west from the proposed Santos central processing facility at Leewood (KP0) north of the Pilliga Forest through predominantly cleared grazing land to KP90 adjacent to the northwest corner of the Pilliga West National Park. This section of preliminary pipeline alignment avoids the Pilliga National Park and Pilliga and Pilliga West State Conservation Areas. Some dryland cropping occurs in this section. A small rural subdivision, which has only been partially settled, is traversed at approximately KP35.

At KP90 the preliminary pipeline alignment turns southwest to run through mixed grazing and cropping land to the Castlereagh Highway northwest of Coonamble (approximately KP150). Remnant vegetation persists as small patches and linear strips in road reserves and along watercourses. The preliminary pipeline alignment continues southwest to KP225 north of Warren. Mixed grazing and dryland cropping occurs throughout this section, with more intensive cropping occurring along the major watercourses including the Castlereagh River.

Between KP225 and KP260 the preliminary pipeline alignment traverses the Macquarie-Bogan Irrigation Scheme and uppermost reaches of the extensive ephemeral floodplain wetland listed as a Nationally Important Wetland that drains to the Macquarie Marshes Nature Reserve and Ramsar wetland over 65km downstream. Selection of the preliminary pipeline alignment has sought to minimise impacts to irrigation infrastructure by considering the arrangement of irrigation channels and paddocks and this is expected to be further refined during landowner discussions.

Between the Macquarie (KP255) and Bogan Rivers (KP320), the preliminary pipeline alignment traverses mixed grazing and cropping land with more intensive cropping occurring along major watercourses. Irrigation infrastructure is limited in this section and largely avoided.

South of the Bogan River, the preliminary pipeline alignment runs west-southwest to join the MSP (KP458) at the Bundure mainline valve (MLV) station, approximately 100km west of Condobolin. Land use in this section is predominantly grazing with some dryland cropping. A small area of intensive cell cropping north of the MSP is avoided. The area south of the Bogan River (KP330 to KP380) contains extensive gilgai. Areas of remnant vegetation associated with small hills and ranges are also traversed in this section. The Nangerybone State Forest is avoided at KP400.

The remainder of this chapter provides a description of the development stages of the proposal to provide an understanding of the potential environmental impacts

as discussed in Chapter 7. The key phases of development, which are subject to staged regulatory processes and informed by detailed landholder and community consultation, include:

- Alignment Selection.
- Pipeline Design.
- Construction and Commissioning.
- Operation.

3.3 Alignment Selection

As discussed, a number of alternative alignments have been considered taking into account the criteria set out in Table 3-2. The strategic objectives in selecting potential alignments for the pipeline included:

- Ongoing operational viability considering access, environmental, stakeholder and cost impacts.
- Minimising impacts on areas of environmental or cultural heritage sensitivity.
- Acceptable gas transmission costs.
- Economically feasible construction.
- Ability to connect emerging gas markets into the MSP which is the nearest pipeline with viable capacity.

The preliminary pipeline alignment, the subject of this PEA, has been selected as the most suitable location when all of the guiding criteria were taken into consideration, including environmental values, complexity of the terrain, the number of land parcels and landowners affected, and land use considerations. The preliminary pipeline alignment will be refined through comprehensive landholder, community and other stakeholder consultation and detailed environmental studies during the EIS process.

The issues that have been considered in selecting the preliminary pipeline alignment are summarised in Table 3-2.

Table 3-2 Criteria for Identification of Potential Gas Pipeline Alignments

Criterion	Rationale
Alignment length	Balance the total alignment length against constructability (e.g. geotechnical and topographic constraints), land use, future economic development and potential environmental and cultural heritage impacts.
Pipeline constructability	The alignment selection needs to consider all construction aspects and potential impacts including access, terrain difficulty, watercourses and infrastructure crossings.

Criterion	Rationale
Pipeline operability	The alignment needs to provide for low impact and safe access for routine maintenance and integrity monitoring.
Extent of areas of environmental and cultural heritage sensitivity	Minimise, to the extent practicable, the expected impacts on remnant vegetation, threatened flora and fauna and their habitat and cultural heritage values.
Number of land parcels and landowners	Minimise, to the extent practicable, the number of affected land parcels and landowners to minimise impacts to existing land use.
Avoidance of non-compatible land uses	Avoidance of sensitive receptors and incompatible land uses such as dwellings, towns and industry.
	Avoidance of incompatible tenures including conservation estate (national park, state forest, nature reserve) and resource tenure (mining leases).

3.4 Pipeline Design

The proposed gas pipeline will be designed and constructed in accordance with the latest version of Australian Standard (AS) *AS2885 Pipelines Gas and Liquid Petroleum*. This standard covers the design, construction and operation of gas transmission pipelines. AS2885 calls up in excess of 80 Australian, American and European standards in accordance with which the pipeline and facilities must be designed. Typically, a gas pipeline of this type will have a design life in excess of forty years.

3.5 Construction & Commissioning

3.5.1 Construction Activities

3.5.1.1 Overview of Construction Process

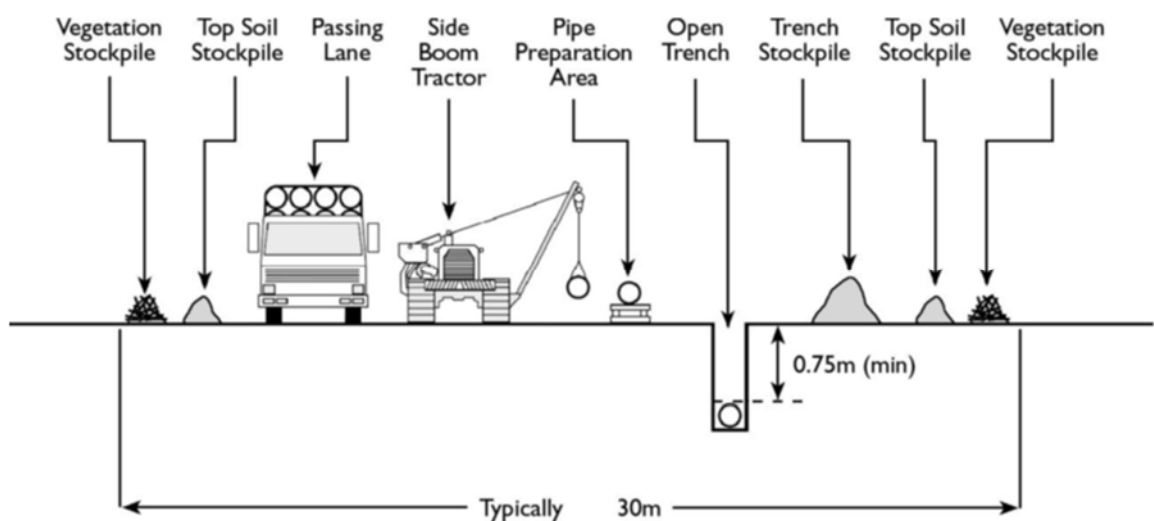
Pipeline construction is linear production-line-work. Typical pipeline construction activities include:

- Installation of temporary construction workforce camps and pipe laydown areas. Preferred sites for temporary camps and pipe stockpiling will be identified during the EIS process.
- Survey of the right of way (ROW).
- Installation of temporary gates in property boundary fences for construction access.
- Installation of access tracks if required. Where possible, existing cleared lines will be used and additional clearing will be minimised.
- Installation and maintenance of erosion and sediment controls.

- Clearing of vegetation and grading of the ROW and extra work spaces to prepare a safe construction working area.
- Setting up temporary facilities such as work areas for equipment and pipe delivery and storage, borrow pits and access tracks.
- Stringing the pipe lengths along the ROW and, where required, bending to match elevation or direction.
- Welding the pipe lengths together.
- Non-destructive testing of pipeline welds.
- Excavation of a trench in which to lay the pipeline. This would be undertaken by a trenching machine, rock saws, or excavator and may involve rock hammers or blasting in hard rock.
- Separation and stockpiling of topsoil and subsoil to protect and preserve topsoil and to ensure the soil profile is reinstated during backfill and rehabilitation.
- Crossing watercourses, roads and rail lines by open cut, boring or horizontal directional drilling (HDD) methods (depending upon the type and nature of the crossing, and geotechnical conditions).
- Placing sand or screened trench sub-soil (padding and shading) into the trench to protect the pipe coating from external damage.
- Placing the pipeline into the trench.
- Returning the subsoil and compacting the trench.
- Testing the integrity of the pipeline by filling it with water and pressurising it to above maximum operating pressure (hydrostatic test).
- Returning topsoil, clearing up, reinstating and rehabilitating the construction ROW and all temporary facilities.

A typical layout for the construction corridor is shown in Figure 3-1.

Figure 3-1 Typical construction corridor or right of way (ROW)



(Diagram courtesy of APGA (edited))

3.5.1.2 *Rehabilitation*

Rehabilitation will be undertaken in accordance with good pipeline construction principles and will ensure that:

- Land is returned as close as possible to its previous productivity within a reasonable timeframe.
- Topsoil cover is re-established and all land and waterways disturbed by project activities are returned to a stable condition as soon as possible after construction.
- Stable landforms are re-established to original topographic contours.
- Natural drainage patterns are reinstated.
- Erosion control measures (e.g. contour banks, filter strips) are installed in erosion prone areas.
- The pre-construction environment is reinstated and disturbed habitats recreated where they do not affect pipeline operation and integrity. For example, trees and shrubs are discouraged over and near the pipeline to maintain integrity of the pipe coatings.
- Installation of pipeline marker posts.

All construction and rehabilitation activities will be undertaken in accordance with the Australian Pipeline and Gas Association Code of Environmental Practice, Onshore Pipelines.

Given that the pipeline will be underground, land users will be able to continue regular land use activities above the pipeline provided that they do not undertake excavation activities or erect structures in the ROW. Shallow-rooted vegetation can be re-established across the entire ROW (e.g. cropping such as grain and fibre crops) although deep rooted vegetation (e.g. mature trees) cannot, due to the potential to damage the pipeline and impede operational access requirements. Shallow-root cropping and grasslands re-establishment are encouraged and no long term impacts would be expected to land uses that rely on cropping and grazing primary production.

3.5.1.3 *Other Construction Activities*

Other construction activities typically include:

- Line pipe delivery and temporary stockpiling as required.
- Temporary construction workforce camps (if required).
- Traffic management.
- Plant, equipment, pipe and heavy haulage.

3.5.1.4 Construction Equipment

Typical pipeline construction equipment includes:

- Bull dozers.
- Loaders.
- Graders.
- Side-boom tractors.
- Trucks, including water trucks and pipe and equipment movement vehicles.
- Padding machines (for sifting subsoil to provide soft material (padding) around the pipeline; eliminates the need to import padding material).
- Excavators.
- Wheel ditching machines including rock saws.
- Trenchless excavation equipment (e.g. boring machines and HDD).
- Welding units.
- X-ray equipment.
- Refuelling and equipment servicing vehicles
- Crew vehicles.

3.5.1.5 Construction Spreads

The construction activities set out in Section 3.5.1.1 would each be undertaken by a different crew. The series of crews are referred to as a 'spread'. It is anticipated that up to two pipeline construction spreads could be simultaneously mobilised for construction of the pipeline. Further studies will determine whether it is appropriate to construct the pipeline with one or two spreads.

Additional small work teams will be required for areas involving specialised construction techniques such as HDD, hard rock extraction and above ground facility installation.

3.5.1.6 Construction Workforce

A workforce of between 250 and 350 personnel is anticipated for the construction phase of the project.

Crews typically work a rostered work cycle of 28 days on 9 days off.

3.5.1.7 Construction Timing

Construction and commissioning of the pipeline is expected to take approximately 8-10 months, including mobilisation, reinstatement and demobilisation.

3.5.2 Commissioning Activities

Commissioning activities include:

- Instrument calibration.
- Hydrostatic testing of the pipeline with water.
- Pipeline drying.
- Gas filling.
- Testing and commissioning of stations and valves.

3.6 Operational Activities

During pipeline operations, gas flows and pressures will be monitored from a remotely operated control room. Inspection of the pipeline easement for issues such as erosion, weeds, subsidence, revegetation and third party activity will be carried out on a regular basis via ground and/or aerial patrols. Other activities will include valve and scraper station maintenance and scheduled internal inspections of the pipeline for integrity monitoring. Regular contact will be maintained with landowners of all properties traversed by the pipeline.

3.7 Decommissioning

Decommissioning of the pipeline will occur at the end of its useful life. A decommissioning plan for the pipeline and associated infrastructure will be prepared in advance of decommissioning in consultation with the relevant regulatory authorities. The basis of the plan will be that the pipeline and associated infrastructure are to be decommissioned in line with the applicable legislative requirements and best practice guidelines existing at that time, including any current version of the APGA Code.

4. Planning and Approvals Process

4.1 NSW Assessment Framework

4.1.1 Environmental Planning and Assessment Act 1979

The *EP&A Act* provides the statutory basis and framework for planning and environmental assessment in NSW. The *EP&A Act* includes provisions to ensure the potential environmental impacts of a development are assessed and considered in the decision-making process.

Under the *State Environmental Planning Policy (State and Regional Development) 2011* Schedule 3, gas transmission pipelines that require a pipeline licence are identified as State Significant Infrastructure (SSI).

Under the *State Environmental Planning Policy (Infrastructure) 2007*, cl.53, development for the purpose of a gas pipeline subject to a licence under the *Pipelines Act 1967*, may be carried out without development consent.

Under the *Pipelines Act 1967*, a pipeline licence is required for the pipeline thus the development can be carried out without development consent and is subject to the assessment and approval provisions of Part 5.1 of the *EP&A Act*. Approval of the Minister for Planning is required and the project must be assessed by an EIS.

Under Part 5.1 of the *EP&A Act* the planning and approval process involves the following key steps:

- Submission of an application with the accompanying supporting documentation (this report) to the Department of Planning and Environment, to apply for the approval of the Minister to carry out SSI.
- Preparation of the environmental assessment requirements by the Department of Planning and Environment in respect of the infrastructure, which must include the preparation of an environmental impact assessment in the form prescribed by the regulations to the EP&A Act;
- Preparation and submission of an EIS, addressing the matters outlined in the Secretary Planning's requirements.
- Public exhibition of the EIS for a minimum of 30 days.
- Assessment of the application by the Department of Planning and Environment and preparation of the Secretary Planning environmental assessment report.
- Assessment decision by the Department of Planning and Environment, or the Planning and Assessment Commission, as delegated by the Minister. Any decision may include conditions of approval.

4.1.1.1 Approvals that do not apply

Section 115ZG of the *EP&A Act* specifies authorisations which are not required for approved State significant infrastructure. Based on a preliminary assessment, those authorisations that may otherwise have been relevant to the proposed development but are not required due to Section 115ZG are set out in Table 4-1.

Table 4-1 Other NSW Legislation not relevant for State Significant Infrastructure

Criterion	Rationale
<i>Fisheries Management Act 1994</i>	A permit under section 201, 205 or 219.
<i>Heritage Act 1977</i>	An approval under part 4, or an excavation permit under section 140, in relation to relics.
<i>National Parks and Wildlife Act 1974</i>	Aboriginal heritage impact permits under Section 90.
<i>Native Vegetation Act 2003</i>	An authorisation referred to in section 12 of the Act to clear native vegetation or State protected land
<i>Water Management Act 2000</i>	Water use approval, water management work approval or activity approval (other than an aquifer interference approval).

4.1.1.2 ***Approvals that must be applied consistently***

Section 115ZH of the *EP&A Act* specifies certain authorisations that cannot be refused if necessary for the carrying out of approved State significant infrastructure. Those authorisations which may be required for the proposed development are:

- A licence granted under Section 14 of the *Pipelines Act 1967*, to construct and/or operate a pipeline.
- A Works Consent under Section 138 of the *Roads Act 1993*, to impact on public roads.
- An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997*.

4.1.2 **Pipelines Act 1967**

Sections 12 and 13 of the *Pipelines Act 1967* outline the licensing application requirements for pipelines. Under Section 11 of the *Pipelines Act 1967*, a licence is required to:

- Commence, or continue, the construction of a pipeline.
- Alter or reconstruct a pipeline.
- Operate a pipeline.

A licence under the *Pipelines Act 1967* is required for the construction and operation of the proposed gas pipeline.

To grant a pipeline licence, the Minister must be satisfied that the lands, or the easements, specified in the application for the licence which relate to the alignment of the proposed pipeline, associated apparatus or works, and access areas are vested in the applicant or are available for compulsory acquisition. In

relation to private lands, the latter may only take place if the Minister is satisfied that the applicant has taken all reasonable steps to enter into an agreement with the owner to acquire the lands or easements and those steps have not resulted in any such agreement.

An authority to survey (ATS) can also be granted under this Act, authorising the entry onto land to survey and take samples from the land.

4.1.3 Roads Act 1993

The *Roads Act 1993* provides the statutory framework for the management of public roads within NSW. The *Roads Act 1993* is managed by NSW Roads and Maritime Services (RMS), Councils and /or the NSW Department of Industry. RMS has jurisdiction over major roads, Councils have jurisdiction over minor roads within their LGAs and the Department of Industry has jurisdiction over road reserves or Crown lands.

Section 138 of the *Roads Act 1993* provides that a person may obtain the consent of the appropriate roads authority to authorise for the erection of a structure, of the carrying out of a work in, on or over a public road, or the digging up or disturbance of the surface of a public road.

Construction of the proposed gas pipeline within public road reserves will therefore require works consent of the appropriate roads authority under Section 138 of the *Roads Act 1993*.

4.1.4 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is a key instrument for the protection of the environment in New South Wales with a focus on avoiding or minimising pollution and regulating and licensing potentially environmentally hazardous activities. One mechanism for achieving these objectives is through a system of environment protection licences (EPLs) for such activities. Activities requiring an EPL are listed in Schedule 1 of the POEO Act and are commonly referred to as "scheduled activities".

The construction and operation of a pipeline is not, of itself, a scheduled activity that requires an EPL. While there is an EPL requirement for certain petroleum production facilities, the EPL requirement is triggered by the "production" of petroleum above a certain threshold. The pipeline will transport gas however it will not "produce" petroleum. The requirement for an EPL, including any EPLs required for ancillary activities such as waste storage or disposal, will be thoroughly investigated in the detailed EIS for the Project.

The Project will be conducted in accordance with the general environment protection requirements of the POEO Act and will be the subject of a detailed Environmental Management Plan (EMP). EMPs will be developed for the construction, operational and decommissioning/rehabilitation stages of the Project.

4.1.5 National Parks and Wildlife Act 1974

It is an offence under the *National Parks and Wildlife Act 1974 (NPW Act)* to cause harm to or desecrate an Aboriginal object or an Aboriginal place.

'Aboriginal object' is defined to mean any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

'Aboriginal place' is defined to mean any place specified or described in an order published by the Minister in the Government Gazette, being a place that, in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture, to be an Aboriginal place for the purposes of this Act.

Engagement with interested Aboriginal parties will be undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* as issued under Part 6 of the *NPW Act*.

Provisions to manage potential impacts on Aboriginal cultural heritage will be developed as part of the EIS, and will address specific EIS requirements such as effects on anthropological, archaeological, cultural, historical or other special values. Conditions of consent to the State Significant Infrastructure are likely to include the taking of appropriate steps to manage impacts on Aboriginal objects and Aboriginal places.

4.1.6 Aboriginal Land Rights Act 1983

Should it be identified that the final pipeline alignment crosses any areas of Aboriginal land under the *Aboriginal Land Rights Act 1983*, or any areas currently the subject of claims under that Act, steps will be taken, including seeking to reach an agreement with the relevant land council, so that the grant of an easement can take place.

4.1.7 Local Government Area Permissibility

The preliminary pipeline alignment traverses seven LGA as set out in Table 4-2 and Figure 4-1. The pipeline traverses predominantly rural land use zones (refer Table 4-2). The local environmental plans (LEP) for each LGA will be taken into consideration in the EIS:

- Bogan Local Environmental Plan 2011.
- Cobar Local Environmental Plan 2012.
- Coonamble Local Environmental Plan 2011.
- Lachlan Local Environmental Plan 2013.
- Narrabri Local Environmental Plan 2012.
- Walgett Local Environmental Plan 2013.
- Warren Local Environmental Plan 2012.

Generally, where an inconsistency with the requirement of the LEPs occurs, the *State Environmental Planning Policy (State and Regional Development) 2011* will prevail (Section 7(1) of the Policy).

Table 4-2 LGAs Land Use Zones Associated with the Preliminary pipeline alignment

LGA	Intersected Land Use Zone	
	RU ¹ Primary Production	SP ² Infrastructure
Bogan	√	
Cobar	√	
Coonamble	√	
Lachlan	√	
Narrabri	√	
Walgett	√	
Warren	√	√ (Crossing of Mitchell Highway and Main Western Railway)

¹ RU relates to Rural zones

² SP relates to Special purpose zones



AREA OF DETAIL:

Scale: 1:1,500,000 @ A3
GDA 1994 MGA Zone 55

LEGEND

- Populated Place
- KP point
- MSP Mainline Valve
- WSP Preliminary Alignment
- Moomba Sydney Pipeline
- Central West Pipeline
- Central Ranges Pipeline
- Local Government Area
- Environmental Study Area

PROJECT: WESTERN SLOPES PIPELINE

TITLE: Local Government Areas

SUBTITLE: Figure 4-1

DATE: 14/02/2017

DATA SOURCE:
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DOCUMENT NUMBER: 560-MAP-P-017

Revision	Description	MB Drawn	SRA Checked	TH QC	JF Approved	14/02/17 Date
0.1	ISSUED FOR USE					

4.2 Commonwealth Assessment Framework

4.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that any proposal having or likely to have a significant impact upon a matter of National Environmental Significance (NES) must be referred to the Commonwealth for approval in addition to any approval required at a State level. If the Project is determined to be a controlled action then Commonwealth Ministerial approval will be required before the Project can proceed.

As areas of threatened species and ecological communities have been identified within the vicinity of, and may be intersected by, the preliminary pipeline alignment a referral under the EPBC Act will be made to the Department of Environment and Energy. Any environmental impact assessment for the Project would be made in accordance with the conditions of the bilateral agreement between the Commonwealth Government and the Government of NSW.

4.2.2 Native Title Act 1993

The *Native Title Act 1993* is administered by the National Native Title Tribunal. The Act prescribes that native title can be extinguished under certain circumstances, including the granting of freehold land. Native title may continue to exist in various areas, including Crown land, watercourses, some leases and some reserves. Where the grant of a pipeline licence or other act associated with the Project affects the exercise or enjoyment of native title rights and interests, the 'future acts regime' of the *Native Title Act 1993* must be complied with for those acts to be valid.

APA understands that the NSW government will require compliance with the relevant *Pipelines Act 1967* processes and broader government policy in relation to native title, as is the normal course. There are currently no determinations of native title over the preliminary pipeline alignment, but there are two native title claims in the area of the preliminary pipeline alignment:

- NC2012/001 Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan.
- NC2011/006 Gomeroi People.

Both native title claims are registered and therefore APA will proceed to negotiate with their representatives for the purposes of the *Native Title Act 1993* future acts regime. Additionally, there is an area that is not the subject of any native title claim. APA will engage with all relevant native title groups and seek to negotiate appropriate agreements in regard to the proposed pipeline.

Engagement with relevant parties and provisions to manage potential impacts on Aboriginal cultural heritage will be undertaken as part of the EIS, and will address specific EIS requirements such as effects on anthropological, archaeological, cultural, historical or other special values (see 4.1.5 and 7.1.6).

5. Community and Stakeholder Engagement

5.1 Guiding Principles

APA values and respects its relationships with stakeholders and communities within which our assets and operations exist. APA is committed to building and maintaining long term relationships with all stakeholders for the Project, as well as meeting all applicable regulatory and legislative requirements.

APA's approach to stakeholder engagement will be guided by the following objectives:

- **No surprises:** Inform and engage community members and key stakeholders early in the process, and ensure they remain fully informed.
- **Be inclusive:** Ensure the community has easy access to clear and concise information about the project, ensuring all communications use language (e.g. non-technical) appropriate for each audience
- **Be honest and act with integrity:** Always use facts and speak the truth. If the answer is not known then the question will be taken on notice, the appropriate parties spoken with and a response provided promptly.
- **Be responsive:** Respond to all stakeholder contact in a timely manner and make every effort to resolve issues to the satisfaction of all involved.
- **Be a part of the community:** Use the Project to contribute to stronger local communities and provide economic and social benefit.
- **Honour all obligations:** Deliver on promises made to the community and stakeholders.

5.2 Stakeholder Plan Overview

The information provided in Table 5-1 includes, but is not restricted to, those stakeholders, areas of interest to be addressed and engagement channels that will form the basis for a comprehensive stakeholder communication and engagement program to underpin the proposal.

Table 5-1 Stakeholder Plan Overview

Preliminary Key Stakeholders (others to be identified through consultation)
<ul style="list-style-type: none"> • Landowners & Leaseholders. • Various NSW and Federal Government agencies. • Various NSW & Federal Government Ministers and elected representatives. • Various LGA representatives. NC2012/001 Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan. • Native title claimants: <ul style="list-style-type: none"> • Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan; • Gomeroi People. • Aboriginal Land Councils and other Registered Aboriginal Parties • Special reference groups, including the Narrabri Community Consultative Committee. • Various community groups, business chambers and special interest groups. • Local, metropolitan and national media.
Likely Areas of Interest
<ul style="list-style-type: none"> • Project details including preliminary pipeline alignment, length, design, timeframe, etc. • Direct impacts on property and land required for pipeline easement. • Potential benefits for the NSW energy market and consumers. • Regulatory approval processes. • Landholder consultation plan. • Community consultation plan. • Environment / biodiversity management plan. • Cultural heritage management plan. • Potential economic and social benefits for regional communities. • Potential risks and local impacts. • Compliance with Australian Standards. • Pipeline security.
Proposed Engagement Channels / Activities
<ul style="list-style-type: none"> • Formal consultation processes under the EP&A Act. • Briefings /meetings as appropriate. • Face-to-face discussions with landholders. • Community information sessions. • Attendance at various appropriate forums, e.g. Regional business forums.



- Website project page, 1800 information line and dedicated project email address
- Dedicated regional contact points.
- Media releases fact sheets and FAQs.
- Formal feedback channel.

6. Assessment Approach

6.1 Risk-Based Approach

Risk assessment is an important step in the environmental impact assessment process. In particular, environmental risk assessment provides important relativity between the identified impacts and the Project, community and stakeholder priorities and requirements. Environmental risk assessment can also assist in identifying appropriate mitigation measures and management responses and can also be applied following the identification of mitigation and management measures to determine the residual risk of associated impacts.

While the approach is qualitative, it provides an important step in the process of project planning and assessment of environmental impact. In particular, it is used to guide the scope of environmental investigations and assessments, proposal design and assist in identifying appropriate mitigation measures and management responses.

Taking into consideration the preliminary desktop investigations, field visits and publically available information, the key issues have been identified as set out in Table 6-1.

6.2 Detailed Assessment

It is proposed that only the key environmental issues as identified in Table 6-1 will be subjected to detailed assessment. The level of detail in the assessment will be guided by feedback from relevant stakeholders and the requirements of the *EP&A Act*. The objectives of the detailed assessment are to provide a thorough understanding of the potential environmental impact of the Project, including cumulative impacts from the Narrabri Gas Project and other relevant projects, and inform the development of Project specific environmental management measures to mitigate any identified adverse impacts.

More detail on the proposed assessment is provided in Chapter 7.

6.3 General Assessment

Other environmental issues, not considered to be key issues, are proposed to be assessed against existing management measures to identify any modifications and improvements to those management measures for the Project (see Section 7.2).

6.4 Outcomes

The outcomes of the assessment approach proposed is to identify a clear set of potential impacts associated with the preliminary pipeline alignment. The environmental assessment will use geographic information systems (GIS) for the display of assessment outcomes. All data collected for the proposal will be spatially referenced on the same datum to facilitate integrated reporting and assessment. Maps at suitable scales will be used to present outcomes specific to that area.

Table 6-1 Review of Environmental Issues

Scoping Considerations	Environmental Issues	Environmental Assessment Requirements
Key Environmental Issues		
Environmental impacts that may be significant and therefore require detailed investigation to adequately determine the level of potential impact and identify appropriate measures to manage and mitigate the effects.	<ul style="list-style-type: none"> • Impacts on biodiversity: <ul style="list-style-type: none"> • Vegetation clearing. • Fauna habitat disturbance. • Disturbance of wetlands and aquatic habitats. • Soils and geology - erosion control. • Water and hydrology. • Transport infrastructure and traffic movements. • On-going land use and agriculture, including biosecurity. • Heritage - Aboriginal and Non-Aboriginal. • Hazards and risks. 	<p>Detailed assessment of issues identified as having potentially significant impact.</p> <p>Development of Project-specific and location-specific measures to mitigate any potentially adverse impacts.</p>
Other Environmental Issues		
Environmental impacts that are expected to be routinely associated with the development and delivery of pipeline projects (particularly construction related impacts) which can be managed through detailed design and/or through the implementation of standard management and mitigation measures (e.g. Australian Pipeline and Gas Association Code of Environmental Practice (APGA Code)).	<ul style="list-style-type: none"> • Noise and air quality (dust generation). • Waste management. • Land contamination. • Infrastructure. • Greenhouse gases. • Socio-economic. • Visual amenity. 	<p>General assessment of impact to inform development of general overarching environmental management framework.</p>

7. Preliminary Environmental Assessment

This chapter provides a summary of the potential risks, impacts and proposed management measures associated with the proposed gas pipeline. The potential risks, impacts and management measures are based on the current understanding of the existing environment along and adjacent to the preliminary pipeline alignment. Environmental issues have been divided into those matters that are considered key or other based on the environmental issues set out in Chapter 6.

For the purposes of this PEA a study area consisting of a 10km wide buffer from the preliminary pipeline alignment (20km wide total width) has been adopted in order to describe existing environmental values and define the extent of relevant database searches.

7.1 Key Environmental Issues

7.1.1 Biodiversity

7.1.1.1 *Existing Environment*

Overview

Biodiversity values for the preliminary alignment and broader study area were desktop assessed by Eco Logical Australia Pty Ltd (Eco Logical, 2017). The desktop assessment involved review and interrogation of the following data sources:

- Databases:
 - Bionet/NSW Atlas of Wildlife (OEH 2016a).
 - Protected Matters Search Tool (DotEE 2016a).
 - Species Profile and Threats Database (DotEE 2016b).
 - Fisheries database (DPI 2016a).
- Mapping:
 - Vegetation mapping:
 - Namoi Catchment Vegetation Mapping (OEH 2015).
 - Central West Catchment Vegetation Mapping (DEC 2006a).
 - Lachlan Catchment Vegetation Mapping (DEC 2006b).
 - Freshwater threatened species distribution maps (DPI 2016b).
 - Ramsar and Directory of Important Wetlands in Australia (DIWA) wetlands (DEWHA 2008a, 2008b).
 - Drainage mapping (LPI 2015).
 - National Parks and Wildlife Services Estate.
 - State Forests.
 - Travelling Stock Reserves (TSRs) as managed by relevant Local Land Services (LLS).

A preliminary review of the Interim Biogeographic Regionalisation of Australia (IBRA) regions was also undertaken to provide context to the biodiversity values present within the study area. Threatened species, populations and ecological communities listed under the *NSW Threatened Species Conservation Act 1995 (TSC Act)*, the *NSW Fisheries Management Act 1994 (FM Act)* and the *EPBC Act* were identified and data was filtered for relevance to the preliminary pipeline alignment based on the occurrence, or likelihood of occurrence of particular biodiversity values within, or in close proximity to the preliminary pipeline alignment.

Bioregions and Broad Vegetation Formations

The preliminary pipeline alignment crosses three bioregions – the Brigalow Belt South, Darling Riverine Plains and Cobar Peneplain Bioregions (refer to Figure 7-1). Bioregions are large land areas which are characterised by broad, landscape-scale natural features and environmental features that influence the function of entire ecosystems (OEH 2016b). Vegetation in NSW has been subject to extensive clearing for agricultural activity which has left little of the original woodland vegetation intact in large stand areas.

The northern section of the preliminary pipeline alignment is located within the Brigalow Belt South Bioregion, to the north of the intact stands of native vegetation associated with the Pilliga and Pilliga West National Parks and State Conservation Areas and adjacent State Forests. Within this section of the preliminary pipeline alignment, dry sclerophyll forests are the dominant vegetation formation.

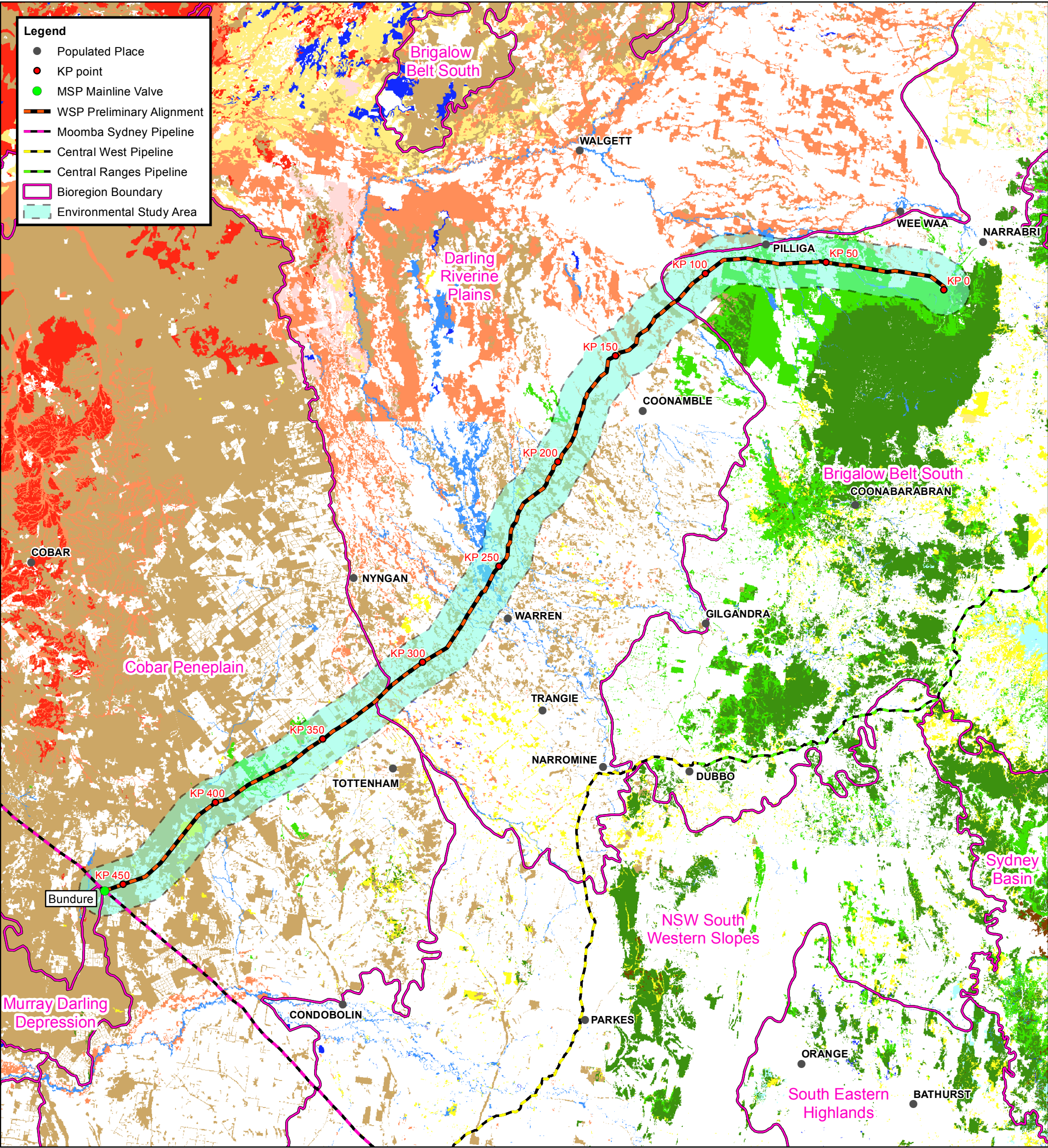
As the preliminary pipeline alignment travels south, it intersects the Darling Riverine Plains bioregion, where native vegetation has been largely cleared. Intact native vegetation dominated by semi-arid woodland tends to be associated with the broad floodplains and watercourses located within the region, with some scattered areas of grassy woodlands. Areas of forested wetlands are present, particularly those associated with the wetlands of the Macquarie River.

The southern section of the preliminary pipeline alignment crosses the Cobar Peneplain Bioregion. Within this bioregion the vegetation along the preliminary pipeline alignment appears to be dominated by semi-arid woodland, with scattered areas of grassy woodland and dry sclerophyll forests.

Due to the length of the pipeline, a wide range of biodiversity values, across a large number of ecosystems, have been identified, as outlined below.

Vegetation and Threatened Ecological Communities

A desktop assessment of NSW catchment-wide vegetation mapping identified a total of 72 vegetation communities within the study area, of which 18 have been identified as, or have the potential to be, threatened ecological communities (TEC) listed under the *TSC Act* (refer to Attachment 1). Detailed field survey and assessment is required to confirm the extent of threatened communities directly impacted by the preliminary pipeline alignment, particularly native grasslands.



AREA OF DETAIL:

SCALE: 1:1,500,000 @ A3
GDA 1994 MGA Zone 55

0 10 20 40 60 80
Kilometres

Vegetation Formation

- Arid shrublands (Acacia subformation)
- Arid shrublands (Chenopod subformation)
- Cleared
- Dry sclerophyll forests (Shrub/grass subformation)
- Dry sclerophyll forests (Shrubby subformation)
- Forested wetlands
- Freshwater wetlands
- Grasslands
- Grassy woodlands
- Heathlands
- Rainforests
- Semi-arid woodlands (Grassy subformation)
- Semi-arid woodlands (Shrubby subformation)
- Wet sclerophyll forests (Grassy subformation)
- Wet sclerophyll forests (Shrubby subformation)

PROJECT: WESTERN SLOPES PIPELINE

TITLE: Vegetation and Bioregions

SUBTITLE: Figure 7-1

DATE: 14/02/2017

DATA SOURCE: Geoscience Australia, OEH, DEE.

DOCUMENT NUMBER: 560-MAP-P-016

Revision	Description	MB	SRA	TH	JF	14/02/17
0.1	ISSUED FOR USE	MB	SRA	TH	JF	14/02/17
		Drawn	Checked	QC	Approved	Date

The desktop assessment (Ecological, 2016) indicates approximately 60% of the total study area as being vegetated. The preliminary pipeline alignment traverses approximately 271km of mapped native vegetation of which approximately 75km, or 16.5%, is identified as TEC or potential to be TEC.

When considering only those vegetation communities known to be a TEC (excluding those with potential to be a TEC) the potentially impacted extent reduces to approximately 35km or 7.7% of the preliminary pipeline alignment. The relevant TECs which these vegetation communities form part of, and are therefore known to occur in the study area, are as follows:

- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions.
- Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions.
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions.

The TEC described as the Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion is also known to occur in the study area between approximately KP40 and KP60 (Bell et al. 2012).

An additional eight TECs are considered to have potential to occur in the study area.

One threatened aquatic ecological community (Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River) listed under the FM Act is known to occur within the study area.

An initial roadside review of the preliminary pipeline alignment indicates that the extent of native vegetation is significantly less than the NSW catchment-wide vegetation mapping indicates. The preliminary pipeline alignment traverses a number of ecological communities which vary from highly degraded to degraded to relatively intact, generally where they persist in road reserves, travelling stock routes, Crown land and as large patches on freehold land. As noted above, detailed field survey and assessment is required to confirm the extent of threatened communities within the study area.

Threatened Species

The review of databases and state vegetation mapping identified a total of 46 threatened fauna species, 17 threatened flora species, seven threatened fish, 13 threatened ecological communities and one threatened aquatic ecological community listed under the TSC Act as occurring, or having the potential to occur, within the study area (refer Attachment 1).

Of the identified threatened species, four are listed as Critically Endangered, namely *Anthochaera phrygia* (Regent Honeyeater), *Pachycephala rufogularis* (Red-lored Whistler), *Galaxias rostratus* (Flathead Galaxias) and *Myriophyllum implicatum* (a wetland herb).

Wetlands

No Ramsar wetlands have been identified within the study area. The closest Ramsar wetland is the Macquarie Marshes, located approximately 34km to the northwest of the preliminary pipeline alignment at the closest point, and approximately 65km downstream of the main crossing point with the Macquarie River. The next closest Ramsar sites are the Hattah-kulkyne lakes near Mildura, Victoria, and the Riverland Ramsar site near Renmark, South Australia. Both of these Ramsar sites are more than 400km from the study area.

The broader mapped extent of the Macquarie Marshes wetland (Macquarie Marshes (NSW009) DIWA Wetland) extends from within the study area to over 168 km to the northwest and includes the Macquarie Marshes Ramsar site and Macquarie Marshes Nature Reserve (refer Figure 7-3). The Macquarie Marshes Adaptive Environmental Management Plan (DECCW, 2010) identifies the ecological assets and values of the Macquarie Marshes wetland as defined from a review of the ecological system, ecological outcomes and the water requirements to achieve them. The plan identifies the southern extent of the wetland as being on the Macquarie River immediately upstream of Marebone Weir (refer Figure 7-3). At the crossing point of the Macquarie River the preliminary pipeline alignment is located approximately 19km upstream from Marebone Weir.

Protected Areas

With respect to tenure, there are two Nature Reserves, three State Conservation Area and two National Parks partially located within the study area. However, the preliminary pipeline alignment does not intersect any of these reserves. Similarly, there are 13 State Forests within the study area which are not intersected by the preliminary alignment. There are 124 TSRs within the study area which are intersected by the preliminary pipeline alignment for 7.8 km of its length (2%). While TSRs are not afforded the same protection as National Parks or State Forests, they can represent undisturbed remnants in largely cleared agricultural landscapes and are therefore important for the protection of biodiversity values.

7.1.1.2 Potential Impacts

Construction of the proposed gas pipeline requires the clearing of vegetation within the nominal 30m ROW and excavation of a trench of up to 0.7m width to a depth of generally about 1.5m depending on depth of burial and pipe diameter. Operation of the pipeline requires the proposed gas pipeline easement to be kept clear of all large regrowth vegetation.

The potential impacts that may occur to biodiversity as a result of construction and operation of the pipeline may include:

- Loss of remnant native vegetation, flora species and loss and/or disturbance of flora and fauna habitat.
- Loss or disturbance of aquatic flora and fauna habitat associated with wetlands and major watercourses.
- Soil loss and/or compaction as a result of clearing, trenching and plant, equipment and vehicle movements.

- Introduction and/or spread of pest species (e.g. weeds, feral animals) directly due to importation of weed species or indirectly due to removing competing native vegetation and disturbance of soil and dormant seed.
- Fauna mortality as a result of increased vehicle movements.

7.1.1.3 *Proposed management measures*

The key management measure is avoidance of environmentally sensitive areas and minimisation of native vegetation clearing. This has been taken into account in the selection process for the preliminary pipeline alignment. Minimising the width of the construction ROW to 30m also minimises vegetation clearing and potential adverse impacts.

Further assessment will include:

- More detailed review of vegetation mapping, threatened terrestrial and aquatic flora and fauna.
- Targeted field surveys in constrained areas to verify the actual presence of species and the viability of further avoidance.
- Identification of management measures to avoid, minimise or mitigate potential impacts to biodiversity.
- Identification of suitable offsets for unavoidable impacts on significant biodiversity.

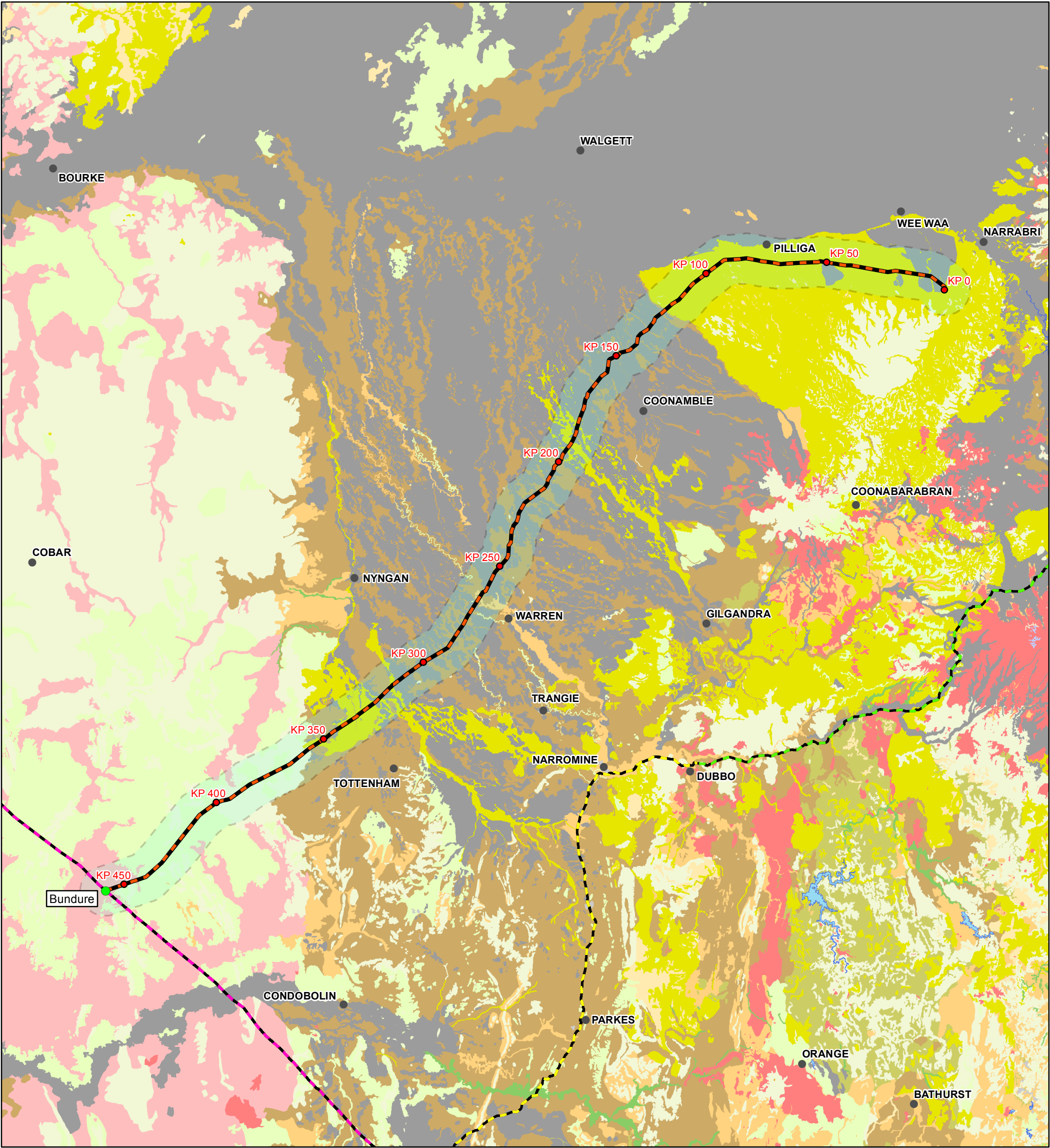
7.1.2 Soils and Geology

7.1.2.1 *Existing environment*

The preliminary pipeline alignment traverses three major geological formations – alluvial deposits, colluvial deposits and sedimentary rock. Sedimentary rock interspersed with colluvial deposits is traversed northeast of the Castlereagh River as the preliminary pipeline alignment runs north and west of the Pilliga West National Park. The expansive floodplains of the Castlereagh River, Macquarie River and Bogan River are underlain by alluvial deposits from the Quaternary period. South of the Bogan River, the preliminary pipeline alignment traverses sedimentary rock from various geological periods. In this area the preliminary pipeline alignment also traverses a band of granite formations from the Silurian period which outcrop as low hills. These formations are interspersed with alluvial and colluvial deposits.

Over the preliminary pipeline alignment the soil characteristics vary considerably (refer to Figure 7-2) but can be collated into key groups to assist in the identification of management measures. The predominant soil types are vertosols and sodosols. These soil groups cover over 50% of the preliminary pipeline alignment with vertosols the most frequently occurring soil group in the northern part of the preliminary pipeline alignment. Vertosols are highly productive soils occurring on the alluvial plains of the Macquarie, Castlereagh and Bogan rivers. The Macquarie River irrigation schemes derive their productivity from the vertosol soils. Extensive areas of gilgai occur in the south between the Macquarie River and MSP. Gilgai or melon holes are natural depressions in the vertosol soils caused by shrinking and heaving of the cracking clays. Sodosols are variable soils that can be highly dispersive when

exposed to water. They are interspersed with the vertosols and occur mostly in the vicinity of the Pilliga West National Park and south of the Bogan River. South of the Bogan River, Sodosols give way to Chromosols which give way to Rudosols and Tenosols and finally Kandasols which are the predominant soil type in the last 50 km of the proposed pipeline. Characteristics of key interest for pipeline construction are salinity, dispersiveness and potential for erosion.



AREA OF DETAIL:

SCALE: 1:1,500,000 @ A3
GDA 1994 MGA Zone 55

LEGEND

- Populated Place
- KP point
- MSP Mainline Valve
- WSP Preliminary Alignment
- Moomba Sydney Pipeline
- Central West Pipeline
- Central Ranges Pipeline
- Environmental Study Area

Dominant Australian Soils Classification Order

- Calcarosols
- Chromosols
- Dermosols
- Ferrosols
- Hydrosols
- Kandosols
- Kurosols
- Kurosols, Natric
- Rudosols
- Rudosols (Alluvial)
- Rudosols and Tenosols
- Sodosols
- Tenosols
- Tenosols (Alluvial)
- Vertosols
- Water
- Not Accessed

PROJECT: WESTERN SLOPES PIPELINE

TITLE: Soils

SUBTITLE: Figure 7-2

DATE: 14/02/2017

DATA SOURCE:
Coffey ASC SoilTypes, Geoscience Australia.

DOCUMENT NUMBER: 560-MAP-P-015

0.1	ISSUED FOR USE	MB	SRA	TH	JF	14/02/17
Revision	Description	Drawn	Checked	QC	Approved	Date

7.1.2.2 *Potential Impacts*

Adverse impacts to soils and geology along the preliminary pipeline alignment that may occur as a result of construction and operation of the gas pipeline could include:

- Loss of topsoil and increased erosion potential due to disturbance of topsoil and loss of vegetation.
- Soil inversion due to trenching leading to loss of productivity to high value agricultural land.
- Subsidence of the trench backfill.
- Changes to soil structure leading to less permeability due to compaction of soils by construction activities and vehicle movements.
- Tunnel erosion due to changed soil structure.

7.1.2.3 *Proposed management measures*

Soils and geology will be managed in accordance with the general provisions of the APGA Code, adapted as appropriate for the Project. During the EIS further assessment will be undertaken to identify location-specific management measure. Further assessment will include:

- Desktop studies of published information (e.g. geological mapping, geological sheets, soil landscape maps and acid sulphate soils risk maps).
- Classification of major land units and appropriate field verification and sampling as agreed with regulators.
- Identification of key soils units and constraints to inform management measures.
- Identification of slope stability and potential landslip areas, if any.
- Identification of high erosion potential areas.
- Consultation with landholders as to the appropriate management measures and rehabilitation for soils within high quality agricultural land.
- Identification of appropriate management measures to avoid, minimise or mitigate impacts on soils and geology during the construction and operation phases, including comprehensive erosion and sediment control measures.

Modern coatings on transmission pipelines are engineered to withstand a wide variety of environmental conditions including soil stress, soil born chemicals, extreme temperatures, salt water and other forms of corrosion. These safe and environmentally sound modern coatings will be specified for use in the Project.

7.1.3 Water Quality and Hydrology

7.1.3.1 *Existing environment*

The proposed gas pipeline is located within the Namoi, Castlereagh, Macquarie-Bogan and Lachlan catchments (refer to Figure 7-3).

The Namoi catchment borders the Gwydir and Castlereagh catchments and is bounded by the Great Dividing Range in the east, the Liverpool and Warrumbungle Ranges in the south and the Nandewar Ranges to the north. Elevations range from over 1500m in the south and east, to just 100m on the alluvial floodplain of the lower catchment west of Narrabri, where the proposed gas pipeline is to be located. The preliminary pipeline alignment runs south of the Namoi River and does not intersect any major rivers within the Namoi catchment although multiple named creeks will be crossed. Major water uses within the catchment include dryland and irrigated agriculture, livestock grazing and water supply for local councils (NSW Office of Water, 2011).

The Castlereagh catchment is bordered by the Namoi catchment to the east and Macquarie-Bogan catchment to the west. Elevations range from 850m in the east to less than 200m on the floodplains in the northwest of the catchment, generally where the proposed gas pipeline is located. The preliminary pipeline alignment crosses the Castlereagh River near Coonamble. Major water uses within the catchment are for stock watering and dryland agriculture as well as a number of local water utilities, particularly in the upper catchment. Surface water within the catchment is highly connected to the alluvial aquifers along the river bed, which provide an important source of groundwater.

The proposed pipeline is located within the north-western reaches of the Macquarie-Bogan catchment, intersecting the Macquarie River and associated broad floodplains and wetlands northwest of Warren and the Bogan River north of Tottenham. The Ramsar listed Macquarie Marshes are located on the Macquarie River between Warren and Carinda, approximately 65km downstream of the preliminary pipeline alignment, and 35km west of the preliminary pipeline alignment at its closet point. Major water users within the catchment include local councils, water utilities, dryland agriculture, livestock grazing and some irrigated agriculture.

The preliminary pipeline alignment traverses the Marthaguy, Tenandra and Trangie-Nevertire irrigation schemes which are located along either side of the Macquarie River near Warren. Several major channels are crossed along with a number of distributor channels. The preliminary pipeline alignment also crosses the Albert Priest Channel west of Warren near the pipeline crossing of Beleringar Creek.

The final 50km of the preliminary pipeline alignment is located within the northern area of the Lachlan catchment, approximately 50km north of the Lachlan River, at the closest point. No major watercourses are intersected by the preliminary pipeline alignment in the Lachlan catchment. Major water uses within the catchment include water utilities and local councils as well as agricultural uses.

7.1.3.2 *Potential Impacts*

Gas transmission pipelines are buried with varying depths of cover (refer Table 3-1). Typically the total depth of the trench will be around 1.5m which is insufficient to adversely interfere with aquifers.

At watercourse crossings the pipe will be buried at greater depth than the typical total trench depth of 1.5m. Installation methods will vary depending upon the nature of the watercourse (i.e. ephemeral or permanent water), geomorphology of the watercourse and the width of the stream bed. Water usage for pipelines is primarily associated with hydrostatic testing and dust suppression.

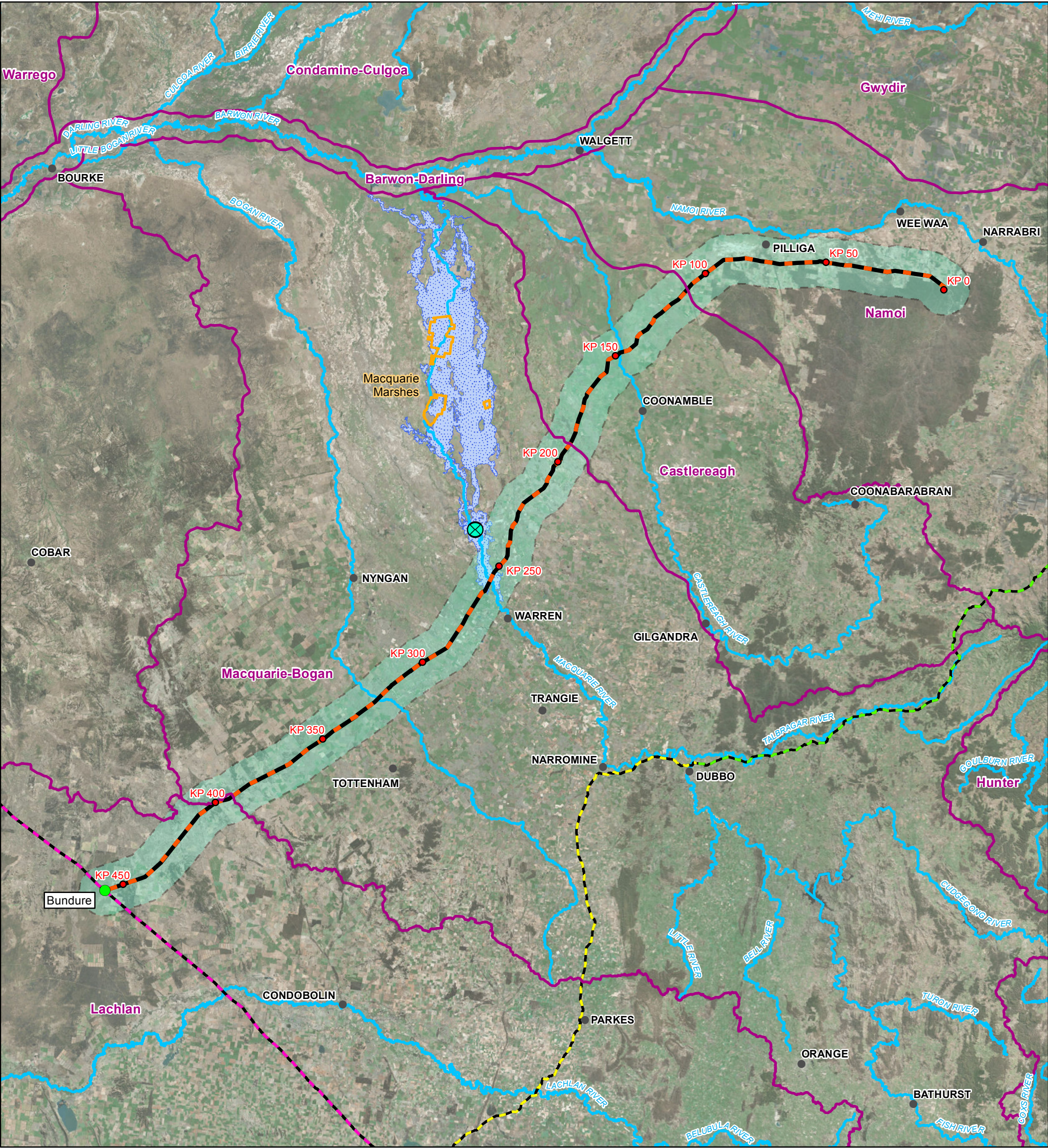
Potential impacts on water quality and hydrology as a result of construction of the proposed gas pipeline are expected to be short term and may include:

- Localised reduced water quality as a result of erosion and increased turbidity.
- Surface water contamination due to fuel release resulting from a vehicle accident.
- Temporary impacts to irrigation channels and flood irrigated laser-graded paddocks during construction.
- Changes to stream flow due to disturbance of watercourse bed and banks.
- Changes in flooding regimes due to altered water velocities and obstacles to overland flow.
- Where agreed to by the relevant owner of the water and subject to obtaining required statutory approvals, temporary use of locally available water supplies to provide construction water.

7.1.3.3 *Proposed management measures*

Watercourse crossings will be managed in accordance with the general provisions of the APGA Code, adapted as appropriate for the Project. Assessment of the potential impacts of the Project on water quality and hydrology will include:

- Identification of sensitive surface water and groundwater reserves along the preliminary pipeline alignment.
- Selection of a suitable construction methodology for each watercourse crossing.
- Consultation with landholders on the appropriate construction methodology to cross irrigation channels in order to minimise impacts and disruption.
- Impact of construction and operation on aquatic environments (refer Section 7.1.1).
- Identification of location specific management measures to avoid or mitigate identified impacts, including comprehensive erosion and sedimentation control measures.
- Identification of water resources and setting up of temporary storage facilities if required for hydrostatic testing and dust suppression.
- Management of hydrostatic test water to ensure no contamination of land or water.



AREA OF DETAIL:

SCALE: 1:1,500,000 @ A3

GDA 1994 MGA Zone 55

LEGEND

- Populated Place
- KP point
- MSP Mainline Valve
- ⊗ Marebone Weir
- WSP Preliminary Alignment
- Moomba Sydney Pipeline
- Central West Pipeline
- Central Ranges Pipeline
- Major Rivers
- NSW Catchment Boundary
- Ramsar Site
- Environmental Study Area
- NSW Wetlands

PROJECT: WESTERN SLOPES PIPELINE

TITLE: Watercourses and Catchments

SUBTITLE: Figure 7-3

DATE: 14/02/2017

DATA SOURCE:
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DOCUMENT NUMBER: 560-MAP-P-014

0.1	ISSUED FOR USE	MB	SRA	TH	JF	14/02/17
Revision	Description	Drawn	Checked	QC	Approved	Date

7.1.4 Traffic and Transport Infrastructure

7.1.4.1 *Existing environment*

The preliminary pipeline alignment traverses a number of major roads and highways (Mitchell Highway, Castlereagh Highway, Cypress Way, Pilliga Road, Martaguy Road, Carinda Road, Bogan Way and Henry Parkes Way) and numerous LGA controlled roads. Construction across these roads will either be by open cut crossing or boring.

Access to the preliminary pipeline alignment will be by a combination of major and minor roads, and private access roads depending on the final location of access points to the ROW and workers camps.

7.1.4.2 *Potential Impacts*

Potential impacts associated with the construction of the proposed gas pipeline are:

- Construction activities across, and/or within, road reserves disrupting/delaying traffic movement.
- Temporary increased traffic movement on local roads and private access roads, including heavy vehicle movements and light vehicle traffic associated with workers camps.
- Damage to roads and access tracks during wet weather.
- Safety of other road users.

7.1.4.3 *Proposed management measures*

A traffic management plan will be developed specific to the Project. The management measures required will be determined through preparation of the management plan and will include:

- Identification of Project-specific traffic generation.
- A review of existing traffic volumes.
- Assessment of impact of Project traffic on existing infrastructure.
- Consultation with road authorities.

7.1.5 Land use and Agriculture

7.1.5.1 *Existing environment*

The preliminary pipeline alignment traverses a mixture of land uses all of which are of a rural nature. Population centres within proximity of the preliminary alignment include Narrabri, Pilliga, Coonamble and Warren. Pilliga is the only one of these localities within 10km of the preliminary pipeline alignment.

The most dominant land uses are open grazing followed by areas of dryland cropping and improved pasture. More intensive cropping activities are generally limited to the areas fed by irrigation schemes northwest and southwest of Warren.

Dwellings are located on a dispersed basis throughout the study area with density reflective of the prevailing lot sizes which generally increase from east to west.

As mentioned in Section 7.1.1.1, there are a number of areas of protected estate located within the study area however none are intersected by the preliminary pipeline alignment.

Conflicting resource tenures have been avoided across the length of the preliminary pipeline alignment with intersects limited to petroleum and mineral exploration tenements.

Numerous powerlines, water infrastructure and telecommunications cables will likely be intersected along the pipeline alignment. These crossings will be identified in more detail in the EIS.

7.1.5.2 *Potential Impacts*

Potential impacts on land use as a result of the proposed gas pipeline may include:

- Temporary disruption to cropping and grazing during construction.
- Short and/or long term loss of productivity due to poor soil management.
- Restricted and/or revised access to properties during construction and/or operation.
- Restrictions to the type of activities and structures over the pipeline.
- Introduction of pest species (refer Section 7.1.1.2).

7.1.5.3 *Proposed management measures*

Efforts have been made during the alignment selection process to minimise the impacts on agricultural operations by positioning the preliminary pipeline alignment adjacent to existing property or paddock boundaries. Similarly effort has been made to achieve appropriate separation between dwellings and the preliminary pipeline alignment.

Land use will be characterised along the entire length of the preliminary pipeline alignment and specific management measures will be formulated taking into consideration the nature of the land use and property management information gained through detailed landholder consultation. A detailed management plan will be prepared addressing potential impacts on agricultural land.

Impacts on existing agricultural operations will be subject to detailed assessment during the preparation of the EIS to support the development of appropriate management measures.

7.1.6 Heritage

This section addresses both Aboriginal and non-Aboriginal heritage.

7.1.6.1 *Existing environment*

No known World Heritage Areas or National Heritage Properties are intersected by the preliminary pipeline alignment. No historical sites, based on a review of the NSW State Heritage Register and NSW Local Environment Plan Heritage sites, have been

identified in relation to the preliminary pipeline alignment. The closest heritage site to the preliminary pipeline alignment is the Milchomi coaching stables, located approximately 900m northwest of KP96. No impacts to the heritage values of this site are expected.

7.1.6.2 *Potential Impacts*

Potential impacts to cultural heritage as a result of construction may include:

- Disturbance of areas of known heritage (e.g. archaeological deposits, scar trees) due to vehicle movements, clearing the pipeline ROW and trench excavation.
- Impacts on the amenity of heritage areas.
- Unexpected disturbance of previously unknown cultural heritage sites.

7.1.6.3 *Proposed management measures*

Heritage assessments, including field survey, will be undertaken to identify Aboriginal and non-Aboriginal heritage sites along and adjacent to the preliminary pipeline alignment. The assessment will include searches of known records and consultation with all registered Aboriginal Parties including the applicable Local Aboriginal Land Councils and interested Native title parties. The key mitigation measure will be avoidance where this is practicable. Management measures for previously unidentified heritage sites or material uncovered during construction will also be implemented.

7.1.7 Hazard and Risk

The proposed gas pipeline has the potential to pose hazards and risks during both construction and operation. AS2885 requires comprehensive assessment of all risks posed by the Project to the environment and by the environment to the proposed gas pipeline.

Risk Assessment will be undertaken in accordance with the requirements of AS2885 and the APA Safeguard Management System. The APA Safeguard Management System provides a framework by which the processes relating to APA's Health, Safety and Environment activities are written, approved, issued, communicated, implemented and controlled. The hazard and risk assessment process will include:

- Identification of hazards.
- Identification of the consequences of the hazards.
- Identification of the proposed safeguards to eliminate, reduce or manage identified hazards.
- Qualitative assessment of the potential severity of the hazards.
- Qualitative assessment of the potential frequency of the hazards.
- Qualitative assessment of the risk posed by the hazard using a risk matrix.
- Where appropriate, quantitative assessment of the risk posed by the hazard (consequence modelling).
- Ranking risks into extreme, high, intermediate, low and negligible.

The outcome of the risk assessment will be to achieve risks 'As Low As Reasonably Practical' (ALARP). Low and negligible risks require no further actions and can be managed through standard management measures. All other risks will require the development of specific management measures.

7.2 Other Environmental Issues

7.2.1 Noise and Air Quality

7.2.1.1 *Existing environment*

The preliminary pipeline alignment traverses predominantly agricultural land. Existing noise sources will vary along the preliminary pipeline alignment depending on proximity to built-up areas and major highways. Background noise levels have not as yet been determined but the majority of the preliminary pipeline alignment is expected to be consistent with quiet, rural amenity generally impacted by agricultural machinery, traffic and transport noise.

Air quality in the area would be predominantly affected by agricultural activities.

7.2.1.2 *Potential Impacts*

The preliminary pipeline alignment largely avoids populated areas and rural residences. Potential noise impacts on populated centres and isolated residences are likely to be related to construction activities and be a function of distance from the construction works. Minimal noise occurs during normal operation of a gas transmission pipeline.

Potential air quality impacts associated with construction and operation of gas transmission pipelines are most often associated with dust resulting from disturbance of the land and vehicle movements on unsealed surfaces. Minor sources of potential air impacts relate to vehicle exhaust emissions.

7.2.1.3 *Proposed management measures*

Noise and air will be managed in accordance with the general provisions of the APGA Code, adapted as appropriate for the Project. Assessment during the EIS will include:

- Identification of sensitive receptors.
- Identification of construction processes and equipment combinations to be used.
- Identification of feasible and reasonable noise mitigation and management measures.
- Assessment of meteorological conditions in relation to dust management (e.g. prevailing wind and rainfall data).
- Management of dust during construction (e.g. wetting).
- Management measures for maintenance of vehicles to minimise exhaust emissions.

7.2.2 Waste Management

7.2.2.1 Existing environment

Existing sources of waste within the study area typically include:

- General domestic waste (including sewage).
- Commercial and hazardous wastes (including from hospitals).
- Agricultural waste (including pesticides and herbicides).

7.2.2.2 Potential Impacts

The main wastes generated by the proposed gas pipeline occur during the construction phase of the Project. Typical waste streams for both the construction and operation phases of pipeline construction are provided in Table 7-1.

Table 7-1 Pipeline Waste

Type
<ul style="list-style-type: none"> • Construction Waste
<ul style="list-style-type: none"> • Solid inert – crates, pallets, cartons, drums, synthetic fibres, waste garnet.
<ul style="list-style-type: none"> • Recyclable – tyres.
<ul style="list-style-type: none"> • Hazardous – used chemicals, fuels, engine coolants, batteries, spent X-ray film, cleaning agents.
<ul style="list-style-type: none"> • Drilling muds/cuttings for horizontally directionally drilled crossings.
<ul style="list-style-type: none"> • Operational Waste
<ul style="list-style-type: none"> • Filters (non-oily).
<ul style="list-style-type: none"> • Sludge from residues in the pipe during pigging.
<ul style="list-style-type: none"> • Packaging (maintenance).

Potential impacts from these waste streams are typically associated with disposal and availability of local resources to handle the waste stream/volume.

If mishandled wastes may result in:

- Contamination of soils and water.
- Increases in pest/feral populations (poor storage).
- Littering.
- Odours.

- Impacts on visual amenity.

7.2.2.3 *Proposed management measures*

Waste will be handled in accordance with standard APA procedures and the APGA Code. Actions will include:

- Classification of waste streams and clarification of waste volumes.
- Identification of all reuse/recycle opportunities taking into account availability of facilities in the area.
- Identification of appropriate disposal locations and consultation with relevant LGAs.

7.2.3 Land Contamination

7.2.3.1 *Existing environment*

No known contaminated sites are traversed by the preliminary pipeline alignment. Landholder negotiations will include clarification of the potential for contamination associated with land uses (e.g. cattle dips, waste burial).

7.2.3.2 *Potential Impacts*

- **Construction** - Contaminated land could potentially be encountered and disturbed due to pipeline trenching and above-ground foundation excavation works. In addition, construction activities have some potential to result in contamination of soil or water due to chemical and/or fuel spills and inappropriate waste management.
- **Operation** – Maintenance procedures may incur a low risk of potential land contamination due to fuels and oil spills.

7.2.3.3 *Proposed management measures*

Prevention of land contamination will be achieved through following APA procedures and the APGA Code. Actions will include:

- Searching the contaminated land record (database) maintained by the NSW EPA.
- Clarifying potential contaminated sites with landowners.
- Management of chemical and fuel storage including the use of bunding.
- Waste management in accordance with Section 7.2.1.

7.2.4 Infrastructure

7.2.4.1 *Existing environment*

The proposed gas pipeline will intersect and cross existing infrastructure and utilities including major and minor roads, other pipelines, telecommunications cables and electricity supply lines.

The requirements for the Project to utilise existing infrastructure for construction and operation of the proposed gas pipeline have not been identified at this stage but may include:

- Water supplies for camp use, dust control and hydrostatic testing of the pipeline.
- Sewage facilities for the disposal of sewerage waste generated by the construction activities.
- Power for use in construction camps (although likely to be via onsite temporary diesel generators).
- Communications infrastructure.
- Waste disposal facilities.

7.2.4.2 *Potential Impacts*

Potential impacts on local infrastructure could include:

- The need to source water for construction purposes (e.g. workforce, dust suppression, HDD and boring).
- Increased demand on the local sewage network due to the presence of increased personnel in the area.
- Increased demand on local landfill for waste disposal.

7.2.4.3 *Proposed management measures*

The assessment of the Project will identify all Project needs in relation to infrastructure and review the potential impacts of these needs. Local governments will be consulted in relation to appropriate management measures, particularly in relation to waste disposal. Power supply requirements will be assessed during the design phase. Reliable sources of mains power will be utilised where available. Where not available, short term diesel generation will be deployed.

7.2.5 Greenhouse Gas

7.2.5.1 *Existing environment*

The existing environment within the Project area is predominantly rural with greenhouse gas emissions being associated with agricultural production (e.g. burning harvesting residue), agricultural plant and equipment and vehicle usage on roads in the area.

7.2.5.2 *Potential Impacts*

Greenhouse gas emissions associated with construction of the pipeline relate to fuel consumption in plant, machinery and vehicles. During operation greenhouse gas emissions could result from emergency or upset venting of gas from the pipeline.

Natural gas is considered a cleaner burning fuel with increased energy conversion over coal and diesel. The potential to provide improved gas availability within NSW

could lead to the increased availability of a cleaner fuel source for industry in the State.

7.2.5.3 *Proposed management measures*

Management of greenhouse gas emissions will be achieved through the implementation of APA's standard procedures and the APGA Code. This will include ensuring all vehicles and machinery are maintained in good working condition and minimising the venting of gas during operation of the pipeline.

7.2.6 Socio-economic

7.2.6.1 *Existing environment*

As previously discussed the preliminary pipeline alignment will pass through the LGAs of Bogan, Cobar, Coonamble, Lachlan, Narrabri, Walgett and Warren (refer Table 4-2).

The populations in the LGAs vary from 12,975 in the Narrabri LGA to 2,758 in the Warren LGA.

Statistical data for these LGAs (ABS, 2011) shows that in all but Cobar the largest employer was the sheep, beef cattle and grain farming sector closely followed by School Education. The largest employer in the Cobar LGA was Metal Ore Mining (27.3%). 'Metal Ore Mining' was also a major employer in the Bogan LGA (9.9%). Other key employers were 'Local Government Administration' and 'Supermarket Grocery'. 'Other crop growing', 'agriculture and fishing support services' and 'cafes, restaurants and takeaways food services' were key employers in the Narrabri LGA.

7.2.6.2 *Potential Impacts*

Potential benefits associated with the Project may include:

- Employment opportunities during construction particularly for non-specialised activities (e.g. clearing and grading, water cartage for dust suppression).
- Approximately 4-5 long terms jobs during the Project's operational phase.
- Direct and indirect benefits to the local economy through the use of local goods and service providers during both the construction and operation phases.
- Improved gas supply in NSW.

Potential adverse impacts may include:

- Interruptions to the movement of people during the construction phase.
- Reduced privacy on private property due to the temporary presence of construction personnel and intermittent access of operational personnel.
- Loss of productivity during construction.
- Temporary amenity issues stemming from other impacts such as noise, vibration, dust and increased traffic.

7.2.6.3 *Proposed management measures*

An assessment of the socio-economic impacts and benefits will be carried out. The socio-economic assessment will include assessment of the economic impact of the proposed gas pipeline during both the construction and operational phases. The benefits from the construction phase would be considered as well as the annual ongoing benefits of operation of the pipeline.

The economic impact of construction will be analysed in respect of employment opportunities, both direct and indirect, and impacts, both short term and long term, on agricultural practices in the area. Similarly, the economic impact of operation will be analysed in relation to contribution to employment and economic activity in the region.

7.2.7 Visual Amenity

7.2.7.1 *Existing environment*

The preliminary pipeline alignment primarily traverses agricultural land. Towns within the area include Narrabri, Coonamble, Warren and Gilgunnia with Coonamble being closest to the preliminary pipeline alignment. The visual setting within the overall Project area is generally representative of a productive rural environment. Sensitive receptors and areas of scenic value within the Project area have not yet been identified but it is noted that the Siding Spring Observatory is located approximately 95km southeast of the alignment at its nearest point.

7.2.7.2 *Potential Impacts*

Potential impacts to the visual amenity of the area will primarily be associated with the clearing of vegetation and short-term construction activities. Light pollution during construction activities is unlikely as night time work will be minimal with limited potential to impact the Dark Sky Region centred upon the Siding Spring observatory, as described in the Dark Sky Planning Guideline (Department of Planning and Environment 2016). The long-term visual impacts of the proposed gas pipeline could include changes in the vegetation cover, the presence of marker posts along the easement and the presence of above ground infrastructure.

7.2.7.3 *Proposed management measures*

Assessment of the visual impact of the proposed gas pipeline within the landscape will take into account:

- Proximity of sensitive receptors to the pipeline construction ROW.



- Proximity of areas of scenic value and the impacts associated with vegetation removal.
- Identification of appropriate management and mitigation measures to minimise impacts on the visual amenity.



ATTACHMENT 1 - THREATENED SPECIES LISTS

Likelihood of Occurrence within the Study Area

An assessment of likelihood of occurrence was made for threatened and migratory species, populations and ecological communities identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposed study area, and professional judgement. The terms for likelihood of occurrence are defined below:

- 'known' = the species was or has been observed in the study area
- 'likely' = a medium to high probability that a species uses the study area
- 'potential' = suitable habitat for a species occurs on the study area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- 'unlikely' = a very low to low probability that a species uses the study area
- 'no' = habitat in the study area and in the vicinity is unsuitable for the species.

Key to the table:

- TSC Act = Listing under the NSW Threatened Species Conservation Act 1995
- EPBC Act = Listing under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999
- CE = Critically Endangered
- E = Endangered (EPBC Act)
- E1 = Endangered (TSC Act)
- E2 = Endangered Population (TSC Act)
- E4 = Extinct (TSC Act)
- V = Vulnerable
- M = Migratory
- Mar - Marine
- C = Camba (China bilateral migratory bird agreement)
- J = Jamba (Japan bilateral migratory bird agreement)
- K = Rokamba (Republic of Korea bilateral migratory bird agreement)
- Bonn = Convention on the Conservation of Migratory Species of Wild Animals

Threatened fauna species

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
Amphibians										
<i>Crinia sloanei</i>	Sloane's Froglet	V		Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Yes	Good	Yes	No	Likely
Birds										
<i>Anseranas semipalmata</i>	Magpie Goose	V		In NSW, found in central and northern parts of the state, with vagrants as far as south-eastern NSW.	Shallow wetlands, floodplains, grasslands, pastures, dams and crops.	Yes	Good	Yes	Yes	Likely
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions.	Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of <i>Casuarina cunninghamiana</i> (River Oak).	Yes	Marginal	Yes	No	Potential

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Apus pacificus</i>	Fork-tailed Swift		C, J, K, Mar	Recorded in all regions of NSW.	Riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	Yes	Good	Yes	Yes	Yes
<i>Ardea alba</i>	Great Egret		C, J, Mar	Widespread, occurring across all states/territories. Also a vagrant on Lord Howe and Norfolk Island.	Swamps and marshes, grasslands, margins of rivers and lakes, salt pans, estuarine mudflats and other wetland habitats.	Yes	Good	Yes	No	Likely
<i>Ardea ibis</i>	Cattle Egret		C, J, Mar	Widespread and common across NSW.	Grasslands, wooded lands and terrestrial wetlands.	Yes	Good	Yes	No	Likely
<i>Ardeotis australis</i>	Australian Bustard	E1		In NSW, mainly found in the north-west corner and less often in the lower western and central west plains regions. Occasional vagrants as far east as the western slopes and Riverine plain.	Tussock and hummock grasslands, low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	Yes	Marginal	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		Widespread from coast to inland, including the western slopes of the Great Dividing Range and farther west. It is sparsely scattered in, or largely absent from, much of the Upper Western region.	Woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests.	Yes	Good	Yes	Yes	Yes
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west.	Permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. (bullrushes) and <i>Eleocharis</i> spp. (spikerushes).	Yes	Good	Yes	No	Likely
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1		In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt.	In NSW, it occurs in lowland grassy woodland and open forest.	Yes	Good	Yes	Yes	Yes
<i>Calidris ferruginea</i>	Curlew Sandpiper	E1	CE	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin.	Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Yes	Marginal	No	No	Unlikely
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina.	Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Chthonicola sagittata</i>	Speckled Warbler	V		From south-eastern Qld, the eastern half of NSW and into Victoria, as far west as the Grampians, mostly on hills and tablelands of the Great Dividing Range and rarely on coast.	Eucalyptus-dominated communities with a grassy understorey and sparse shrub layer, often on rocky ridges or in gullies.	Yes	Good	Yes	Yes	Yes
<i>Circus assimilis</i>	Spotted Harrier	V		Found throughout the Australian mainland, except in densely forested or wooded habitats, and rarely in Tasmania.	Grassy open woodland, inland riparian woodland, grassland, shrub steppe, agricultural land and edges of inland wetlands.	Yes	Good	Yes	Yes	Yes
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell.	Eucalypt woodlands and dry open forest.	Yes	Good	Yes	Yes	Yes
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		Distribution in NSW is nearly continuous from the coast to the far west.	Inhabits eucalypt forests and woodlands, mallee and <i>Acacia</i> woodland.	Yes	Good	Yes	Yes	Yes
<i>Epthianura albifrons</i>	White-fronted Chat	V		Occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state.	Saltmarsh vegetation, open grasslands and sometimes low shrubs bordering wetland areas.	Yes	Marginal	Yes	No	Likely
<i>Falco subniger</i>	Black Falcon	V		Sparsely distributed in NSW, occurring mostly in inland regions.	Woodland, shrubland and grassland, especially riparian woodland and agricultural land. Often associated with streams or wetlands.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Gallinago hardwickii</i>	Latham's Snipe		C,J,R, Mar	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW.	Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Yes	Marginal	Yes	No	Potential
<i>Glossopsitta pusilla</i>	Little Lorikeet	V		In NSW, found from the coast westward as far as Dubbo and Albury.	Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	Yes	Good	Yes	Yes	Yes
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas.	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Yes	Good	Yes	Yes	Yes
<i>Grus rubicunda</i>	Brolga	V		Sparsely distributed across the southern part of its range, which includes central NSW to western Victoria.	Open wetlands, grassy plains, coastal mudflats and irrigated croplands and, on the coast, mangrove-studded creeks and estuaries.	Yes	Marginal	Yes	Yes	Yes
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	C	Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia.	Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.	Yes	Marginal	Yes	No	Potential

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Hieraaetus morphnoides</i>	Little Eagle	V		Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment.	Open eucalypt forest, woodland or open woodland, including sheoak or <i>Acacia</i> woodlands and riparian woodlands of interior NSW.	Yes	Good	Yes	Yes	Yes
<i>Hirundapus caudacutus</i>	White-throated Needletail		C,J,K	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide.	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Yes	Good	Yes	Yes	Yes
<i>Leipoa ocellata</i>	Malleefowl	E1	V	Arid and semi-arid zones. In NSW, populations occur in the south west mallee centred on Mallee Cliffs NP and extending east to near Balranald; in the Scotia mallee west of the Darling River; and in the Goonoo forest near Dubbo. Recorded less recently in the Pilliga forests, around Cobar and Goulburn River NP.	Predominantly mallee communities. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands, or other woodlands dominated by Mulga or native Cypress Pine species.	Yes	Marginal	Yes	No	Potential
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	V		In NSW, occurs across the arid and semi-arid inland, as far east as Bourke and Griffith, and sporadically even further east.	Wide range of treed and treeless inland habitats, always within easy reach of water.	Yes	Good	Yes	Yes	Yes
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V		Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i> .	Open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Motacilla flava</i>	Yellow Wagtail		C,J,K	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.	Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Yes	Marginal	Yes	No	Potential
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		Bonn, Mar	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains.	Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Yes	Marginal	Yes	No	Potential
<i>Neophema pulchella</i>	Turquoise Parrot	V		Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range.	Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.	Yes	Good	Yes	Yes	Yes
<i>Ninox connivens</i>	Barking Owl	V		Wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests.	Woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest.	Yes	Good	Yes	Yes	Yes
<i>Pachycephala rufogularis</i>	Red-lored Whistler	CE	V	Two isolated populations in NSW: in and around Round Hill and Nombinnie Nature Reserves in central NSW; and in the Scotia Mallee in the far southwest corner of the state.	Mallee woodland with a shrub layer, usually of Broombush and native pine such as <i>Callitris verrucosa</i> (Mallee Pine).	Yes	Marginal	Yes	No	Potential
<i>Pedionomus torquatus</i>	Plains-wanderer	E1	CE	Most recent records in NSW are from the western Riverina, in an area bounded by Hay and Narrandera in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east.	Semi-arid, lowland native grasslands that typically occur on hard red-brown soils.	No	Marginal	Yes	No	Unlikely

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Plegadis falcinellus</i>	Glossy Ibis		C	Recorded over much of NSW. Spring/summer breeding migrant to southern Murray-Darling region and Macquarie Marshes.	Edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. Occasionally estuaries, deltas, saltmarshes and coastal lagoons.	Yes	Marginal	Yes	Yes	Yes
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	In NSW, occurs on inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems.	Box-gum woodland, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V		In NSW, occurs on the western slopes of the Great Dividing Range, and as far as Louth and Balranald on the western plains. Also occurs in woodlands in the Hunter Valley and in some locations on the north coast	Open woodland habitats; favours Box-gum woodlands on the slopes and Box-cypress and open Box woodlands on alluvial plains.	Yes	Good	Yes	Yes	Yes
<i>Rostratula australis</i>	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.	Swamps, dams and nearby marshy areas.	Yes	Marginal	No	No	Unlikely
<i>Stagonopleura guttata</i>	Diamond Firetail	V		Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland.	Grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.	Yes	Good	Yes	Yes	Yes
Mammals										
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Yes	Good	No	No	Unlikely

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Chalinolobus picatus</i>	Little Pied Bat	V		Inland Qld and NSW (including Western Plains and slopes) extending slightly into SA and Victoria.	Dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands.	Yes	Good	Yes	Yes	Yes
<i>Macropus dorsalis</i>	Black-striped Wallaby	E1		Occurs on both sides of the Great Divide in northern NSW. On the north west slopes it occurs in Brigalow remnants to south of Narrabri. On the north coast it is confined to the upper catchments of the Clarence and Richmond Rivers.	On the north west slopes, uses brigalow, ooline and semi-evergreen vine thicket. On the north coast, uses dry rainforest and moist eucalypt forest with a rainforest understorey or a dense shrub layer.	Yes	Good	Yes	Yes	Yes
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	Distribution coincides approximately with the Murray Darling Basin; the Pilliga Scrub region is the distinct stronghold for this species.	Mallee, <i>Allocasuarina luehmannii</i> (bulloke) and box eucalypt-dominated communities, especially box/ironbark/cypress-pine vegetation.	Yes	Good	Yes	No	Likely
<i>Petaurus norfolcensis</i>	Squirrel Glider	V		Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern Qld to western Victoria.	Mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Phascolarctos cinereus</i>	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands.	Eucalypt woodlands and forests.	Yes	Good	Yes	Yes	Yes
<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V	V	Distribution restricted to the Pilliga region of NSW. However, a Pilliga Mouse was trapped in the Warrumbungles after a major wildfire in January 2013.	Heathy and shrubby woodland.	Yes	Marginal	Yes	Yes	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria.	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	No	Marginal	No	No	No
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW.	Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V		Found in a broad band on both sides of the Great Dividing Range south to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT.	Dry open forest and woodland, near cliffs or rocky overhangs, cliff-lines in wet eucalypt forest and rainforest.	Yes	Good	Yes	Yes	Yes
Reptiles										
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E1	V	Restricted to the North West Slopes and Plains of north-east NSW and south-east Qld, from the Ashford area west to Mungindi and Walgett in NSW and north to Dalby in Qld.	Grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. Also grassland areas and open paddocks with scattered trees.	Yes	Marginal	Yes	No	Potential
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V	V	In NSW, only known from the Central and Southern Tablelands, and the South Western Slopes.	Sloping, open woodland areas with predominantly native grassy groundlayers, rocky outcrops or scattered, partially-buried rocks.	No	Good	No	No	No
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V		In NSW, it occurs from the coast to the western side of the Great Divide as far south as Tuggerah. Historically recorded west to Mungindi and Quambone on the Darling Riverine Plains, across the North West Slopes, and the New England Tablelands.	Dry eucalypt forests and woodlands, cypress forest, rainforest and moist eucalypt forest.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Underwoodisa urus sphyrurus</i>	Border Thick-tailed Gecko	V	V	Found only on the tablelands and slopes of northern NSW and southern Qld, reaching south to Tamworth and west to Moree.	Forest and woodland areas with boulders and rock slabs, often on steep rocky or scree slopes.	Yes	Marginal	No	No	Unlikely

Threatened flora species

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Acacia curranii</i>	Curly-bark Wattle	V	V	In NSW, known from near Cobar south to Hillston area. Also in Gundabooka National Park near Bourke and Nombinnie Nature Reserve.	<i>Acacia</i> shrubland and mallee. Prefers acidic, skeletal soils in rocky habitats.	Yes	Good	Yes	No	Likely
<i>Austrostipa metatoris</i>	A spear-grass	V	V	Most records occur in the Murray Valley. Scattered records also occur in central NSW including Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee.	Sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils.	Yes	Good	Yes	No	Likely
<i>Bertya opposens</i>	Coolabah Bertya	V	V	In NSW, known only from a few scattered sites including Coolabah, south of Narrabri on the North West Slopes, Cobar, and the North Coast.	Stony mallee ridges and cypress pine forest on red soils.	Yes	Marginal	Yes	No	Potential
<i>Cadellia pentastylis</i>	Ooline		V	In NSW, found along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield.	Dry rainforest, semi-evergreen vine thickets and sclerophyll communities. Usually on low- to medium-nutrient soils of sandy clay or clayey consistencies.	Yes	None	Yes	No	No

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Commersonia procumbens</i>		V	V	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Recent collections made from the Upper Hunter region, and additional populations found in Goonoo SCA in response to the 2007 fires.	Recorded in <i>Eucalyptus dealbata</i> and <i>Eucalyptus sideroxylon</i> communities, <i>Melaleuca uncinata</i> scrub, under mallee eucalypts with a <i>Calytrix tetragona</i> understorey, and in a recently burnt Ironbark and <i>Callitris</i> area. Also in <i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> , <i>Eucalyptus dealbata</i> , <i>Eucalyptus albens</i> and <i>Callitris glaucophylla</i> woodlands north of Dubbo.	Yes	Good	Yes	Yes	Yes
<i>Cyperus conicus</i>		E1		Recorded in the Pilliga area of NSW.	Open woodland on sandy soil. Recorded from <i>Callitris</i> forest growing with <i>Cyperus gracilis</i> , <i>C. squarrosus</i> and <i>C. fulvus</i> .	Yes	Good	Yes	Yes	Yes
<i>Dichanthium setosum</i>	Bluegrass	V	V	In NSW, found on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes.	Cleared woodland, grassy roadside remnants and highly disturbed pasture, on heavy basaltic black soils and red-brown loams with clay subsoil.	Yes	Good	Yes	Yes	Yes
<i>Diuris tricolor</i>	Pine Donkey Orchid	V		Sporadically distributed on the western slopes of NSW, from south of Narrandera all the way to the north of NSW.	Grassy sclerophyll forest, often occurring with <i>Callitris</i> spp. (Cypress Pine). Sandy soils and red earth soil.	Yes	Good	Yes	Yes	Yes
<i>Eriocaulon australasicum</i>	Austral Pipewort		E	Known in NSW only from the Murray River towards junction of the Murrumbidgee.	Aquatic habitats with shallow water, including swamps and sedgelands.	Yes	Marginal	Yes	No	Potential

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Lepidium aschersonii</i>	Spiny Peppercress	V	V	In NSW, occurs in the marginal central-western slopes and north-western plains regions (and potentially the south western plains).	Found on ridges of gilgai clays dominated by <i>Acacia harpophylla</i> (Brigalow), <i>Casuarina cristata</i> (Belah), <i>Allocasuarina luehmannii</i> (Buloke) and <i>Eucalyptus microcarpa</i> (Grey Box).	Yes	Good	Yes	Yes	Yes
<i>Lepidium monoplacoides</i>	Winged Peppercress	E1	E	Semi-arid western plains regions of NSW. Large numbers of historical records (from Broken Hill, Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin) but few recent collections. (Hay Plain, south-eastern Riverina, and near Pooncarie).	Open woodland dominated by <i>Allocasuarina luehmannii</i> and/or eucalypts, wetland-grassland, or <i>Maireana pyramidata</i> shrubland. Occurs on seasonally moist to waterlogged sites, with heavy fertile soils.	Yes	Good	Yes	Yes	Yes
<i>Myriophyllum implicatum</i>		CE		In NSW, known only from the Pilliga National Park, south of Narrabri.	Moist situations, extending away from fresh water. NSW population found on a partly-inundated gilgai depression on cracking clay soil.	Yes	Marginal	Yes	No	Potential
<i>Philotheca ericifolia</i>			V	Known only from the upper Hunter Valley and Pilliga to Peak Hill district (between West Wyalong and the Pilliga Scrub).	Dry sclerophyll forest, heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops.	Yes	Marginal	Yes	No	Potential
<i>Polygala linariifolia</i>	Native Milkwort		E	North from Copeton Dam and the Warialda area to southern Queensland; also found on the NSW north coast near Casino and Kyogle, and there is an isolated population in far western NSW near Weebah Gate, west of Hungerford.	In the Pilliga area, this species has been recorded in Fuzzy Box woodland, White Cypress Pine-Bullock - Ironbark woodland, Rough-barked Apple riparian forb-grass open forest, and Ironbark - Brown Bloodwood shrubby woodland.	Yes	Good	Yes	Yes	Yes

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Pterostylis cobarensis</i>	Greenhood Orchid	V		In NSW, recorded from Bourke, Nyngan, Cobar, Nymagee, Warren, Gilgandra, Narrabri, Coonabarabran districts.	Eucalypt woodlands, open mallee or <i>Callitris</i> shrublands on low stony ridges and slopes in skeletal sandy-loam soils.	Yes	Good	Yes	Yes	Yes
<i>Swainsona murrayana</i>	Slender Darling Pea	V	V	Recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree.	Bladder saltbush, black box and grassland communities, remnant native grasslands or grassy woodlands on heavy clay-based soils, on level plains, floodplains and depressions.	Yes	Good	Yes	No	Likely
<i>Swainsona sericea</i>	Silky Swainson-pea	V		In NSW, recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. Also an isolated record from the far north-west of NSW.	Natural Temperate Grassland and <i>Eucalyptus pauciflora</i> (Snow Gum) Woodland on the Monaro, and Box-Gum Woodland in the Southern Tablelands and South West Slopes.	Yes	Marginal	Yes	Yes	Yes
<i>Tylophora linearis</i>		V	E	In NSW, found in the Barraba, Mendooran, Temora and West Wyalong districts in the northern and central western slopes. Records include Crow Mountain near Barraba, Goonoo, Pilliga West, Cumbil, and Eura State Forests, Coolbaggie Nature Reserve, Goobang National Park, and Beni Conservation Area	Dry scrub, open forest, dry woodlands of <i>Eucalyptus fibrosa</i> , <i>Eucalyptus sideroxylon</i> , <i>Eucalyptus albens</i> , <i>Callitris endlicheri</i> , <i>Callitris glaucophylla</i> and <i>Allocasuarina luehmianii</i> .	Yes	Good	Yes	Yes	Yes

Threatened fish and aquatic species

Scientific Name	Common Name	FM Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Ambassis agassizii</i>	Western population of Olive Perchlet	E2		This population is now found only at a few sites in the Darling River drainage.	Rivers, creeks, ponds and swamps. They are usually found in slow-flowing or still waters, often near overhanging vegetation or amongst logs, dead branches and boulders.	Yes	Good	Yes	Yes	Yes
<i>Galaxias rostratus</i>	Flathead Galaxias	CE	CE	Southern part of the Murray Darling Basin; now only known from the upper Murray River near Tintaldra and wetland areas near Howlong.	Still or slow moving water bodies such as wetlands and lowland streams, with rock or sandy bottoms and aquatic vegetation.	Yes	Good	Yes	Yes	Yes
<i>Maccullochella macquariensis</i>	Trout Cod	E1	E	Endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW.	Found in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags).	Yes	Good	Yes	No	Likely
<i>Maccullochella peelii</i>	Murray Cod		V	Throughout most of the Murray Darling Basin with the exception of some localised extinctions. Some translocated populations exist outside the species' natural distribution in impoundments and waterways (Cataract Dam and the Nepean River system in NSW).	Clear rocky streams to slow flowing, turbid rivers and billabongs. Frequently found in the main river channel and larger tributaries; also in floodplain channels when they contain water.	Yes	Good	Yes	No	Likely
<i>Macquaria australasica</i>	Macquarie Perch	E1	E	Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments.	River and lake habitats, especially the upper reaches of rivers and their tributaries.	Yes	Good	Yes	No	Likely

Scientific Name	Common Name	FM Act Status	EPBC Act Status	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Species known to occur in region	Species known to occur in study area	Likelihood of occurrence
<i>Mogurnda adspersa</i>	Purple Spotted Gudgeon	E1		Inland drainages of the Murray-Darling basin as well as coastal drainages of northern NSW and Qld. In inland NSW, only recorded once since 1983.	Slow-moving or still waters of rivers, creeks and billabongs, often amongst weeds, rocks or large woody debris.	Yes	Good	Yes	Yes	Yes
<i>Prototroctes maraena</i>	Australian Grayling		V	Streams and rivers on the eastern and southern flanks of the Great Dividing Range; in NSW, it occurs south from the Shoalhaven River.	Coastal rivers and streams, fresh and brackish coastal lagoons.	No	None	No	No	No
<i>Tandanus tandanus</i>	Murray-Darling Basin population of Eel Tailed Catfish	E2		Originally widely distributed throughout the Murray-Darling River System; now only regularly observed in the Macquarie catchment upstream of Warren, the Castlereagh catchment upstream of Mendooran, the Namoi catchment upstream of Wee Waa, the Gwydir catchment upstream of Moree and the Border Rivers catchment upstream of Goondiwindi.	Rivers, creeks, lakes, dams, billabongs and lagoons; prefers sluggish or still waters.	Yes	Good	Yes	Yes	Yes

Threatened ecological communities (terrestrial)

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
<i>Acacia loderi</i> Shrublands	E		Open structure of individual shrubs to small trees (to 8 m tall) with a low, diverse understorey dominated by chenopod sub-shrubs, herbs and grasses. Dominated by the tall shrub or small tree, <i>Acacia loderi</i> (Nelia). Other tree species that may occur in association with <i>A. loderi</i> are <i>A. aneura</i> , <i>A. oswaldii</i> , <i>Callitris gracilis</i> , <i>Casuarina pauper</i> and <i>Flindersia maculosa</i> .	Known from the Broken Hill Complex, Murray-Darling Depression, Cobar Peneplain, Riverina, Mulga Lands and Darling Riverine Plains Bioregions. In NSW, the community is mainly confined to south-western NSW, extending east to Hillston and north to White Cliffs.	Solonized brown and duplex soils on level to undulating plains or on calcareous red earths; typical habitat has a rainfall range of 240 mm to 280 mm.			Yes	Marginal	Yes	No	Potential
<i>Acacia melvillei</i> Shrubland in the Riverina and Murray-Darling Depression Bioregions	E		Typically has an open canopy of shrubs or small trees, sometimes with scattered mid-stratum shrubs, and with a sometimes sparse, but highly variable ground layer dominated by grasses, chenopods and herbs. The shrub/tree layer is dominated by <i>Acacia melvillei</i> , either in pure stands or with a range of other less abundant trees or tall shrubs. These may include <i>Acacia loderi</i> (Nelia), <i>Alectryon oleifolius</i> subsp. <i>canescens</i> (Western Rosewood), <i>Casuarina pauper</i> (Belah) and <i>Myoporum platycarpum</i> (Sugarwood).	Recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions in the local government areas of Balranald, Carrathool, Central Darling, Conargo, Wakool and Wentworth.	Red-brown, sandy loam soils; occurs as scattered patches grading into surrounding woodlands dominated by Belah and Western Rosewood, <i>Callitris glaucophylla</i> (White Cypress Pine) or sandplain mallee.			Yes	Marginal	Yes	No	Potential
Artesian Springs Ecological Community	E	E	The vegetation within the community frequently consists of sedges or similar vegetation; however, trees and shrubs may be adjacent to the springs or nearby.	Restricted to the artesian springs of the Great Artesian Basin, including the Mulga Lands, Darling Riverine Plains and Cobar Peneplain Bioregions of NSW.	Artesian springs; these are characterised by mounds of sediment and salts deposited as water evaporates, or they may be depressions.	The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin	Artesian Springs Ecological Community	Yes	Marginal	Yes	No	Potential
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	E	E	Characterised by the presence of <i>Acacia harpophylla</i> (Brigalow) as one of the three most abundant tree species. Brigalow is usually either dominant in the tree layer or co-dominant with other species such as <i>Casuarina cristata</i> (Belah), other species of <i>Acacia</i> , or <i>Eucalyptus</i> . The structure of the vegetation ranges from open forest to open woodland. The height of the tree layer varies from about 9 m in low rainfall areas to around 25 m in higher rainfall areas. A prominent shrub layer is usually present.	In NSW, remnants mostly occur north of Burke, west of Narrabri and north of Moree. Other minor occurrences occur near Walgett and Gunnedah, at Mt Misery and in the Pilliga East State Forest. Associated mostly with the Mulga Lands and Brigalow Belt South bioregions, with lesser areas in the Cobar Peneplain, Darling Riverine Plains, NSW South-western Slopes and Nandewar Bioregions.	In NSW, occurs on undulating plains or sandplains in the western areas and on flat or gentle rises on alluvial plains or undulating peneplains in eastern areas. It is associated with red, brown and grey clays, red and grey earths and red-brown earths.	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions Brigalow-Gidgee woodland/shrubland in the Mulga Lands and Darling Riverine Plains Bioregions	Yes	Marginal	Yes	Yes	Yes

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Brigalow-Gidgee woodland/shrubland in the Mulga Lands and Darling Riverine Plains Bioregions	E	E	The structure ranges from woodland to shrubland and scrub depending on local conditions. The canopy is dominated by either <i>Acacia harpophylla</i> (Brigalow) or <i>Acacia cambagei</i> (Gidgee) with the other species being co-dominant or part of the shrub layer, depending on site disturbance.	North of Bourke between the Culgoa and Warrego Rivers; recorded from parts of the local government areas of Bourke and Brewarrina, but may occur elsewhere in the Mulga Lands and Darling Riverine Plains Bioregions.	Soft red earths and heavy grey clays on level to slightly undulating plains.	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Brigalow-Gidgee woodland/shrubland in the Mulga Lands and Darling Riverine Plains Bioregions	Yes	Marginal	Yes	No	Potential
<i>Cadellia pentastylis</i> (Ooline) community in the Nandewar and Brigalow Belt South Bioregions	E		The canopy is dominated by the tree <i>Cadellia pentastylis</i> (Ooline). Other canopy species include <i>Eucalyptus albens</i> (White Box), <i>E. beyeriana</i> and <i>E. melanophloia</i> (Ironbarks), <i>E. chloroclada</i> (Dirty Gum), <i>E. pilligaensis</i> (Narrow-leaved Grey Box), <i>E. viridis</i> (Green Mallee) and <i>Callitris glaucophylla</i> (White Cypress Pine). The understorey is made up of a range of shrubs, such as <i>Acacia spp</i> , and grasses.	Known from only seven main locations on the North West Slopes in NSW, between Narrabri and the Queensland border; also in Queensland.	Undulating terrain on a variety of soil types, between 300-450 m altitude.			Yes	Marginal	Yes	No	Potential
Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions	E		This was previously an open forest community of flora and fauna that may now exist as woodland or as remnant trees. Characteristic tree species are <i>Corymbia tessellaris</i> (Carbeen) and <i>Callitris glaucophylla</i> (White Cypress Pine). Associated trees include <i>Corymbia dolichocarpa</i> , <i>Eucalyptus populnea</i> , <i>E. camaldulensis</i> , <i>Casuarina cristata</i> and <i>Allocasuarina luehmannii</i> .	Riverine plains of the Meehi, Gwydir, MacIntyre and Barwon Rivers, and in small remnants farther south.	Siliceous sands, earthy sands and clayey sands.			Yes	Marginal	Yes	No	Potential
Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions	E		Carex Sedgelands are fens dominated by sedges, grasses and semi-aquatic herbs. Dominant species are <i>Carex appressa</i> , <i>Stellaria angustifolia</i> , <i>Scirpus polystachyus</i> , <i>Carex gaudichaudiana</i> , <i>Carex sp.</i> <i>Bendemeer</i> , <i>Carex tereticaulis</i> and <i>Isachne globosa</i> , either as single species or in combinations.	Mostly found at higher altitudes on tablelands but extends onto the slopes. The community has been recorded from the local government areas of Armidale Dumaresq, Warrumbungle, Glen Innes Severn, Guyra, Gwydir, Inverell, Liverpool Plains, Tamworth Regional, Uralla and Walcha.	Drainage depressions in valley floors, frost hollows, and undulating terrain, on a variety of lithologies including granite, basalt, metasediments, acid volcanics, sandstone and Aeolian sands.			No	Marginal	Yes	No	Unlikely

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	E	E	Semi-arid to humid subtropical woodland where <i>Eucalyptus coolabah</i> subsp. <i>coolabah</i> (Coolibah) and/or <i>Eucalyptus largiflorens</i> (Black Box) are the dominant canopy species and where the understorey tends to be grassy. Other tree species may occur in the tree canopy but are not dominant, including <i>Acacia salicina</i> (Cooba), <i>Acacia stenophylla</i> (River Cooba), <i>Casuarina cristata</i> (Belah), <i>Eremophila bignoniiflora</i> (Eurah), <i>Eucalyptus camaldulensis</i> (River Red Gum) and <i>Eucalyptus populnea</i> (Bimble Box). The mid or shrub layer may or may not be present. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall.	Associated with the floodplains and drainage areas of the Darling Riverine Plains and the Brigalow Belt South bioregions.	Found on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands, stream levees, drainage depressions and gilgai.	Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands Bioregions	Yes	Marginal	Yes	Yes	Yes
Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	E		Tall woodland or open forest dominated by <i>Eucalyptus conica</i> (Fuzzy Box), often with <i>Eucalyptus microcarpa</i> (Grey Box), <i>Eucalyptus melliodora</i> (Yellow Box), or <i>Brachychiton populneus</i> (Kurrajong). <i>Allocasuarina luehmannii</i> (Buloke) is common in places. Shrubs are generally sparse, and the groundcover moderately dense, although this will vary with season.	Alluvial soils of the South West Slopes, Brigalow Belt South and Darling Riverine Plains Bioregions. Mainly in the Dubbo-Narromine-Parkes-Forbes area.	Brown loam or clay, alluvial or colluvial soils on prior streams and abandoned channels or slight depressions on undulating plains or flats of the western slopes.			Yes	Marginal	Yes	No	Potential
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	E	Woodland to open forest with a canopy dominated by <i>Eucalyptus microcarpa</i> (Grey Box). Other tree species are often present and may be co-dominant with Grey Box at some sites, including <i>Allocasuarina luehmannii</i> (Buloke), <i>Brachychiton populneus</i> (Kurrajong), <i>Callitris glaucophylla</i> (White Cypress Pine), <i>Eucalyptus albens</i> (White Box), <i>E. camaldulensis</i> (River Red Gum), <i>E. conica</i> (Fuzzy Box), <i>E. leucoxylon</i> (Yellow Gum), <i>E. melliodora</i> (Yellow Box) and <i>E. populnea</i> (Bimble Box). The understorey is characterised by a moderately dense to sparse shrub layer, and a ground layer of perennial and annual native forbs and graminoids, dominated by tussock grasses. The community includes patches of derived grassland, where the tree canopy and mid layer has been removed to less than 10% crown cover but the native ground layer remains largely intact.	Central New South Wales through northern and central Victoria into South Australia. In NSW, found in the southern subregions of the Brigalow Belt South bioregion, the eastern subregions of the Darling Riverine Plain bioregion, the NSW South Western Slopes bioregion and the eastern subregions of the Cobar Penepplain bioregion.	Flat to undulating plains, low slopes and rises and, to a lesser extent, drainage depressions and flats. May extend to more elevated hillslopes on the fringes of its range. Often occurs on productive soils derived from alluvial or colluvial materials.		Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions	Yes	Marginal	Yes	Yes	Yes

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Marsh Club-rush sedgeland in the Darling Riverine Plains Bioregion	CE		Dominated by the Marsh Club-rush <i>Bolboschoenus fluviatilis</i> which forms dense stands up to 2 m tall. The community is further characterised by an understorey including <i>Carex appressa</i> (Tussock Sedge), <i>Eleocharis plana</i> (Ribbed Spike Rush), <i>Lachnagrostis filiformis</i> (Blown Grass), <i>Paspalum distichum</i> (Water Couch) and <i>Ranunculus undosus</i> (Swamp Buttercup). Other species that may be present include <i>Cyperus victoriensis</i> , <i>Typha domingensis</i> , <i>Ludwigia peploides</i> subsp. <i>montevidensis</i> and <i>Eleocharis pallens</i> .	Mainly restricted to the Gwydir wetlands but may occur elsewhere in the Darling Riverine Plains Bioregion.	Associated with grey clay soils usually with a surface layer of organic matter several centimetres thick.			Yes	Marginal	Yes	No	Potential
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	E	CE	Temperate grasslands are typically dominated by tussock grasses in the genera <i>Austrodanthonia</i> , <i>Austrostipa</i> , <i>Bothriochloa</i> , <i>Chloris</i> , <i>Enteropogon</i> , or <i>Themeda</i> . Representatives of these genera, as well as temperate grassland forbs, are present to some extent throughout the ecological community. The shrub cover is typically a very minor component of the grassland however in some areas the cover of shrubs, such as <i>Acacia farnesiana</i> (Mimosa), can be quite thick. Other shrubs that may be present include <i>Pittosporum phylliraeoides</i> , <i>Pimelea</i> spp. and <i>Sclerolaena</i> spp. A tree canopy is typically absent to sparse.	In NSW, mainly occurs on the Liverpool Plains and Moree Plains of northern NSW, within the Brigalow Belt South bioregion, but also extends into the Nandewar, Sydney Basin and Darling Riverine Plains bioregions.	Mainly associated with fine textured, often cracking clay soils derived from either basalt or alluvium. Typically occurs on flat to very low slopes.		Native vegetation on cracking clay soils of the Liverpool Plains	Yes	Marginal	Yes	No	Potential
Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion	E		Pilliga Outwash Ephemeral Wetlands are generally dominated by <i>Allocasuarina luehmannii</i> , <i>Eucalyptus pilligaensis</i> , <i>Eucalyptus chloroclada</i> , <i>Melaleuca densispicata</i> and <i>Eucalyptus sideroxylon</i> . They commonly occur on the Pilliga outwash within a mosaic of woodlands and shrublands, or formerly wooded areas.	Pilliga Outwash Ephemeral Wetlands have an exceptionally restricted geographic distribution. It is estimated that these wetlands are 2,342 km ² in extent where one third of them is located within conservation reserves such as Pilliga National Park and Pilliga State Conservation Area; they may also occur in the Pilliga West State Conservation Area. South west of Narrabri some ephemeral wetlands are found in the Pilliga forest which do not conform to the basic type of this community	Pilliga outwash ephemeral wetlands are found in a small area of Pilliga scrub generally associated with ephemeral creeks and waterways.			Yes	Marginal	Yes	Yes	Yes

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes Bioregions	E		Characterised by an open tree stratum, which may be reduced to isolated individuals or may be absent as a result of past clearing. The tree layer is dominated by <i>C. glaucophylla</i> , either in pure stands or with a range of other less abundant trees or tall shrubs.	Far south-western portion of the NSW South Western Slopes bioregion near Urana, extending through the Riverina bioregion, from the Urana – Narranderra district in the east, into the southern part of the Murray-Darling Depression bioregion, as far west as the SA border.	In the Riverina and South Western Slopes, the community is typically associated with prior streams and aeolian source-bordering dunes, which are scattered within an extensive alluvial clay plain. On the alluvial plain of the Murray River and its tributaries, and on parts of the sandplain in south-western NSW, it typically occupies red-brown loamy sands with alkaline sub-soils.			No	Marginal	Yes	No	Unlikely
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	E	E	A low, dense form of dry rainforest generally less than 10 m high, made up of vines and rainforest trees as well as some shrubs. The main canopy is dominated by rainforest species such as <i>Cassine australis</i> var. <i>angustifolia</i> (Red Olive Plum), <i>Geijera parvifolia</i> (Wilga), <i>Notelaea microcarpa</i> var. <i>microcarpa</i> (Native Olive) and <i>Ehretia membranifolia</i> (Peach Bush), with taller eucalypts and cypress pines from surrounding woodland vegetation emerging above the main canopy. <i>Carissa ovata</i> (Currant Bush) is often present and typical vines include <i>Parsonsia eucalyptophylla</i> (Gargaloo) and <i>Pandorea pandorana</i> (Wonga Vine).	Scattered distribution near Gunnedah, Barraba, Bingara and north of Warialda on the NSW North West Slopes and Plains, and also in Queensland.	Rocky hills, in deep, loamy, high nutrient soils derived from basalt or other volcanic rocks, in areas which are sheltered from frequent fire.	Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions		Yes	Marginal	No	No	Unlikely
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E	CE	Characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of <i>Eucalyptus albens</i> (White Box), <i>E. melliodora</i> (Yellow Box) and <i>E. blakelyi</i> (Blakely's Red Gum). In the Nandewar Bioregion, <i>Eucalyptus microcarpa</i> or <i>E. moluccana</i> (Grey Box) may also be dominant or co-dominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated.	Occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. In NSW, it occurs in the Brigalow Belt South, Nandewar, New England Tableland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes and Riverina Bioregions.	Areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m.	White Box Yellow Box Blakely's Red Gum Woodland	White Box Yellow Box Blakely's Red Gum Woodland	No	Marginal	Yes	No	Unlikely

Community Name	TSC Act Status	EPBC Act Status	Description	Distribution	Habitat	EPBC listing equivalent	TSC listing equivalent	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Weeping Myall Woodlands	E	E	The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland. The tree layer grows up to a height of about 10 metres and invariably includes <i>Acacia pendula</i> (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs. The structure and composition of the community varies, particularly with latitude, as chenopod shrubs are more prominent south of the Lachlan River district, while other woody species and summer grasses are more common further north. In some areas the shrub and canopy stratum may have been reduced or eliminated by clearing or heavy grazing, leaving derived grassland that may still constitute this community.	Scattered across the eastern parts of the alluvial plains of the Murray-Darling river system. Known from parts of the Local Government Areas of Berrigan, Bland, Bogan, Carrathool, Conargo, Coolamon, Coonamble, Corowa, Forbes, Gilgandra, Griffith, Gwydir, Inverell, Jerilderie, Lachlan, Leeton, Lockhart, Moree Plains, Murray, Murrumbidgee, Narrabri, Narrandera, Narromine, Parkes, Urana, Wagga Wagga and Warren.	Typically, it occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall.		Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Yes	Marginal	Yes	Yes	Yes

Threatened Aquatic Ecological Communities

Community Name	FM Act Status	EPBC Act Status	Description	Distribution	Habitat	Distribution overlaps study area	Habitat quality in study area	Community known to occur in region	Community known to occur in study area	Likelihood of occurrence
Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River	E		Includes all 21 native fish as well as aquatic invertebrates.	All natural creeks, rivers, streams and associated lagoons, billabongs, lakes, flow diversions to anabranches, the anabranches, and the floodplains of the Darling River within NSW, including Menindee Lakes and the Barwon River.	Occurs in a lowland riverine environment, characterised by meandering channels and a variety of habitats, including deep channels, pools, wetlands, gravel beds and flood plains.	Yes	Good	Yes	Yes	Yes



ATTACHMENT 2 - PROTECTED MATTERS SEARCH TOOL RESULTS



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 23/01/17 16:25:50

[Summary](#)

[Details](#)

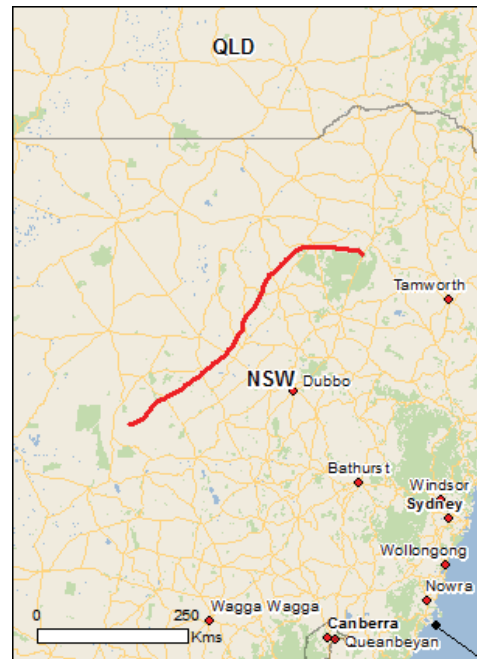
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

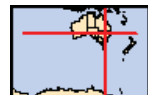
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	5
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	32
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	7
Regional Forest Agreements:	None
Invasive Species:	31
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	500 - 600km upstream
Hattah-kulkyne lakes	400 - 500km upstream
Riverland	400 - 500km upstream
The coorong, and lakes alexandrina and albert wetland	600 - 700km upstream
The macquarie marshes	30 - 40km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
Wetlands and inner floodplains of the Macquarie Marshes	Approval Disallowed	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Pachycephala rufogularis Red-lored Whistler [601]	Vulnerable	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys pilligaensis Pilliga Mouse, Poolkoo [99]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Acacia curranii Curly-bark Wattle [3908]	Vulnerable	Species or species habitat likely to occur within area
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area
Austrostipa metatoris [66704]	Vulnerable	Species or species habitat may occur within area
Bertya opposens [13792]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species

Name	Status	Type of Presence
Dichanthium setosum bluegrass [14159]	Vulnerable	habitat likely to occur within area Species or species habitat likely to occur within area
Eriocaulon australasicum Austral Pipewort, Southern Pipewort [7649]	Endangered	Species or species habitat known to occur within area
Lepidium aschersonii Spiny Pepper-cress [10976]	Vulnerable	Species or species habitat likely to occur within area
Philotheca ericifolia [64942]	Vulnerable	Species or species habitat likely to occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area

Reptiles

Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species

[[Resource Information](#)]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species

Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Migratory Wetlands Species

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Telstra Corporation Limited

Listed Marine Species

[\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Brigalow	NSW
Brigalow	NSW
Carrabear	NSW
Pilliga	NSW
Pilliga	NSW
Pilliga West	NSW
Pilliga West	NSW

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.	

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name		State
Macquarie Marshes		NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-30.50286 149.626766,-30.477619 149.603749,-30.454308 149.560067,-30.448579 149.508528,-30.442104 149.457028,-30.4406 149.405649,-30.438257 149.354345,-30.431037 149.302979,-30.423797 149.251618,-30.420504 149.199852,-30.41459 149.148273,-30.412262 149.096892,-30.415729 149.045013,-30.419142 148.993125,-30.421433 148.941288,-30.415697 148.889683,-30.408063 148.838571,-30.40543 148.786988,-30.409518 148.735167,-30.427465 148.689665,-30.455115 148.648536,-30.482752 148.607383,-30.513788 148.570015,-30.548501 148.536742,-30.575105 148.49532,-30.605349 148.456645,-30.638043 148.423655,-30.67047 148.389193,-30.703515 148.358984,-30.737216 148.328601,-30.75517 148.282513,-30.77952 148.241724,-30.821704 148.229431,-30.854027 148.193627,-30.889753 148.161697,-30.930337 148.14374,-30.972859 148.128567,-31.015994 148.113511,-31.058666 148.097817,-31.096225 148.069622,-31.135253 148.045074,-31.171539 148.017427,-31.210852 147.992575,-31.246328 147.963509,-31.272928 147.9211,-31.305165 147.885961,-31.347021 147.869005,-31.386237 147.845019,-31.430973 147.841275,-31.473518 147.831066,-31.510479 147.803402,-31.545664 147.770876,-31.586275 147.747941,-31.620635 147.717346,-31.659033 147.689675,-31.697408 147.661949,-31.73638 147.635664,-31.774136 147.606781,-31.811277 147.577477,-31.834519 147.532198,-31.857745 147.486896,-31.883479 147.443554,-31.91026 147.401289,-31.937533 147.359161,-31.968341 147.320637,-32.000251 147.283237,-32.027861 147.241477,-32.055644 147.199943,-32.080368 147.155634,-32.104982 147.111231,-32.132428 147.069235,-32.157814 147.025416,-32.183795 146.982103,-32.212226 146.940937,-32.236518 146.896486,-32.256907 146.84914,-32.277277 146.801773,-32.29763 146.754384,-32.323199 146.710726,-32.349617 146.667662,-32.362216 146.617003,-32.386579 146.57282,-32.414515 146.531316,-32.449607 146.497902,-32.48469 146.464463,-32.519763 146.430998,-32.554828 146.397507,-32.588406 146.362141,-32.618784 146.322755,-32.638747 146.276173,-32.653068 146.225626,-32.667131 146.174971,-32.677778 146.137462

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.