

NARRABRI GAS PROJECT

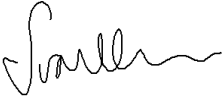

Water Management Plan

PHASE 1

0041-150-PLA-0010

Date	Revision	Reason for Issue	Author	Checked	Approved
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Document review history

In accordance with consent condition D4, this document has been reviewed as follows:

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Acronyms and abbreviations

Acronym	Description
°C	degrees Celsius
µg/L	micrograms per litre
µg/m ³	micrograms per cubic metre
AHD	Australian height datum
AEP	annual exceedance probability
AIP	Aquifer Interference Policy
ANZECC	Australia and New Zealand Environment and Conservation Council
APGA	Australian Pipelines and Gas Association
APPEA	Australian Petroleum Production and Exploration Association
APIA	Australian Pipeline Industry Association
ARI	average recurrence interval
AS/NZS	Australian Standard/New Zealand Standard
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BOM	Australian Bureau of Meteorology
CaCO ₃	calcium carbonate
CaSO ₄	calcium sulfate (gypsum)
CCC	Community Consultative Committee
cm	centimetre
CoA	Conditions of approval of EPBC 2014/7376
CoC	Conditions of consent for the NGP SSD 6456
CSG	coal seam gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAWE	The former Cth Department of Agriculture, Water and the Environment
DA	development application
DCCEEW	The Cth Department of Climate Change, Energy, the Environment and Water
dS	deciSiemens
dS/m	deciSiemens per metre
DEC	The former NSW Department of Environment and Conservation
DECC	The former NSW Department of Environment and Climate Change
DECCW	The former NSW Department of Environment, Climate Change and Water
DES	QLD Department of Environment and Science
DO	dissolved oxygen
DPE	NSW Department of Planning and Environment
DPE Water	The Water Group within DPE
DPI	The former NSW Department of Primary Industries

Acronym	Description
DIPE	The former NSW Department of Planning, Industry and Environment
DTIRIS	The former Department of Trade and Investment, Regional Infrastructure and Services
EC	electrical conductivity
EHS	environmental health and safety
EIS	environmental impact statement
EMP	environmental management plan
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EPL	environment protection licence under the POEO Act
ESCP	erosion and sediment control plan
ESP	exchangeable sodium percentage
EQulS	Environmental Quality Information System
FCNSW	Forestry Corporation of NSW
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
GAB	Great Artesian Basin
GDE	groundwater-dependent ecosystem
GIA	groundwater impact assessment
GIS	geographical information systems
g/m ² /month	gram per square meter per month
GTP	gas transmission pipeline
GMA	Groundwater Management Area
GMP	Groundwater Management Plan
ha	hectare
HDPE	high density polyethylene
IEA	Independent Environmental Audit
IESC	Independent Expert Scientific Committee
IMP	Irrigation Management Plan
ISO	International Organisation for Standardisation
kg	kilogram
kg/ha	kilograms per hectare
L	litre
LEP	local environmental plan
LALC	Local Aboriginal Land Council
LNG	liquefied natural gas
LGA	Local government area

Acronym	Description
MEG	Regional NSW - Mining, Exploration and Geoscience (formerly the Division of Resources and Geoscience)
m	metre
m/s	metres per second
m ²	square metre
m ³	cubic metre
ML	megalitre
ML/day	megalitre per day
ML/y	megalitre per year
NP&W Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
NPWS	NSW National Parks and Wildlife Service
NRAR	Natural Resources Access Regulator
NSWIC	NSW Irrigators Council
OEH	The former NSW Office of Environment and Heritage
PAL	petroleum assessment lease under the PO Act
PEL	petroleum exploration licence under the PO Act
PO Act	<i>Petroleum (Onshore) Act 1991</i> (NSW)
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)
POEO Regulation	Protection of the Environment Operations (General) Regulation 2009
PPL	petroleum production lease under the PO Act
PPLA	petroleum production lease application under the PO Act
RFO	river flow objective
RREO	Resource Recovery Exemption and Order
SEPP	State Environmental Planning Policy
SWB	Site Water Balance
SWD	soil water deficit
t	tonne
TDS	total dissolved solids
TJ	terajoules
TJ/day	terajoules per day
TJ/hour	terajoules per hour
WAL	water access licence
WBTP	water and brine treatment plant
WHS Act	<i>Work, Health and Safety Act 2011</i> (NSW)
WHS Mines Act	<i>Work Health and Safety (Mines and Petroleum Sites) Act 2013</i> (NSW)
WM Act	<i>Water Management Act 2000</i> (NSW)
WQO	water quality objective
WRP	water resource plan

Acronym	Description
WSP	water sharing plan
WTAG	Water Technical Advisory Group

Table of contents

1. Introduction	1
1.1 Narrabri Gas Project	1
1.1.1 Background.....	1
1.1.2 Current Project.....	1
1.1.3 Existing infrastructure	4
1.2 Purpose and scope of the WMP - Phase 1.....	8
1.3 Objectives	10
1.4 Performance measures.....	10
1.5 Preparation of this Plan.....	10
1.6 Consultation	10
1.7 Structure of this Plan.....	11
1.8 Distribution	12
2. Roles and responsibilities.....	13
3. Regulatory requirements.....	14
3.1 Relevant Legislation.....	14
3.1.1 Commonwealth legislation.....	14
3.1.2 NSW State legislation	14
3.2 Project Approval.....	16
3.3 Compliance conditions.....	17
3.3.1 PEL 238	17
3.3.2 PAL 2 and PPL 3	17
3.3.3 EPL 20350	18
3.3.4 Development Consent SSD 6456.....	18
3.3.5 EPBC 2014/7376	22
3.4 Relevant codes, standards, policies and guidelines	25
3.4.1 Produced Water Code	25
3.4.2 Well Integrity Code	25
3.4.3 Aquifer Interference Policy.....	25
3.4.4 NSW Flood Prone Land Policy	26
3.4.5 Policy and Guidelines for Fish Habitat Conservation and Management	26
3.4.6 Fish Passage Requirements for Waterway Crossings	26
3.4.7 ANZECC Guidelines	27
3.4.8 Water Quality Objectives	27

3.4.9	Managing Urban Stormwater: Soils and Construction.....	28
3.4.10	Effluent Irrigation Guidelines.....	28
3.5	EIS commitments	28
4.	Risk assessment and mitigation	30
5.	Monitoring and reporting	33
6.	Trigger action response plans	34
7.	Record keeping	36
8.	Incidents, non-compliances and complaints	37
8.1	Incidents and non-compliances	37
8.2	Complaint management.....	37
9.	Reporting, evaluation and review.....	38
9.1	Annual Review	38
9.2	Independent environmental audits.....	38
9.3	Management Plan review and evaluation.....	38
9.4	Improvement measures	39
10.	References	40
11.	Glossary	41
	Appendix A - Consultation records	46
	Appendix B - Compliance conditions relevant to the WMP	54
	Appendix C - Data management system.....	66
	Appendix D - WSP area for the Namoi and Peel Unregulated Rivers Water Sources 2012.....	68

Tables

Table 1.1 - Existing and approved yet to be constructed infrastructure	7
Table 1.2 - Sub-plans and protocols linked to the WMP	8
Table 3.1 - Water management performance measures	19
Table 3.2 - Outcomes for water resources (groundwater and surface water).....	24
Table 3.3 - EIS commitments relevant to the management of water	29
Table 4.1 - EIS likelihood criteria.....	30
Table 4.2 - EIS consequence criteria	31
Table 4.3 - Santos Risk Matrix	32
Table 6.1 - Trigger action response plans.....	34

Figures

Figure 1.1 - Regional setting of the Project area and petroleum titles	3
Figure 1.2 - Key assets and infrastructure - Phase 1	5
Figure 1.3 - Existing storage ponds at Leewood	6
Figure 1.4 - Water Management Plan structure	9

1. Introduction

1.1 Narrabri Gas Project

1.1.1 Background

Resource exploration has been occurring in the north-western area of NSW since the 1960s; initially for oil, but more recently for coal and gas. Santos NSW Pty Ltd began exploring for natural gas from coal seams in north-western NSW in 2008 and is currently conducting coal seam gas (**CSG**) exploration and appraisal activities within Petroleum Exploration Licence (**PEL**) 238, Petroleum Assessment Lease (**PAL**) 2 and Petroleum Production Lease (**PPL**) 3, located in the Gunnedah Basin about 20 kilometres (**km**) south-west of the town of Narrabri. Activities in PAL 2 have focussed on the Bibblewindi and Bohena CSG pilots, whilst recent activities in PEL 238 have focussed on the Dewhurst and Tintfield CSG pilots.

The Narrabri Coal Seam Gas Utilisation Project (Wilga Park Power Station and associated infrastructure) operates under an existing Part 3A approval under the *Environmental Planning and Assessment Act 1979* (NSW) (**EP&A Act**). It was originally approved in 2008, with modifications approved between 2011 and 2019. It encompasses a gas gathering system, a compressor and associated flare, a gas flow line from Bibblewindi to Wilga Park within a 10 metre (**m**) corridor with a riser at Leewood and an expansion of the existing Wilga Park Power Station from 12 to 40 megawatts.

1.1.2 Current Project

On 30 September 2020, Santos NSW (Eastern) Pty Ltd (**Santos**) obtained consent for State significant development (**SSD**) 6456 to develop the Narrabri Gas Project (**NGP**) (**the Project**). Approval EPBC 2014/7376 under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) was granted on 24 November 2020.

The Project includes the progressive installation of up to 850 new gas wells on up to 425 new well pads over approximately 20 years and the construction and operation of gas processing and water treatment facilities.

Four phases of development are defined under the consent, including:

- Phase 1 - exploration and appraisal;
- Phase 2 - construction activities for production wells and related infrastructure;
- Phase 3 - gas production operations; and
- Phase 4 - gas well and infrastructure decommissioning, rehabilitation and closure.

Phase 1 of the Project is defined in the consent as the phase of the development comprising ongoing exploration and appraisal activities in the Project area, including:

- seismic surveys;
- core and chip holes;
- construction and operation of pilot wells (up to 25 wells on up to 25 well pads across the project area); and
- pilot well ancillary infrastructure, including access tracks, gas and water gathering lines, water balance tanks, safety flaring infrastructure, utilities and services, and environmental monitoring equipment including groundwater monitoring bores.

Santos plans to continue exploration and appraisal of the resource in the near term until a final investment decision can be made. The exploration and appraisal activities will include continued operation of Santos' existing wells, infrastructure and facilities in PEL 238 and PAL 2, and construction and operation of new core holes, pilot wells and supporting infrastructure permitted under Phase 1.

Santos' existing exploration and appraisal activities in PEL 238 and PAL 2 include:

- Tintsville Pilot;
- Bibblewindi East Pilot;
- Bibblewindi West Pilot;
- Dewhurst North Pilot;
- Dewhurst South Pilot;
- Dewhurst northern and southern flow lines;
- Leewood Water Management Facility including ponds, water and brine treatment plant (**WBTP**) and irrigation area;
- Bibblewindi Facility including gathering system, water balance tank, compressor and flare; and
- Bibblewindi to Leewood buried gas pipeline.

These exploration and appraisal activities will continue as part of the NGP. The initial, new-appraisal Phase 1 scope is a relatively minor extension to these existing exploration and appraisal activities.

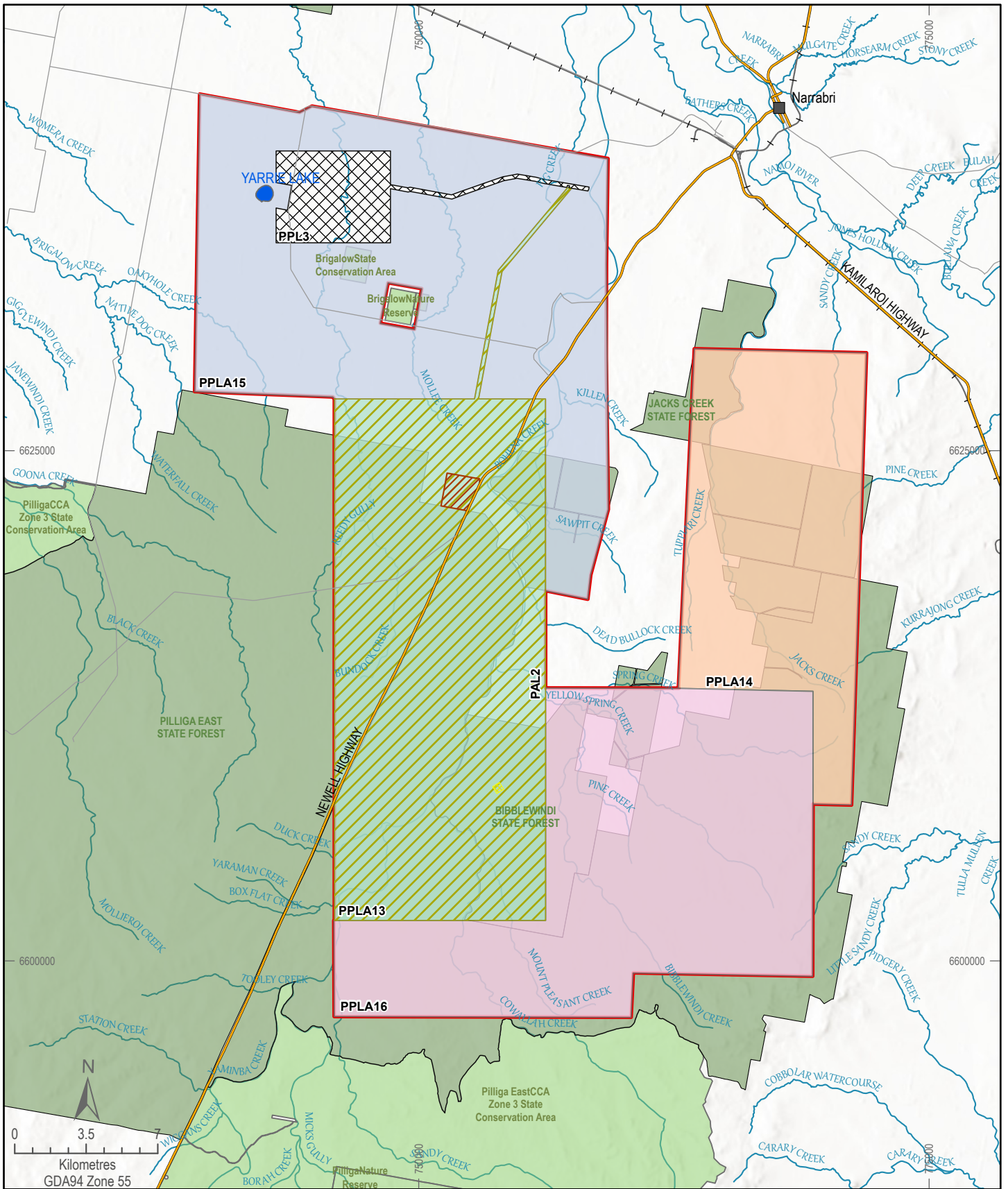
The Phase 1 scope is planned to include the construction and operation of:

- 4 coreholes;
- 6 pilot wells;
- 2 deep reservoir monitoring bore (converted coreholes);
- new shallow water monitoring bores;
- associated linear infrastructure;
- seismic surveys (length and location to be determined); and
- continued operation of Santos' existing exploration and appraisal activities, including workover activities.

Full definitions of the approved activities for Phases 2, 3 and 4 of the Project are provided in the consent. Santos is not prevented from carrying out any or all of the phases concurrently, subject to the conditions of this consent. Details regarding the staging of the works and the exact scope for each phase are as per the approved Field Development Plan.

The existing infrastructure is described in greater detail in section 1.1.3, with a full overview of the regulatory framework and statutory provisions of the NGP and the current approvals, leases and licences related to the management of water provided in section 3.

The regional setting of the Project and the petroleum titles are presented in Figure 1.1.



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LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Urban areas
- Highway
- Major roads
- Railway
- Watercourse
- State Forest
- Parks and reserves
- Lakes and dams
- PAL2
- PPL3
- PPLA13
- PPLA14
- PPLA15
- PPLA16

NARRABRI GAS PROJECT

Figure 1.1
Regional Settings of the Project
area and Petroleum Titles

1.1.3 Existing infrastructure

A number of approvals have been obtained for previous natural gas exploration and appraisal activities within the Project area. Some of the infrastructure constructed for these activities may also be used for the Project, including existing produced water and brine ponds and water treatment facilities. The principal facilities are located at Bibblewindi and Leewood, as detailed in the sections below. Figure 1.2 presents both the existing and the approved assets and infrastructure, and the indicative Phase 1 footprint.

Bibblewindi

The Bibblewindi site includes existing infrastructure for Santos' exploration and appraisal program, including:

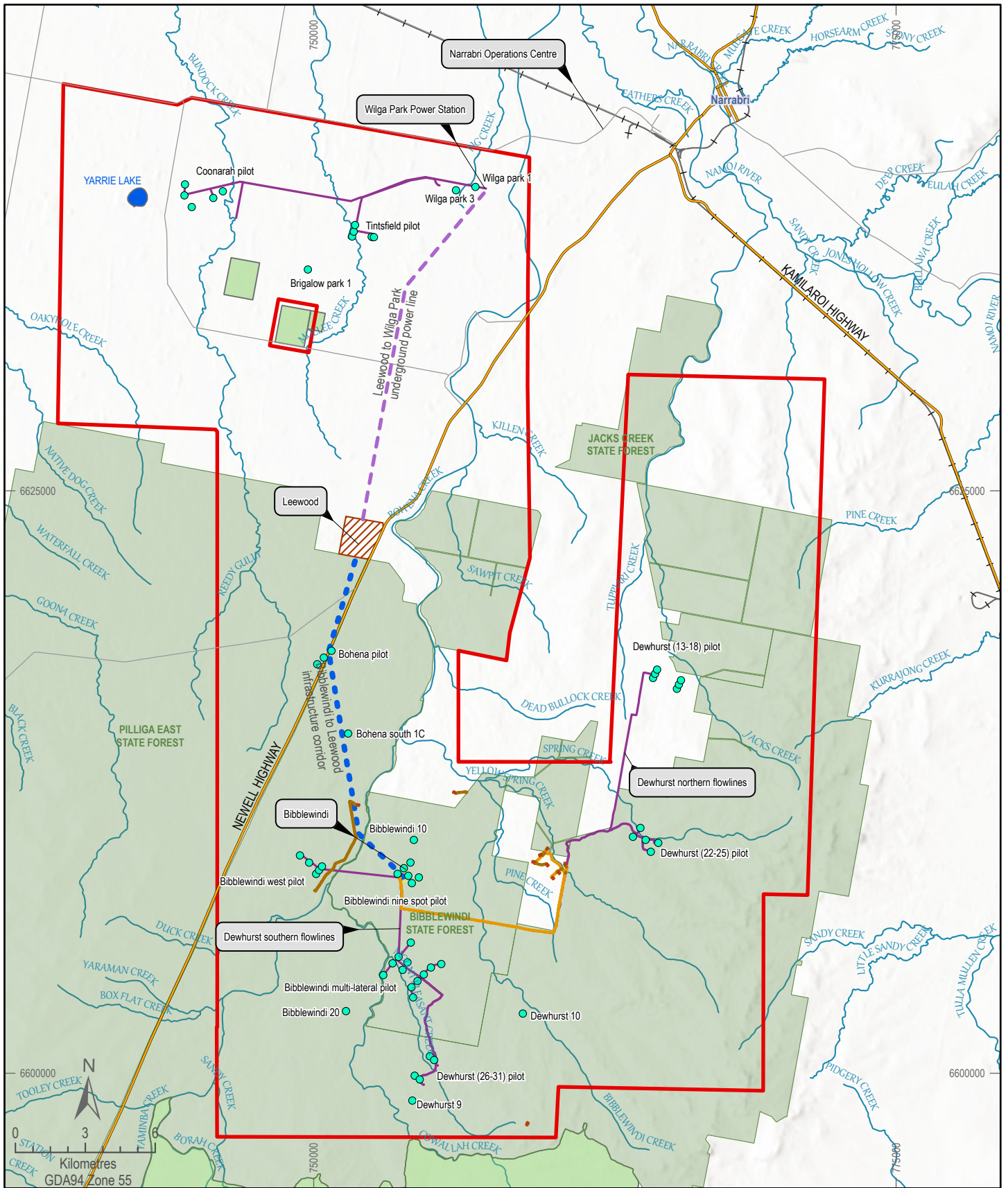
- a small capacity gas compression station;
- a safety flare;
- a 5 megalitre (**ML**) water balance tank - used to manage produced water flows between the gas field and the WBTP;
- two water storage ponds (Bibblewindi Pond 2 and 3) (currently not in use);
- two groundwater supply bores (Bibblewindi 1 and Bibblewindi 5);
- storage and utilities areas; and
- staff amenities and car parking.

Bibblewindi to Leewood infrastructure corridor

The Bibblewindi to Leewood infrastructure corridor includes:

- an existing gas pipeline;
- an existing water pipeline; and
- an approved (but not yet constructed) second water pipeline.

Each of the water pipelines can be operated with the option to pump either produced or treated water in either direction.



Santos

ONWARD
CONSULTING

LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Existing wells
- Existing flowlines
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor
- State Forest
- Parks and reserves
- Lakes and dams
- Highway
- Major roads
- Watercourse
- Railway

NARRABRI GAS PROJECT

Figure 1.2
Key Assets and Infrastructure
Phase 1

Leewood

The Leewood site includes the following infrastructure for Santos' exploration and appraisal program:

- two double-lined produced water and brine storage ponds of approximately 355 ML storage capacity, each pond with two cells of approximately 170-180 ML capacity each (refer to Figure 1.3);
- a WBTP to manage water produced during the exploration program;
- a storage and utilities area;
- staff amenities and car parking; and
- an irrigation area.

The 49-hectare (**ha**) irrigation area is located on the eastern half of the Leewood site, adjacent to the existing WBTP. Irrigation with treated water occurred between August 2017 and February 2018. A crop of barley and a crop of Lucerne were grown at that time, however the site has remained fallow since. The irrigation area and the beneficial use of treated water for irrigation during Phase 1 is further described in the Irrigation Management Plan (**IMP**).



Figure 1.3 - Existing storage ponds at Leewood

Table 1.1 details both the existing and the approved (but yet to be constructed) infrastructure.

Table 1.1 - Existing and approved yet to be constructed infrastructure

Project name	Infrastructure	Used for the Project
Leewood Produced Water and Brine Management Ponds	<ul style="list-style-type: none"> Approximately 355 ML brine pond; Approximately 355 ML produced water pond; 16 km water flow line and return flow line from the Bibblewindi facility to Leewood; 5 ML balance tank at Bibblewindi; and associated infrastructure. 	<p>Yes</p> <p>The use of these facilities for production purposes will be part of the Project.</p>
Leewood Produced Water Treatment and Beneficial Reuse Project, Phase 2	<ul style="list-style-type: none"> WBTP to treat, manage and beneficially reuse produced water and brine from exploration and appraisal activities. 	<p>Yes.</p> <p>The modular WBTP will continue to be used.</p>
Bibblewindi Ponds 1, 2 and 3	<ul style="list-style-type: none"> Pond 1 has been decommissioned; Although not part of Phase 1, the design and construction of Ponds 2 and 3 will be reviewed and the necessary upgrades undertaken to ensure they meet relevant regulatory requirements and standards. 	<p>Yes.</p> <p>The ponds will be used for water storage as part of the Project. Pond 2 will store fresh or treated water for use in construction and/or drilling & completions.</p>
Tintsville 2-7 Pilot	<ul style="list-style-type: none"> Tintsville Pond 1 and 2; and Flare 	<p>Yes.</p> <p>Tintsville Pond 1 will be used once it has been upgraded to comply with the <i>Exploration Code of Practice: Produced Water Management, Storage and Transfer</i>. It is unlikely that Pond 2 will be used to support the initial activities of the Project.</p>
Dewhurst Northern Flow Lines	<ul style="list-style-type: none"> Gas and water gathering lines 	<p>Yes.</p> <p>Operation of both the gas and water flow lines.</p>
Dewhurst Southern Flow Lines	<ul style="list-style-type: none"> Gas and water gathering lines 	<p>Yes.</p> <p>Operation of both the gas and water flow lines.</p>

1.2 Purpose and scope of the WMP - Phase 1

Santos has developed this Water Management Plan (**WMP** or the **Plan**) and its attached sub-plans in accordance with the requirements of approval conditions of PEL 238, PAL 2 and PPL 3 and the SSD 6456 conditions of consent (**CoC**), predominantly conditions B26 to B42. It provides the 'roadmap' to the specific documents that detail how Santos manages all water associated with the development of the Project and acts as the central document for all water management requirements for the ongoing exploration and appraisal activities during Phase 1. The structure of the WMP and associated plans and protocols as required under condition B41 is presented in Figure 1.4. The specific contents of each sub-plan and protocol are detailed in Table 1.2.

Since this WMP applies to Phase 1 of the Project only, requirements and obligations applicable to subsequent phases of the Project are not relevant and have not been considered in this Plan or in the attached sub-plans. Note however that on occasions, references may have been made to activities or infrastructure that may form part of future phases for clarity or explanatory purposes. A full list of the conditions directly applicable to the WMP is presented in section 3.3.4. A copy of the consent conditions and where each requirement has been addressed is provided in Table A1 in Appendix A.

Table 1.2 - Sub-plans and protocols linked to the WMP

Document Name	Link to this Plan
Erosion and Sediment Control Plan (ESCP)	Plan for managing risks of soil erosion, the potential for the transport of sediment to downstream waters, or of flood risks
Site Water Balance	Forecasting water inflows and outflows for Phase 1
Surface Water Management Plan (SWMP)	Reporting of baseline data on surface water flows and quality of watercourses and description of the surface water management system including performance criteria and trigger response plan
Groundwater Management Plan (GMP)	Plan for collecting and managing groundwater data, including baseline data of hydrogeology and groundwater levels, formation parameters and quality for groundwater resources and description of groundwater management and monitoring system including performance criteria and trigger response plan
Produced Water Management Plan (PWMP)	Plan for capturing and recording water production
Irrigation Management Plan (IMP)	Plan for managing beneficial reuse of treated water for crop irrigation and stock watering
Dust Suppression Protocol	Plan for managing beneficial reuse of treated water for drilling & completions, dust suppression, construction activities and firefighting
Managed Release Protocol	Protocol that is managing disposal of treated water to Bohena Creek. There will be no release to Bohena Creek for Phase 1 and as such this has been incorporated into the PWMP for Phase 1.
Salt Management Plan	Plan for managing salt and other waste volumes and composition generated by the produced water management system. For Phase 1, the Salt Management Plan forms part of the PWMP.
Pollution Incident Response Management Plan (PIRMP)	Plan for responding to incidents, spills and leaks associated with the produced water management system and a Dam Safety Emergency Plan for managing potential incidents and emergencies associated with produced water storages

WATER MANAGEMENT PLAN STRUCTURE

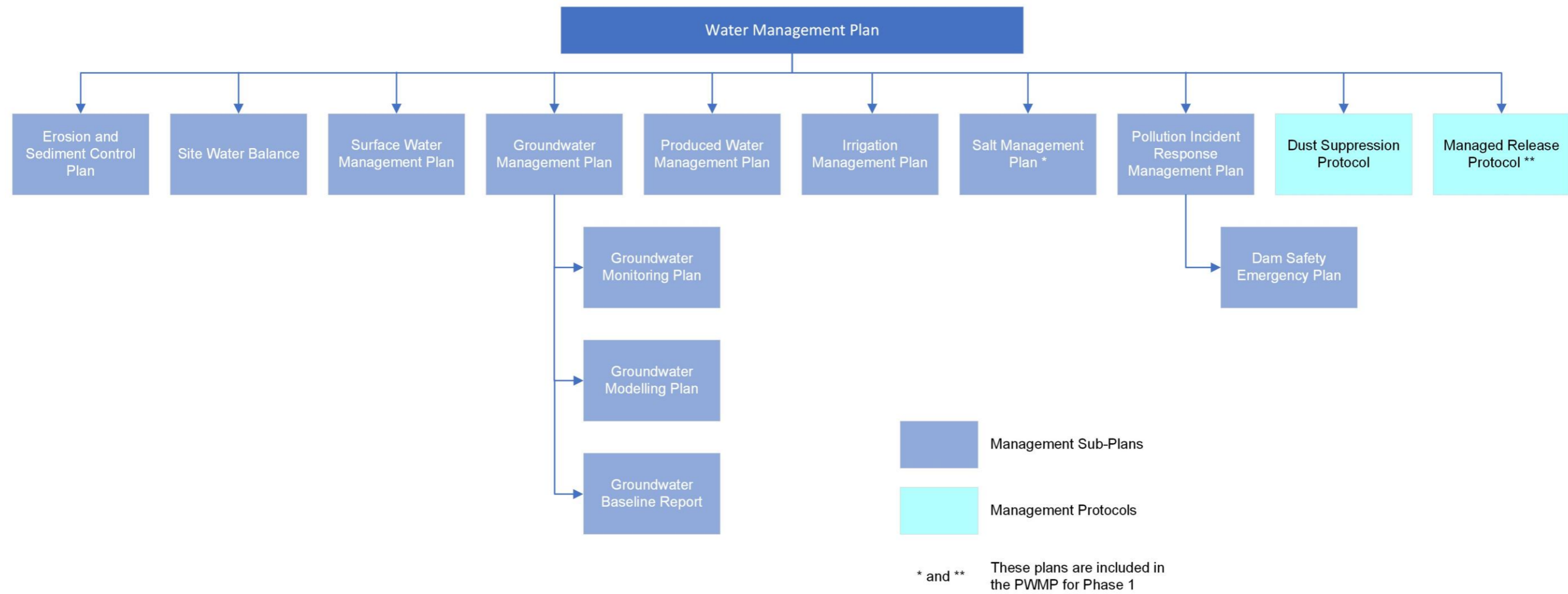


Figure 1.4 - Water Management Plan structure

1.3 Objectives

The objectives of this WMP are to provide the following:

- details of the structure of the water management documentation that together forms the Water Management Plan for the NGP;
- details of the relevant statutory requirements (including any relevant approval, licence or lease conditions) and any commitments or recommendations applicable to the management of water as identified in the EIS during Phase 1 of the Project; and
- a description of the measures to be implemented to comply with the relevant statutory requirements, trigger levels, limits or performance criteria.

1.4 Performance measures

There are a number of performance measures related to water management for the Project that Santos must comply with. These are listed in consent condition B37 and have been reproduced in Table 3.1 in section 3.3.4. This table also specifies in which sub-plan(s) or protocol(s) each of the water management performance measures has been addressed.

1.5 Preparation of this Plan

This WMP and the attachments have been prepared by Mr. Mark Vile of Onward Consulting Pty Ltd, approved by the former NSW Department of Planning, Industry & Environment (**DPIE**) on 17 February 2021 as a suitably qualified expert for the preparation of the Water Management Plan for the NGP. Mr. Vile was assisted by Mr. Servaes van der Meulen of Onward Consulting Pty. Ltd. In the development of this Plan. Dr Richard Cresswell from Ecological Australia (ELA) prepared the Groundwater Management Plan and its attachments, supported by CDM Smith in the preparation of the Groundwater Modelling Plan. A copy of the DPIE approval letter is provided in Appendix A.

1.6 Consultation

As required by consent condition B41, this WMP and the sub-plans and protocols have been prepared in consultation with the Water group within the Department of Planning and Environment (**DPE**) (generally referred to as **DPE Water**), the NSW Environment Protection Authority (**EPA**) and the Water Technical Advisory Group (**WTAG**).

The comment received from the Natural Resources Access Regulator (**NRAR**) [on behalf of DPE Water] on the draft WMP (Revision C) centred around the provision of additional information of the existing and proposed Phase 1 infrastructure.

The comment provided by the EPA related to the use of unamended treated water for beneficial use. There will be no application of unamended treated water during Phase 1.

The comments provided by the WTAG predominantly related to clarification requests. The comments also identified a number of discrepancies

All consultation correspondence and the responses to comments are provided in Appendix A.

1.7 Structure of this Plan

Together with the suite of documents listed Table 1.2, this WMP forms the backbone for the management of all water associated with the development of the Project. The structure of this Plan is as follows:

Sections

Section 1	Provides an introduction to the Project and the context, scope, purpose and objectives of this Plan
Section 2	Defines the roles and responsibilities of personnel involved with the management of water generated through NGP activities, including staff, consultants, contractors and service providers
Section 3	Outlines the statutory provisions relevant to the management of all water associated with the NGP development. It further provides details where each of the water management performance measures is addressed in the attached sub-plans and protocols
Section 4	Provides summary details of the Santos risk assessment process and associated risk matrix
Section 5	Provides summary details for monitoring and recording programs that are implemented for the management of water associated with the Project activities
Section 6	Provides summary details of the trigger, action and response plan process to manage risks to operations, personnel and the environment
Section 7	Provides summary details on the process that is implemented to manage data and records in a consistent, efficient and effective manner
Section 8	Outlines the process for reporting incidents and non-compliances to the relevant agencies, and the management procedure for complaints
Section 9	Describes the reporting, evaluation and review process of this WMP, including the annual review, independent audits and environmental improvement measures
Section 10	References
Section 11	Glossary

Appendices

Appendix A	Consultation records
Appendix B	Consent conditions directly relevant to this WMP
Appendix C	Santos Data Management System
Appendix D	WSP for the Namoi and Peel Unregulated Rivers Water Sources 2012

Attachments

Attachment 1	Erosion and Sediment Control Plan
Attachment 2	Site Water Balance
Attachment 3	Surface Water Management Plan

- Attachment 4 Groundwater Management Plan
- Attachment 5 Produced Water Management Plan
- Attachment 6 Irrigation Management Plan
- Attachment 7 Dust Suppression Protocol
- Attachment 8 Pollution Incident Response Management Plan, incorporating the Dam Safety Emergency Plan

1.8 Distribution

A copy of the approved WMP is available to all Santos personnel via the Santos intranet. In accordance with consent condition D13, the latest copy of the Plan including all associated appendices, audits and reports, and summaries of all monitoring data (where relevant), can also be found on the Project website, once these have been approved by the Planning Secretary. This information will be kept up to date.

Since specific approval or code of practice conditions require one or more of the sub-plans or protocols to be made available at the location of the activities to all persons involved in those activities, a controlled copy of this WMP will be kept at the Santos Operations Centre located at 300 Yarrie Lake Road in Narrabri. This is where operational and field staff commence and finish each workday.

Note that any printed copies of this Water Management Plan are uncontrolled.

2. Roles and responsibilities

All Santos employees and contractors involved in the Narrabri Gas Project are responsible for the environmental performance of their activities and for complying with all legal requirements and obligations. Project personnel will be required to comply with approval requirements of the activities they undertake and potential environmental impacts from all activities is managed in accordance with the Project's relevant management plan(s).

In accordance with consent condition D1, the Environmental Management Strategy (**EMS**) sets out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the Project, including the requirements and obligations in this WMP and the attached sub-plans and protocols. All roles, responsibilities and accountabilities have been assigned in accordance with Santos Management System *SMS-MS_14 People Management Standard*.

3. Regulatory requirements

3.1 Relevant Legislation

This section provides a summary of the respective Commonwealth and NSW State legislation directly relevant to the management of all water during the development of the NGP. If and where applicable, the various sub-plans and protocols may provide further details of specific legislative requirements.

A full list of environmental legislation relevant to the NGP is provided in the EMS, together with a framework to ensure compliance with applicable legislative requirements, as per consent condition D1.

3.1.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) requires the assessment of an 'action' as a whole. As such, where an action referred to the Cth Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) [formerly the Cth Department of Agriculture, Water and the Environment (**DAWE**)¹] includes both extraction activities which have a significant impact on a water resource (with relation to coal seam gas or mining projects) and other activities (such as associated infrastructure) then the significance of the whole of the referred Project on water resources is considered.

Water Act 2007

The Murray Darling Basin Authority is an independent statutory body that operates under the Commonwealth *Water Act 2007* to manage the water resources of the Murray Darling Basin (**MDB**), in which the Project is located, in an integrated and sustainable manner. The Murray Darling Basin Plan came into effect in 2012 and provides a coordinated approach to water use within the MDB. The plan aims to achieve a balance between environmental, economic and social considerations and limits water use to environmentally sustainable levels for both surface water and groundwater resources.

3.1.2 NSW State legislation

Water Act 1912

The *Water Act 1912* (NSW) (**Water Act**) has historically been the primary legislation managing water resources in NSW. The Water Act governs access, trading and allocation of licences associated with both surface water and groundwater sources and is currently being progressively phased out and replaced by water sharing plans (**WSPs**) under the *Water Management Act 2000* (**WM Act**). Existing licences under the Water Act are converted to water access licences (**WALs**) and to water supply works and use approvals under the WM Act. The elements to which the Water Act applies include extraction of water from a river, extraction of water from groundwater sources, aquifer interference (less than 3 ML per year) and diversion works of surface water runoff for capture (of a capacity less than basic landholder rights).

¹ The Cth Department of Climate Change, Energy, the Environment and Water was established on 1 July 2022.

The surface water and groundwater systems associated with the Project are currently regulated by WSPs under the WM Act.

Water Management Act 2000

The WM Act is progressively being implemented throughout NSW to manage water resources, superseding the *Water Act 1912*. The aim of the WM Act is to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It is also intended to provide formal means for the protection and enhancement of the environmental qualities of watercourses and their in-stream uses as well as to provide for protection of catchment conditions. Fresh water sources throughout NSW are managed by WSPs under the WM Act. Key rules within WSPs specify when licence holders can access water and how water can be traded.

The Project is located within the area covered by the WSP for the Namoi and Peel Unregulated Rivers Water Sources, which commenced in October 2012. The WSP applies to the unregulated rivers and creeks within the Namoi River and Peel River catchments. The WSP area, as shown in Figure D1 in Appendix D, covers 31 management zones and includes the Bohena Creek, Brigalow Creek, Bundock Creek and Eulah Creek water sources.

Groundwater sources associated with the Project are regulated by the following five WSPs:

- Upper and Lower Namoi Groundwater Sources;
- NSW Murray-Darling Basin Fractured Rock Groundwater Sources;
- NSW Murray-Darling Basin Porous Rock Groundwater Sources;
- NSW Great Artesian Basin Groundwater Sources; and
- NSW Great Artesian Basin Shallow Groundwater Sources.

The NSW *Aquifer Interference Policy* is further discussed in section 3.4.4.

Petroleum (Onshore Act) 1991

The *Petroleum (Onshore) Act 1991* (NSW) (**PO Act**) regulates onshore petroleum exploration and production in NSW through a system of petroleum titles (licences and leases). A proponent generally applies for a PEL over an area and subsequently apply for a PAL and / or PPL to further develop the resource.

Under Section 23 of the PO Act, a petroleum title is subject to conditions prescribed under regulations and additional conditions prescribed by the Minister. The *Code of Practice for Coal Seam Gas: Well Integrity* is enforced in this manner (refer to section 3.4.4). Santos is the holder of PEL 238 over the Project area, which will require a PPL following Project approval. Santos lodged four petroleum production lease applications (**PPLAs**) under the PO Act in May 2014 for the Project area, being PPLAs 13, 14, 15 and 16. These areas are shown in Figure 1.1.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (**POEO Act**) regulates pollution through the control of environment protection licences (**EPLs**). Activities requiring an EPL are listed in Schedule 1 of the Act and include petroleum exploration, appraisal and production.

Santos is the holder of EPL 20350 for its current petroleum activities in the Narrabri area. The EPL will be varied to reflect all Project-related gas development and production activities, following Project approval. The variation application will most likely include a request for an authorised release point at Bohena Creek during appropriate flow conditions with the implementation of toxicity-based assessment criteria to manage and monitor the release. It is to be noted that it is not proposed to release to Bohena Creek during Phase 1 of the Project.

The EPL will be amended to include a licence condition that prescribes the allowable chemistry of Project-related treated water release to the receiving environment. This approach would be consistent with the 2013 *Environment Protection Authority Licensing Fact Sheet: Using Environment Protection Licensing to Control Water Pollution*.

Dams Safety Act 2015

The *Dams Safety Act 2015 (Dams Safety Act)*, administered by Dams Safety NSW, commenced on 1 November 2019 and regulates the safety of certain dams. The *Dams Safety Regulation 2019* sets out operational details and safety standards that declared dam owners must comply with to satisfy the provisions of the Dams Safety Act. The existing Leewood Ponds are declared dams under the Dams Safety Act.

The Project is not located within a 'notification area' declared by Dams Safety NSW.

3.2 Project Approval

The Project is permissible with development consent under the *State Environmental Planning Policy (Resources and Energy) 2021*, and is identified as a 'State significant development' under section 4.38 of the EP&A Act and the *State Environmental Planning Policy (Planning Systems) 2021*.

The Project was subject to the State significant development assessment and approval provisions of Division 4.7 of Part 4 of the EP&A Act and was granted approval as a State significant development under the EP&A Act and the EPBC Act. The Project will be carried out in accordance with the:

- relevant existing development consents and activity approvals;
- the conditions of relevant tenements including PEL 238, PAL 2, PPL 3,
- the provisions of the PO Act and relevant codes of practice;
- EPL 20350 issued by the EPA under the provisions of the POEO Act;
- conditions of consent for the NGP SSD 6456; and the
- conditions of approval of EPBC 2014/7376.

Section 4.41 of the EP&A Act outlines the authorisations that are not required for an SSD that is authorised by a development consent granted under Division 4.7 of Part 4. These include:

- a water use approval under section 89; a water management work approval under section 90; or an activity approval (other than an aquifer interference approval) under section 91 of the WM Act;
- a dredging and reclamation work permit under section 201; or a permit to obstruct fish passage temporarily or permanently under section 219 of the *Fisheries Management Act 1994* (NSW).

Further, Section 4.42 of the EP&A Act prescribes the authorisations that cannot be refused if they are necessary for carrying out an approved SSD under Division 4.7 of Part 4 and are to be substantially consistent with the development consent. These authorities are:

- a production lease under the PO Act;
- an EPL under Chapter 3 of the PoEO Act (for any of the purposes referred to in section 43 of the POEO Act);
- a consent under section 138 of the *Roads Act 1993* (NSW); and
- a licence under the *Pipelines Act 1967* (NSW).

3.3 Compliance conditions

Compliance conditions associated with the following licence(s), lease(s) and consent(s) are relevant to this WMP:

- PEL 238, granted on 1 September 1980 and most recently renewed on 12 April 2022;
- PAL 2, granted on 30 October 2007;
- PPL 3, granted on 15 December 2003;
- PPLs 13, 14, 15 and 16, once issued;
- WALs;
- EPL 20350, as varied;
- SSD 6456; and
- EPBC 2014/7376.

It is noted that PAL 2 is past its last expiry date, but a renewal application has been made. Under the provisions of Section 20 of the PO Act, if an application for renewal of a title has not been withdrawn or determined before the date on which the title would, but for this section, expire, the title continues in force until the date on which the application is withdrawn or determined. Therefore, PAL 2 continues in force until such time as a determination is made on the renewal application.

3.3.1 PEL 238

Where PEL 238 licence conditions are directly relevant to the management of water, these conditions are further addressed in the respective sub-plans and protocols attached to this WMP.

3.3.2 PAL 2 and PPL 3

Lease condition 2 of PAL 2 and PPL 3 states that activities must only be carried out in accordance with a Petroleum Operations Plan (**POP**) which has been approved by the Director-General of the Department of Primary Industries. Further, the POP must (i) identify how operations will be carried out on site in order to prevent and or minimise harm to the environment; and (ii) reflect conditions of approval under the EP&A Act, the POEO Act, and any other approvals relevant to PAL2 and PPL 3.

This WMP supports the POP and satisfies condition 2 of PAL 2 and PPL 3 by providing information about how Santos manages all water associated with its activities within PAL 2 and PPL 3.

3.3.3 EPL 20350

'Petroleum exploration, assessment and production' is a scheduled activity listed in Schedule 1 of the POEO Act. Under section 48 of this Act, all scheduled activities are required to hold an environment protection licence. EPL 20350 is held for CSG activities in PEL 238, PAL 2 and PPL 3. There are several conditions specifically related to the management of water, including applications to land, and conditions related to monitoring, operating and reporting.

In accordance with condition L1.1 of EPL 20350, Santos will comply with section 120 of the POEO Act, unless as may be expressly provided in any other condition of the EPL. The conditions related to water and water management are further addressed in the EMS and the respective sub-plans and protocols attached to this WMP.

Note that this Water Management Plan, including the ESCP, satisfies the requirements for a Soil and Water Management Plan referred to in condition O6.1 to O6.4 of EPL 20350. These conditions are specifically addressed in Table B1 in Appendix B of the ESCP.

3.3.4 Development Consent SSD 6456

There are a number of SSD 6456 consent conditions relevant to the management of water associated with the Project. Where applicable, these have been listed in full and addressed in each of the sub-plans and protocols attached to this WMP. For example, all conditions related to produced water have been addressed in the Produced Water Management Plan (**PWMP**). It should be noted that since this version of the WMP is only applicable to Phase 1 of the Project, only conditions that are relevant to Phase 1 have been included.

The key consent conditions B36, B37 and B41(d)(vi) that are directly relevant to this Plan have been outlined below. Table B1 in Appendix B specifies where each of the requirements of all the relevant SSD 6456 consent conditions are addressed in this Plan.

Consent condition B36 states that Santos must ensure that all surface discharges from the development comply with:

- (a) discharge limits (both volume and quality) set for the development in any EPL or Resource Recovery Exemption and Order (**RREO**); and
- (b) relevant provisions of the POEO Act.

Consent condition B37 states that Santos must ensure that the development complies with a range of management performance measures, as listed in Table 3.1. Also specified in the table is in which sub-plan(s) or protocol(s) each of the management performance measures has been addressed.

Table 3.1 - Water management performance measures

Feature	Performance Measure	Plan and Section Reference	
		Plan	Section
Water management -general	Maximise water recycling, reuse and sharing opportunities	PWMP	Section 5.5
	Maximise beneficial reuse of treated water	PWMP	Section 5.5
	Minimise the need for discharge of treated water to Bohena Creek	PWMP	Section 6
	Design, install, operate and maintain water management infrastructure in a proper and efficient manner	PWMP	Section 5
Namoi alluvial aquifers and Great Artesian Basin aquifers	Negligible environmental consequences to the aquifers beyond those predicted in the EIS, including: <ul style="list-style-type: none"> • negligible change in groundwater levels; • negligible change in groundwater quality; and • negligible impact to other groundwater users 	GMP	Section 8.5
	No exceedance of the minimal harm considerations in the <i>Aquifer Interference Policy</i> (DPI, 2012)	GMP	Section 3.2.1 and 8.2
	Negligible change to baseline methane levels in groundwater user bores	GMP	Section 4.4.4 and 8.2
Gunnedah Oxley Basin aquifers	Drawdown and water take to be generally consistent with the ‘base case’ predictions and produced water profile in the EIS	GMP	Section 5.2
	Negligible change in groundwater quality	GMP	Section 5.2, 8.2, 8.4 and 8.5.1
Riparian and aquatic ecosystems	Maintain or improve baseline channel stability in affected watercourses	ESCP	Section 5.7
	Negligible change to surface water quality in any watercourse	SWMP	Section 5.5
	Negligible impact on groundwater dependent ecosystems	GMP	Section 4.5.2 and 8.1

Feature	Performance Measure	Plan and Section Reference	
		Plan	Section
	Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1</i> (Landcom, 2004) and <i>2E Mines and Quarries</i> (DECC, 2008b)	ESCP	Section 5.4, 5.5 and 5.6
	Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012)	ESCP	Section 5.9
	Design, install and maintain any creek crossings generally in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013) and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries, 2003)	ESCP	Section 5.9
	Develop site-specific in-stream water quality objectives in Bohena Creek in accordance with the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> (ANZECC & ARMCANZ, 2000) and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW</i> (DEC, 2006)	SWMP	Section 3.2.4
Well integrity	Design, construct, maintain and decommission gas wells in accordance with the <i>Code of Practice for Coal Seam Gas Well Integrity</i> (2012, as may be updated or amended), unless approval is granted to vary this standard by the Planning Secretary	Well Integrity Control Plan, which forms part of the Principal Control Plan NSW Operations	Section 2 and 3
	Minimise leakage of methane, carbon dioxide, drill fluids, saline groundwater and other potential contaminants to the environment	Well Integrity Control Plan, which forms part of the Principal Control Plan NSW Operations	Sections 4 and 5
	No oil-based or synthetic based drill fluids to be used in well construction	Water Management Plan (this Plan)	Section 3.4.2
Produced water management	Implement all reasonable and feasible measures to minimise risk of leaks and spills	PWMP	Section 8 and 9
	Design, install and maintain leak detection systems and fail-safe measures on the produced water management system	PWMP	Section 8
	Design, install and maintain all produced water storage ponds to provide sufficient freeboard to accommodate a 72 hour 1 in 100-year ARI flood event	PWMP	Section 8

Feature	Performance Measure	Plan and Section Reference	
		Plan	Section
	All produced water to be treated to meet the treated water quality criteria in Appendix 6 [of the CoC], unless otherwise authorised in an EPL	PWMP	Section 5.4 and Appendix D
	Design, install and maintain produced water infrastructure in accordance with the <i>Exploration Code of Practice: Produced Water Management, Storage and Transfer</i> (DPE, 2017)	PWMP	Section 3.2.1
Irrigation and beneficial reuse management	Negligible change to soil quality and groundwater quality and levels in irrigation areas and other areas subject to treated water application	IMP	Section 1.4 and 5.3
	Only amended treated water to be used for reuse activities (except for firefighting), unless other use of treated water has been approved as part of the Water Management Plan	IMP	Section 1.4 and 5.2
	No irrigation in forested area, apart from dust suppression and construction activities on operational areas and access roads	IMP	Section 1.4 and 5.4
Bohena Creek water discharge ²	No discharge of treated water to Bohena Creek when the creek is flowing less than 100 ML/day (at the gauging station identified in the Water Management Plan)	PWMP	Section 6
	Maximum discharge of 10 ML/day of treated water to Bohena Creek, unless otherwise authorised by an EPL	PWMP	Section 6
Salt Management ³	Maximise beneficial reuse of produced salt, as far as reasonable and feasible	Salt Management Plan	Incorporated as section 7 of the PWMP for Phase 1
	Classify produced salt in accordance with the EPA's Waste Classification Guidelines	Salt Management Plan	
	Store produced salt on-site within weather-proof structure, prior to off-site transport for reuse or disposal	Salt Management Plan	
	Dispose salt waste not able to be beneficially reused to appropriately licenced waste facility	Salt Management Plan	
Chemical and hydrocarbon storage	Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard	SWMP	Section 5.2 and 6.2

² There will be no release to Bohena Creek for Phase 1 and as such this has been incorporated into the Produced Water Management Plan for Phase 1.

³ For Phase 1, the Salt Management Plan forms part of the Produced Water Management Plan

Consent condition B41 states that prior to the commencement of Phase 1, Santos must prepare a Water Management Plan for the NGP to the satisfaction of the Planning Secretary and that this plan must:

- (a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
- (b) be prepared in consultation with DPE Water, EPA and the Water Technical Advisory Group;
- (c) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 7 of the CoC);
- (d) include:
 - (i) an Erosion and Sediment Control Plan;
 - (ii) a Site Water Balance;
 - (iii) a Surface Water Management Plan;
 - (iv) a Groundwater Management Plan;
 - (v) a Produced Water Management Plan;
 - (vi) an Irrigation Management Plan;
 - (vii) a Dust Suppression Protocol;
 - (viii) a Managed Release Protocol;
 - (ix) a Salt Management Plan;
 - (x) a Pollution Incident Response Management Plan, and
 - (xi) a protocol to report on the measures, monitoring results and performance criteria identified above, in the Annual Review.

3.3.5 EPBC 2014/7376

The Project was declared to be a controlled action under the EPBC Act on 5 December 2014 and was assessed under the bilateral agreement between the Commonwealth and NSW Governments as it triggered the following controlling provisions:

- listed threatened species and ecological communities;
- a water resource (specifically for coal seam gas developments); and
- Commonwealth land.

The approval decision EPBC 2014/7376 was received on 24 November 2020, subject to a number of conditions of approval (**CoA**). The majority of the conditions either mirror or reinforce the SSD 6456 CoC, with CoA 1 stating that Santos must undertake the Project as described in and in accordance with the SSD 6456 consent conditions (referred to as the NSW approval). There are however a number of specific conditions related to potential impact on groundwater resources during Phase 1, as listed below. Table B2 in Appendix B specifies where each of the requirements of the relevant EPBC 2014/7376 CoA are addressed in this Plan.

Approval condition 5 states that for the protection of water resources, Santos must comply with conditions A15-A17 and B26-B42 of the NSW approval relating to water management. It further states that Santos must achieve and maintain the performance measures in the NSW approval (refer to Table 3.1 above) to demonstrate that the outcomes and sub-outcomes specified in CoA Appendix B are being achieved and maintained. These outcomes for water resources have been reproduced in Table 3.2.

Approval condition 6 states that Santos must provide DCCEEW with the approved Water Management Plan required by condition B41 of the NSW approval within 2 business days of its approval by the NSW Planning Secretary. Santos must notify DCCEEW within 2 business days of any proposed changes to the approved Water Management Plan. If the NSW Planning Secretary approves a revised version of the Water Management Plan, Santos must provide DCCEEW with the approved revised Water Management Plan within 2 business days of its approval by the NSW Planning Secretary.

Note that approval conditions 7 to 17 are related to the management of groundwater impacts, and are further addressed in the GMP, provided as Attachment 4.

Table 3.2 - Outcomes for water resources (groundwater and surface water)

Groundwater				
Unconsolidated hydrogeological units				
Outcome	Conditions within unconsolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by associated users.			
Associated users	Water supply bores	Aquatic GDEs	Terrestrial GDEs	Subterranean GDEs
Sub-outcome	Bore continues to supply water for its intended purpose or is made good.	No adverse effects on the function and environmental values due to CSG development.	No adverse effects on the function and environmental values due to CSG development.	Habitat is maintained or improved.
Consolidated hydrogeological units				
Outcome	Conditions within consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by associated users.			
Associated users	Water supply bores	Aquatic GDEs	Terrestrial GDEs	Subterranean GDEs
Sub-outcome	Bore continues to supply water for its intended purpose or is made good.	No adverse effects on the function and environmental values due to CSG development.	No adverse effects on the function and environmental values due to CSG development.	Habitat is maintained or improved.
Surface water				
Surface water features				
Outcome	Conditions within instream, riparian zone, wetland and floodplain, including water regime, and water quality; maintain or improve ecosystem services.			

Note:

This is a reproduction of Appendix B of EPBC 2014/7376.

3.4 Relevant codes, standards, policies and guidelines

3.4.1 Produced Water Code

As per consent condition B37, produced water infrastructure must be designed, installed and maintained in accordance with the *Exploration Code of Practice: Produced Water Management, Storage and Transfer* (DPE, 2017) (**the Produced Water Code**).

The Produced Water Code sets out mandatory requirements and provides title holders with related guidance about the expected performance for the management, storage and transfer of produced water.

As detailed in the attached Produced Water Management Plan, it serves three purposes. It:

- provides upfront information to industry and the community;
- facilitates the assessment of exploration activities consistent with Part 5 of the EP&A Act; and
- sets out enforceable mandatory requirements related to produced water management, storage and transfer.

Further, it enables industry to:

- adopt a risk-based approach to ensure compliance with mandatory requirements related to produced water;
- commit to measurable performance;
- monitor performance and take corrective action if outcomes are not being achieved; and
- keep and maintain relevant records of activities and/or actions.

3.4.2 Well Integrity Code

The *Code of Practice for Coal Seam Gas: Well Integrity* (DTIRIS 2012) (**Well Integrity Code**) is an industry guideline administered by the NSW Government and enforced under the PO Act. The Well Integrity Code and practice defines the standards for well design and construction to prevent environmental harm, particularly to groundwater resources. Wells constructed as part of the Project will comply with the code. With regard to produced water, the Well Integrity Code states that wells must be designed 'to ensure all fluids produced from the well travel directly from the production zone to the surface without contaminating groundwater'.

It is to be noted that these requirements exceed the 'Minimum Construction Requirements for Water Bores in Australia, as per the footnote on page iv of the Well Integrity Code. Further, as required by the well integrity performance measures in CoC B37 and the associated Table 7, no oil-based or synthetic based drill fluids will be used in well production.

Well integrity is fully addressed in the Santos Well Integrity Control Plan [0011-289-IMP-0001], which forms part of the Santos Principal Control Plan NSW Operations [0011-050-PCP-0001].

3.4.3 Aquifer Interference Policy

The WM Act defines an aquifer interference activity as that which involves any of the following:

- the penetration of an aquifer;

- the interference with water in an aquifer;
- the obstruction of the flow of water in an aquifer;
- the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and
- the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.

The NSW Aquifer Interference Policy defines the regime for protecting and managing the impacts of aquifer interference activities on NSW's water resources. There are three key parts to the Policy:

- all water taken must be properly accounted for;
- the activity must address minimal impact considerations for impacts on water table, water pressure and water quality; and
- planning for measures in the event that the actual impacts are greater than predicted, including making sure that there is sufficient monitoring in place.

3.4.4 NSW Flood Prone Land Policy

A key guideline relevant to the assessment is the NSW *Floodplain Development Manual* published in 2005. It concerns the management of flood-prone land within NSW. It provides guidelines in relation to the management of flood liable lands, including any development that has the potential to influence flooding, particularly in relation to increasing the flood risk to people and infrastructure.

3.4.5 Policy and Guidelines for Fish Habitat Conservation and Management

The Fisheries NSW *Policy and Guidelines for Fish Habitat Conservation and Management* published in 2013 outlines policies and guidelines aimed at maintaining and enhancing fish habitat for the benefit of native fish species, including threatened species, in marine, estuarine and freshwater environments. It aims to help developers, their consultants and government and non-government organisations to ensure compliance with legislation, policies, and guidelines as they relate to fish habitat conservation and management. It can be used to inform land use and natural resource management planning, development planning and assessment processes. It is also a valuable tool to improve awareness and understanding of the importance of fish habitats and how impacts can be mitigated, managed, or offset. Note that as stated in section 3.3, any permits under sections 201, 205 and 219 of the NSW *Fisheries Management Act 1994* are not required for this Project.

3.4.6 Fish Passage Requirements for Waterway Crossings

The *Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings* published by NSW Fisheries in 2003 aims to minimise impacts on fish passage and general aquatic wildlife by providing practical guidelines to those involved in the planning, design, construction and maintenance of waterway crossings. Considerable effort has been taken to make these guidelines applicable across Australia; however, local knowledge, data and experience should always be used to enhance, modify or even replace the information presented within these guidelines.

3.4.7 ANZECC Guidelines

The Australian and New Zealand Environment Conservation Council (**ANZECC**) and Agriculture and Resource Management Council of Australia and New Zealand (**ARMCANZ**) published the revised *Australian and New Zealand guidelines for fresh and marine water quality* in 2000 (the ANZECC Guidelines). The ANZECC Guidelines provide a risk-based framework under which water quality data may be statistically interrogated, trends analysed, and site-specific trigger values may be derived. Potential impacts of the Project on surface water quality were assessed in accordance with methodology from the ANZECC Guidelines.

Although the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (the **National Water Quality Guidelines**) were published in 2018 after a scientific review of the ANZECC Guidelines, both consent condition B37 (water management performance measures) and the treated water quality criteria in Appendix 6 [of the CoC] refer to the 2000 version of the ANZECC guidelines. As such, the 2000 version of the guidelines apply to the Project.

In reference to Appendix 6 [of the CoC], it is to be noted however that there is some ambiguity around the performance measure in Table 7 [of the CoC] which requires 'all produced water to be treated to meet the treated water quality criteria in Appendix 6'. Appendix 6 [of the CoC] includes multiple columns of criteria, including 'target values' which were derived purely theoretically prior to commissioning of the WBTP during the preparation of the EIS. Actual operational values are now available, and these should be used rather than the target values, which were for design purposes only and should be discarded for future versions of this WMP. An EPL variation application will be submitted during Phase 1 to amend the treated water quality criteria, as per CoC B37.

The use of operational values rather than target values is further addressed in the PWMP, IMP and the Dust Suppression Protocol. Operational values have been incorporated into the relevant tables in the plans and protocols together with the values reproduced from Appendix 6 [of the CoC].

3.4.8 Water Quality Objectives

The NSW Government have published online the NSW Water Quality and River Flow Objectives (**the Objectives**). The Objectives are the agreed environmental values and long-term goals for NSW's surface waters. They set out:

- the community's values and uses for rivers, creeks, estuaries and lakes (i.e. healthy aquatic life, water suitable for recreational activities like swimming and boating, and drinking water); and
- a range of water quality indicators to help assess whether the current condition of our waterways supports those values and uses.

The Objectives are consistent with the agreed national framework for assessing water quality set out in the ANZECC Guidelines. The ANZECC Guidelines provide an agreed framework to assess water quality in terms of whether the water is suitable for a range of environmental values (including human uses). The Objectives provide environmental values for NSW waters and the ANZECC Guidelines provide the technical guidance to assess the water quality needed to protect those values. Refer to the note in section 3.5.9 that the ANZECC Guidelines have been superseded by the national Water Quality Guidelines.

The Objectives, and the associated trigger levels, are further addressed in the Surface Water Management Plan.

3.4.9 Managing Urban Stormwater: Soils and Construction

The *Managing Urban Stormwater: Soils and Construction - Volume 1* (Landcom 2004), more commonly known as the 'Blue Book', provides support for developments to reduce the impacts of land disturbance activities on waterways by better management of soil erosion and sediment control. It provides guidance for the design, construction and implementation of measures to improve stormwater management during the construction phase of land development.

Volume 1 is specifically for urban works. It has been complemented by a series of publications in 2007 and 2008 combined as *Managing Urban Stormwater: Soils and Construction - Volume 2* which cover a range of developments. The requirements of the Blue Book and the supporting guidelines are further addressed in the ESCP.

3.4.10 Effluent Irrigation Guidelines

The *Environmental Guidelines: Use of Effluent by Irrigation* (DEC 2004) provides information for planners, designers, installers and operators of irrigation systems that use effluent from a wide range of rural and industrial sources, including treated sewage effluent. The aims of the guideline are to:

- encourage the beneficial use of effluent and show how this might be accomplished in an ecologically sustainable manner;
- provide guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources; and
- outline the statutory requirements that may be needed for an effluent irrigation system in NSW.

3.5 EIS commitments

In the EIS Chapter 31 and updated in Appendix B of the Response to Submissions, Santos has committed to implement a number of measures pending Project approval and a final investment decision. The EIS commitments relevant to the management of water associated with the development have been listed in Table 3.3, in accordance with consent condition D3(c) which states that Santos must ensure that (where relevant) the management plans include any relevant commitments or recommendations identified in the EIS.

However, it should be noted that in some instances, a commitment made in the EIS may no longer be relevant or applicable. This could be due to the following:

- the management plan structure, categorisation or classification required by the SSD 6456 consent conditions is different than that originally proposed in the EIS; or
- aspects of the Project have not been deemed by Government to have the impact level that requires a specific management plan to be developed, e.g. vibration or traffic management; or
- the commitment is not relevant until Phase 2 or later, considering this WMP is for Phase 1 only; and most importantly,
- consent condition A4, which states that the conditions of the SSD 6456 consent and the directions of the Planning Secretary prevail to the extent of any inconsistency with the EIS.

Where there is a deviation from the water management-related EIS commitments for Phase 1, this has been identified in Table 3.3, together with the rationale for the deviation. As described in section 9 of this Plan and section 8 of the EMS, this Plan will be subject to regular evaluation and review. This will include a review of the EIS commitments to ensure they remain current, applicable and generally improve the environmental performance of the Project.

Table 3.3 - EIS commitments relevant to the management of water

Number	EIS Commitment relevant to Water Management	Commitment met by the WMP Phase 1	Deviation	Plan / Section reference
1.2	A project-wide environmental management strategy, comprising a number of sub-plans to be used throughout the planning and design, construction, operation and decommissioning and rehabilitation stages of the project are described in Chapter 30. The sub-plans [relevant to the management of water] are:			
	<ul style="list-style-type: none"> Erosion and Sediment Control Plan 	Yes		Refer to the ESCP
	<ul style="list-style-type: none"> Soil Management Plan 	No	No stand-alone Soil Management Plan is required under the CoC. This aspect has been incorporated into the Erosion and Sediment Control Plan	Refer to the ESCP, sections 1.2 and 1.3
	<ul style="list-style-type: none"> Produced Water Management Plan 	Yes	The Produced Water Management Plan	Refer to the PWMP
	<ul style="list-style-type: none"> Water Monitoring Plan 	Yes		Refer to the Surface Water Management Plan, section 7; and the Groundwater Monitoring Plan (Attachment 1 of the GMP)
2.2	Extraction (take) of groundwater in compliance with the <i>Water Management Act 2000</i> (NSW), specifically the procurement of sufficient Water Access Licence (WAL) allocations	Yes		Refer to the GMP, section 4.5
2.3 / 3.6 / 4.8 / 7.2	The Water Monitoring Plan (refer to EIS Appendix G3) will be implemented.	Yes		Refer to the Groundwater Monitoring Plan (Attachment 1 of the GMP)
2.4	Groundwater monitoring bores will be installed in accordance with the Minimum Construction Requirements for Water Bores in Australia.	Yes		Refer to the GMP, section 9.6
2.5	Implementation of make good protocols in accordance with the requirements of the NSW Aquifer Interference Policy.	Yes		Refer to the GMP, section 8.4.1
2.6	Compliance with NSW and / or Commonwealth policies relating to drilling fluids.	Yes		Refer to the GMP, section 3
2.7	Lined pits will be utilised during drilling. Drilling fluids and drill cuttings that are not appropriate for beneficial reuse will be removed after the completion of drilling.	Yes		Refer to the Waste Management Plan, section 6.5.1
3.1 / 5.6	Irrigation of treated water during production will be undertaken in accordance with an irrigation framework, included under the Produced Water Management Plan	Yes	A stand-alone IMP has been developed, instead of including the irrigation framework in the PWMP	Refer to the IMP
3.2 / 5.7	Only treated, amended ⁴ or bore water will be used for dust suppression and rehabilitation.	Yes		Refer to the Dust Suppression Protocol, section 5 and to the Surface Water Management Plan, section 5.3
3.3 / 7.1	Treated water will be released to Bohena Creek at the managed release point only during periods when the flow in Bohena Creek is equal to, or greater than, 100 ML/day as measures at the Newell Highway gauging	No	No water will be released to Bohena Creek during Phase 1	A Managed Release Protocol will be developed for Phase 2. A summary is provided in section 6 of the PWMP
3.4	The managed release point to Bohena Creek will utilise a diffuser designed to promote mixing of water at the release point			
3.5 / 4.7	The managed release [to Bohena Creek] will be undertaken in a manner that minimises erosion to the bed and banks at the release point and the build-up of sediment at that location.			
4.4	Erosion and sediment control measures will be implemented during construction of watercourse crossings	Yes		Refer to the ESCP, section 5.9
4.5	Construction of watercourse crossings would occur during periods of no flow in the watercourse.	Yes		Refer to the ESCP, section 5.9
5.1	Erosion and sediment controls for the Project will be implemented based on <i>Managing Urban Stormwater: Soils and Construction – Volume 1</i> (the 'Blue Book')	Yes		Refer to the ESCP, section 5.1

⁴ Amended' is defined to mean amended treated produced water.

4. Risk assessment and mitigation

A risk is defined by the Australian/New Zealand ISO Standard for Risk Management (AS/NZS ISO 31000:2018) as the chance of something happening that will have an impact on objectives. It is measured in terms of a combination of the consequences of an event and the likelihood of an event occurring.

The risks of the potential issues and their impacts to surface water, groundwater and water-related environmental values associated with the Project were identified with Santos and technical professionals during the preparation of the EIS for the NGP. The potential risks were then evaluated and assigned a risk rating, according to the likelihood (the likely frequency of the potential event or action occurring) and the anticipated consequence (resulting level of impact).

The assessment of environmental risks was based on the likelihood and consequence criteria provided in Table 4.1 and Table 4.2 respectively. Likelihood criteria range on a scale from 'almost certain' (once a year or greater) to 'rare' (once per thousand years). Consequence criteria range on a scale from 'critical' (severe, widespread long-term effect) to 'negligible' (minimal impact or no lasting effect), dependent on the size of the impact, the spatial area affected and the expected recovery time of the environment as well as community and regulatory considerations.

Table 4.1 - EIS likelihood criteria

Likelihood level	Description
Almost certain Common	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely Has occurred in recent history	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible Could happen, has occurred in the past, but not common	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely Not likely or uncommon	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Rare Remote or practically impossible	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; if it has occurred, it is regarded as extremely unique.

Table 4.2 - EIS consequence criteria

Consequence category	Description
Critical Severe, widespread long-term effect	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major Has occurred in recent history	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible
Moderate Localised, short-term to moderate effect	Short-term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor Localised short-term effect	Impact of fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated.
Negligible Minimal impact or no lasting effect	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

The Santos risk matrix has been revised and updated since the submission of the EIS, and the current version of the risk matrix is presented in Table 4.3. The matrix includes a description of the categories of likelihood and consequences considered and a description of the relative severity of consequences for each category.

Specific sections of each of the sub-plans and protocols attached to this Plan address the specific risks associated with the subset of the water management system relevant to that document and provide a range of appropriate mitigation measures. It is to be noted however that only those risks relevant to Phase 1 of the Project have been considered in this Plan and in the attachments.

Further risk assessments for the subsequent phases of the Project will be conducted as part of the amendment and review of this Plan in accordance with Santos Management System *SMS-MS_1 Risk Management Standard*.

Table 4.3 - Santos Risk Matrix

Santos Risk Matrix

Consequence	Safety	Negligible Harm	Minor Harm	Moderate Harm	Severe Harm	Single Fatality OR Critical Life Threatening Injuries	Multiple Fatalities	
	Environment	+ No bodily damage or minimal harm or impairment (hours to days)	+ Short term impairment (days to weeks)	+ Temporary disablement or medium term impairment (weeks to months)	+ Long term/life altering disablement or impairment	+ Extensive population or community scale impact to EV(s) of conservation significance	+ Irreversible impact to EV(s).	
	Community & Reputation	+ No impact to Environmental Value (EV).	+ Small-scale impact to EV(s) of conservation significance + Potential surface or groundwater impact.	+ Moderate-scale impact to EV(s) of conservation significance + Localised surface or groundwater impact.	+ Large-scale impact to EV(s) of conservation significance + Moderate-scale surface water impact; + Localised impact to groundwater with potential or known beneficial use.	+ Extensive population or community scale impact to EV(s) of conservation significance + Extensive impact to other EV(s).		
	Financial (A\$)	+ No actual or potential community criticism + Details remain within Santos sites and/or offices	+ Minor level local community criticism (< week) + No reputation impact	+ Local community criticism (> week) or one-day community protest + Local company reputation impacted	+ State-level community criticism or protest over multiple days/locations + State-based company reputation impacted + Very short-term share price impact (< week)	+ National community criticism or large scale protest + Company reputation and approvals impacted + Shareholder intervention or short-term share price impact (< month)	+ Sustained national community criticism or widespread protest + Industry reputation and approvals impacted + Changes at executive/board level or long-term share price impact (> month)	
	Workforce	< \$30k	\$30k to \$300k	\$300k to \$3m	\$3m to \$30m	\$30m to \$300m	> \$300m	
	Compliance	+ Will require some staff attention over several days. + No actual or potential impact to culture	+ Will require several days local management time. + Minor impact to employee engagement and limited staff turnover	+ Will require head office staff and take several weeks of site management time. + Moderate impact to employee engagement and staff turnover above industry average with some key roles	+ Will require several weeks of senior management time + Impact to employee engagement (< 6 months), moderate turnover of key roles and no succession	+ Will require several months of senior management time + Impact to employee engagement (< 18 months), high staff turnover and attraction issues	+ Will require more than a year of senior management involvement and operations severely disrupted + Impact to employee engagement (> 18 months), significant key role turnover and attraction issues	
		+ Non-conformance with legislation, instruments (e.g. tenure licence) or contract + No regulatory or punitive action	+ Minor breach of legislation, instruments or contract + Notification/report to; request for information by; and/or administrative/warning notice from the regulator + LOCI Tier 3 or non-hydrocarbon releases notifiable to the regulator	+ Limited number of minor breaches of legislation, instruments or contract + Statutory notice from the regulator + LOCI Tier 2 or non-hydrocarbon releases immediately reportable to the regulator	+ Systemic minor breaches (or one moderate breach) of legislation, instruments or contract + Company charged with an offence with minor penalty/fine + LOCI Tier 1 or cumulative regulator notification of non-hydrocarbon releases	+ Systemic moderate breaches (OR single material breach) of legislation, instruments or contract + Company charged with an offence with moderate penalty/fine	+ Material breaches of legislation, instruments or contract + Company or officers charged with an offence with material penalty/fine, or loss of tenure/operatorship	
	I	II	III	IV	V	VI		
Likelihood	ALMOST CERTAIN (< 4 monthly) Occurs in almost all circumstances OR could occur within days to weeks	f	Low	Medium	High	Very High	Very High	Very High
	LIKELY (4 monthly - 1 yearly) Occurs in most circumstances OR could occur within weeks to months	e	Low	Medium	High	High	Very High	Very High
	OCCASIONAL (1 - 3 yearly) Has occurred before in Santos OR could occur within months to years	d	Low	Low	Medium	High	High	Very High
	POSSIBLE (3 - 10 yearly) Has occurred before in the industry OR could occur within the next few years	c	Very Low	Low	Low	Medium	High	Very High
	UNLIKELY (10 - 30 yearly) Has occurred elsewhere OR could occur within decades	b	Very Low	Very Low	Low	Low	Medium	High
	REMOTE (30 - 100 yearly) Requires exceptional circumstances and is unlikely even in the long term OR only occurs as a "one in 100 year event"	a	Very Low	Very Low	Very Low	Low	Medium	Medium

Operational Risk Assessment Requirements

Risk Level	Action	Governance Mechanism	Authority for Continued Tolerance of Risk	Control Development and Timeframe	Control Ownership
Very High	+ Following verification of the risk at 'Very High' activity must stop + Activity cannot recommence until controls are implemented to reduce risk to 'High' or lower + For incidents, a dedicated multi-disciplinary incident investigation team will be formed + Level 3 Manager or Excom member will be included in the investigation team	+ Controls will be governed at the Operations Committee meeting or equivalent forum + Sponsorship of incident investigation by EVP or Level 2 Manager	+ CEO	+ Intolerable Risk Level + Develop and implement controls urgently to reduce risk to 'High' or lower as soon as practicable	+ Level 2 Manager (e.g. Executive Vice President)
High	+ Assess risk to determine if it is reduced So Far As Is Reasonably Practicable (SFAIRP) + If SFAIRP, activities related to maintenance of controls will be prioritised and managed + If not SFAIRP, improve existing controls and/or implement new control(s) + For incidents, a dedicated multi-disciplinary incident investigation team will be formed	+ Controls will be governed at Divisional level meeting or equivalent forum + Sponsorship of incident investigation by Level 3 Manager	+ EVP or Level 2 Manager	+ Action to reduce risk level to 'Medium' or below	+ Level 3 Manager (e.g. General Manager)
Medium	+ Assess risk to determine if SFAIRP + If SFAIRP, activities related to maintenance of controls will be prioritised and managed + If not SFAIRP, improve existing controls and/or implement new control(s) + Incidents are assessed using Mining the Diamond and investigated relative to the incident potential	+ Controls will be governed at Area level meeting or equivalent forum + Sponsorship of incident investigation at Level 4 Manager	+ General Manager or Level 3 Manager	+ Manage and monitor risk efficiently in accordance with business management plans	+ Level 4 Manager (e.g. Asset or Functional Manager)
Low	+ Assess risk to determine if SFAIRP + If SFAIRP, activities related to maintenance of controls will be prioritised and managed + If not SFAIRP, improve existing controls and/or implement new control(s) + Incidents are assessed using Mining the Diamond and investigated relative to the incident potential	+ Controls will be governed at site level meeting or equivalent forum + Sponsorship for incident investigation at Level 5 Manager	+ Level 4 Manager	+ Manage and monitor risk efficiently in accordance with business management plans	+ Level 5 Manager (e.g. Area Manager, Team Leader, Superintendent or equivalent)
Very Low	+ Risk to be managed as stipulated by the related work processes	+ Governed if required	+ Level 5 Manager	+ Manage and monitor risk efficiently in accordance with business management plans	+ Any individual contributor

5. Monitoring and reporting

Consent condition B41(d)(xi) states that this WMP must include a protocol to report on the measures, monitoring results and performance criteria identified in the conditions relevant to each of the sub-plans and protocols, in the Annual Review referred to in CoC D8.

In turn, D8 states that by the end of March each year, unless the Planning Secretary agrees otherwise, Santos must submit an Annual Review of the environmental performance of the development to the Department via the Major Projects Portal and that this review must:

- (a) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;
- (b); ⁵
- (c);
- (d) include a comprehensive review of the monitoring results and complaints records⁶ of the development over the previous calendar year, including a comparison of these results against the:
 - (xii) relevant statutory requirements, limits or performance measures/criteria;
 - (i) requirements of any plan or program required under this consent;
 - (ii) monitoring results of previous years; and
 - (iii) relevant predictions in the document/s listed in condition A2(c);
- (e) identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- (f) evaluate and report on compliance with the performance measures, criteria and operating conditions in this consent;
- (g) identify any trends in the monitoring data over the life of the development;
- (h) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- (i) describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.

Monitoring and reporting requirements as specified in the relevant consent conditions for each of the sub-plans and protocols are fully detailed and addressed in each of the individual documents. Each Annual Review will consider new and existing information, monitoring data and reports from the previous complete calendar year.

The preparation of the Annual Review in accordance with Condition D8 comprises the protocol to report on the measures, monitoring results and performance criteria.

In accordance with CoA 7, CoC D13, and as described in section 6 of the EMS, all monitoring data and associated reports will be made available on the Project website, for the duration of the Project.

⁵ . Item (b) and (c) relate to biodiversity credit retirements and greenhouse gas emissions respectively, which are not relevant to the Water Management Plan.

⁶ Complaints are handled in accordance with the process detailed in the Environmental Management Strategy.

6. Trigger action response plans

Trigger action response plans (TARPs) are developed to identify, assess and respond to abnormal conditions and are implemented to manage risk to operations, personnel and the environment. All TARP documents are stored on the Santos intranet and are available to all Santos Operations personnel. In addition to the trigger points and associated actions to be undertaken, these documents also detail the delegation of responsibility at each trigger point and contact details for both internal and external notification requirements.

A typical TARP document sets out a certain set of conditions (or “triggers”) and a set of actions which managers, supervisors and field personnel must follow when those trigger events occur. TARPs also typically include a number of different trigger levels, each with a set of responsibilities assigned to personnel to action as necessary.

A number of trigger action response plans (**TARPs**) have been developed to identify, assess and respond to abnormal conditions and are implemented to manage risk to operations, personnel and the environment.

TARP(s) relevant to each of the sub-plans and protocols are fully detailed and addressed in each of the individual sub-plans. A list of the current Phase 1 TARPs is provided in Table 6.1.

All TARPs are stored on the Santos intranet and are available to all Santos Operations personnel. In addition to the trigger points and associated actions to be undertaken, these documents also detail the delegation of responsibility at each trigger points and contact details for both internal and external notification requirements.

Table 6.1 - Trigger action response plans

Management Plan	TARPs
Dust Suppression Protocol	<ul style="list-style-type: none"> No specific TARPs
Erosion and Sediment Control Plan	<ul style="list-style-type: none"> Erosion and sediment control inspections
Groundwater Management Plan	<ul style="list-style-type: none"> Produced water volume, pressure and quality Subsidence
Irrigation Management Plan	<ul style="list-style-type: none"> Crop health Waterlogging (surface ponding and runoff) Salinity in soil Sodicity in soil Salinity in groundwater Native vegetation community health
Produced Water Management Plan	<ul style="list-style-type: none"> Produced Water Pond Level Management Leewood Pond Leakage Management

Management Plan	TARPs
Site Water Balance	<ul style="list-style-type: none"> • Water balance (Produced water and brine storage at Leewood ponds)
Surface Water Management Plan	<ul style="list-style-type: none"> • Downstream water quality (watercourses) • Erosion and sediment control • Channel stability • Downstream water users • Downstream flooding impact • Riparian vegetation

7. Record keeping

Santos has a data management plan for the NGP that outlines the policies and procedures that will be implemented to ensure that data is managed in a consistent, efficient and effective manner in order to provide accurate records of activity operations and enhance the value of the data collected. An overview of Santos' data management plan is presented in Figure C1 of Appendix C, in the form of a data-management flow chart.

Santos uses a number of systems and platforms to manage the documentation and data associated with the activities under this Protocol. These include Sharepoint for management plans, procedures and laboratory reports; Santos' EHS Toolbox for capturing inspections and field assessments; and EQUIS⁷, an advanced environmental data management and decision support system, for capturing all data and any laboratory results.

Key records associated with this Plan and the associated sub-plans and protocols that will be stored and managed include:

- inspection and monitoring records;
- operational monitoring and performance data for water treatment and water transfer systems;
- water sampling and laboratory analytical reports;
- calibration records;
- records of implementation of any TARP;
- records of any reviews of this Plan and the appended plans and protocols; and
- annual inspection reports and/or certifications.

Monitoring data is subject to quality assurance (**QA**) and quality control (**QC**) protocols and procedures that ensure that data is accurate and usable. Data is subjected to consistent validation and verification procedures. Any data that fails QA and QC procedures is rejected for future use.

Records are to be kept in a legible form for production to any inspector for a period of four years following the expiry or termination of a prospecting title, in compliance with sections 97D and 97E of PO Act. Records associated with a code of practice may need to be kept for a longer period.

Specific record keeping requirements that may be required for any of the management plans or protocols are fully detailed and addressed in the respective documents.

^{7 7} EQUIS (Environmental Quality Information System) is a proprietary software application.

8. Incidents, non-compliances and complaints

8.1 Incidents and non-compliances

Incident reporting and non-compliance notification will be in accordance with CoC D6 and D7 respectively, as described in section 6 of the EMS. Santos will notify the DPE and any other relevant agency via the Major Projects Portal immediately after becoming aware of an incident.

Within 7 days of becoming aware of a non-compliance with the CoC, Santos will notify the Department of the non-compliance via the Major Projects Portal. This notice will set out the non-compliance, the reasons for the non-compliance (if known) and what actions have been taken, or will be taken, to address the non-compliance. A non-compliance which has been notified as an incident will not be notified as a non-compliance.

Where incidents or non-compliances associated with this WMP (or the sub-plans in the attachments) are identified, Santos will:

- take all reasonable and feasible steps to ensure that the incident or non-compliance ceases and does not reoccur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to the relevant department(s) describing options and any preferred remediation measures or other courses of action; and
- implement remediation measures as directed by the relevant department(s).

8.2 Complaint management

Santos has a documented *Complaint Management Procedure* that is communicated to all relevant staff members. Complaints can be directed to Santos via phone or email 24 hours a day, 7 days a week. Contact details are publicly available on the Project website and are presented in Appendix D of the EMS.

All complaints are logged on a complaint form which includes the following details:

- date and time of the complaint;
- complainant details;
- details of the issue or complaint;
- actions taken to remediate the issue, if any;
- follow up actions required, if any;
- details of further liaison with complainant, if any; and
- closure date and time of the issue.

As per CoC D13, Santos maintains a complaint register which is updated as required and available on the Project website.

9. Reporting, evaluation and review

9.1 Annual Review

In accordance with CoC B41(d)(xi) and CoC D8 and as further described in the EMS, Santos will review the performance of its water management measures as described in this WMP and all associated water management sub-plans for the previous calendar year and report the relevant results within the Annual Review, to the satisfaction of the Planning Secretary. The Annual Review will be submitted to the Department via the Major Projects Portal by the end of March each year, and will at a minimum provide the following information regarding:

- the effectiveness of the water management measures as described in this WMP and all associated water management sub-plans to prevent, and if prevention is not reasonable and feasible, to minimise any impact from the management of water associated with the Project; and
- any water management incidents, non-compliances and complaints.
- monitoring results, including any trends;
- compliance with performance measures, performance criteria and operating conditions;
- discrepancies between predicted and actual impacts; and
- measures to be implemented to improve environmental performance.

The Annual Review may also make recommendations for any additions, changes or improvements to the water management strategies and processes.

9.2 Independent environmental audits

Within one year of commencement of Phase 1 and every three years thereafter, Santos will commission an Independent Environmental Audit (IEA) of the operation, to be conducted in accordance with CoC D9. The audit team will be led by a suitably qualified auditor and include experts in groundwater, well integrity, hazards, and any other fields specified by the Planning Secretary.

The IEA process is further described in section 8.3 of the EMS.

9.3 Management Plan review and evaluation

As required by CoC D4, Santos will review the suitability of existing strategies, plans and programs required under this consent, within two months of:

- (a) the submission of an incident report;
- (b) the submission of an Annual Review;
- (c) the submission of an Independent Environmental Audit;
- (d) the submission of a Field Development Plan;
- (e) the submission of a Groundwater Model Update; or
- (f) the approval of any modification of the conditions of SSD 6456.

This is to ensure the WMP is updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the Project.

In view of the various conditions requiring annual reviews, suitability assessments and performance evaluations, this WMP will also be reviewed and, if necessary, updated in at least the following circumstances:

- in accordance with any direction from the NSW EPA or the Minister administering the PO Act;
- on exceedance of any measures, monitoring data or performance criteria (e.g. as mandated by a TARP) that justify that an update to this Plan is required; or
- otherwise at intervals of no longer than one year, after the submission of the Annual Review (as per condition D4).

The review history table in the front of this Plan provides the details of each review, conducted in accordance with condition D4.

As required by CoC D5, if the review under condition D4 determines that the WMP requires revision - to either improve the environmental performance of the development, cater for a modification or comply with a direction - then Santos will submit the revised document to the Planning Secretary for approval within 6 weeks of the review.

As required by consent condition B42, Santos will implement the WMP once it has been approved by the Planning Secretary. Further, in accordance with CoA 5, Santos will provide DCCEEW with the approved WMP within 2 business days of its approval.

Further details on the reporting, evaluation and review of the WMP are provided in section 8 of the EMS.

9.4 Improvement measures

Santos will conduct a program to investigate and implement ways to improve the environmental performance regarding irrigation over time, and implement a protocol for the periodic review of the IMP, in accordance with CoC D3(g) and (i) respectively.

Measures to improve the environmental performance of the Project that will be implemented following review and evaluation include the following:

- audit of the irrigation management system, reviewing the water treatment plant operation and the management measures;
- implementation of modifications to the IMP; and
- additional monitoring and inspections.

The protocol for review is set out by consent conditions D8, D4 and D5, which have been addressed in sections 9.1 and 9.3 above.

In accordance with CoC D13 and as described in section 6 of the EMS, all relevant monitoring data and associated reports will be made available on the Project website, for the duration of the Project. This information will be kept up to date.

10. References

CDM Smith (2016a). *Narrabri Gas Project EIS Appendix F: Groundwater Impact Assessment*. Prepared for Santos Ltd.

DEC (2004). *Environmental Guidelines - Use of Effluent by Irrigation*.

DECC (2008a). *Managing Urban Stormwater: Soils and Construction, Volume 2C, Unsealed Roads*. Department of Environment & Climate Change

DECC (2008b). *Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries*. Department of Environment & Climate Change

DPE (2017). *Code of Practice: Produced Water Management, Storage and Transfer*.

DPE (2022). *Guidelines for Groundwater Documentation for SSD/SSI Projects*. Technical guideline.

GHD (2017). *Narrabri Gas Project Environmental Impact Statement*. Prepared for Santos Ltd.

Landcom (2004) *Managing Urban Stormwater - Soils and Construction: Volume 1*.

OEH (2012). *Erosion and Sediment Control of Unsealed Roads - A Field Guide for Erosion and Sediment Control Maintenance Practices*

11. Glossary

Term	Definition ⁸
Access track	Cleared and graded track constructed where existing tracks are not available
Alignment	The line or lines that describe a linear-infrastructure route; it defines how linear infrastructure (such as a road, access track or pipeline) will be located in relation to the features encountered along the route
Alluvial	Sediments deposited following a decrease in velocity of flowing water
Alluvium	General term for unconsolidated fluvio-lacustrine deposits of inorganic materials (clay, silt, sand, gravel, and boulders) deposited following a decrease in velocity of flowing water
Alluvium aquifer	An aquifer formed within alluvium. See Alluvium.
Amended treated water	Produced water that has undergone treatment and amendment, as generally described in the EIS, to enable it to be used for beneficial reuse purposes including irrigation, stock watering, drilling ⁹ , construction and dust suppression
Approved disturbance area	The disturbance areas shown in the EIS as modified by any approved Field Development Plan
Aquatic ecosystems	The physical and chemical environment that contains a community of organisms (plants, animals, and microbes), and ecological processes within rivers and their riparian zones and reservoirs, lakes, wetlands and their fringing vegetation
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
Aquifer	A saturated permeable geologic unit that can transmit useful quantities of water
Baseline	A starting point used for future comparisons. Water baselines in context of the Narrabri Gas Project have been derived from long term water level and quality data presented in the Narrabri Gas Project Water Baseline Report.
Beneficial use	Beneficial use refers to the use of waters, including produced water from an oil or gas well, for a secondary purpose that has a positive value. Potential beneficial use options for produced water include domestic and livestock supply, industrial supply, irrigation supply, dust suppression and recreation.
Brine	Saline water with a total dissolved solid concentration of greater than 40,000 milligrams per litre. May be a wastewater produced by the desalination of coal seam water (e.g. by reverse osmosis)
Bund (or bunding)	Wall of a secondary containment system, usually in the form of an embankment, used to prevent sediment and liquids from entering the environment
Catchment	The area of land that collects and transfers rainwater into a watercourse
Cation exchange capacity	The number cations (positively charged ions) available in a soil. Cation exchange capacity can be used as a measure of soil fertility
Council	Narrabri Shire Council
Department	NSW Department of Planning Environment (DPE)
Depressurisation	The extraction of coal seam water to facilitate gas production causes depressurisation of the target coal seams, which has the potential to propagate into surrounding formations.

⁸ The majority of the definitions are as provided in the Development Consent for SSD 6456.

⁹ Note that when 'drilling' is stated in consent conditions, where relevant this has been interpreted to mean 'drilling and completions'.

Term	Definition ⁸
Discharge spring	Occur where water that has recharged sandstone sediments that outcrop on the margins of the Great Artesian Basin discharges after having travelled underground for relatively large distances and over an extended period of time.
Drilling fluid	A fluid (sometimes referred to as a mud) made up of 70 to 80 per cent water that is pumped into wells during drilling to cool and lubricate the drill bit and carry drill cuttings to the surface
Ecosystem	An interconnected biological community of organisms that interact with each other and their physical environment.
EIS	The Environmental Impact Statement titled Narrabri Gas Project Environmental Impact Statement, dated 31 January 2017, submitted with the development application, including the Applicant's response to submissions and supplementary response to submissions, and the additional information provided by the Applicant to the Department in support of the application
Ephemeral	Relates to the amount of time that surface water persists in a watercourse or wetland; ephemeral watercourses flow only during significant rainfall events and for a short-time following rainfall events. Also known as intermittent.
Erosion	Wearing away of rock or soil caused by physical or chemical processes
Exploration well	A petroleum well that is drilled to: a) Explore for the presence of petroleum or natural underground reservoirs suitable for storing petroleum, or b) obtain stratigraphic information for the purpose of exploring for petroleum. For clarity, an exploration well is not a production well
Feasible	Means what is possible and practical in the circumstances
Fugitive dust	Dust derived from a mixture of non-point or not easily defined sources; examples include dust from vehicular traffic on unpaved roads, materials transport and handling and disturbed (unvegetated) soils and surfaces
Gaining stream	Streams that gain water from inflow of groundwater through the streambed. This can occur permanently or seasonally.
Gas compression facility	A facility that houses multiple compressor units, either nodal or hub compressors or a mixture of both used to increase the pressure of gas for the purpose of transmission; may be collocated with a gas treatment facility and/or water management facility
Gas field infrastructure	All Project-related infrastructure, excluding the Leewood facility, Bibblewindi facility and the road upgrades required under SSD 6456
Gas well	Pilot wells and production wells
Gathering lines	Pipelines used to transfer gas and produced water from wells
Groundwater	Water contained in the interconnected pore spaces and voids of the saturated zone of sediments and rocks.
Groundwater dependent ecosystem	Ecosystems that have a species composition and natural ecological processes sustained to some extent by groundwater.
Groundwater level (or static / standing water level)	The depth to groundwater from some reference point (usually the natural surface)
Groundwater monitoring network	An arrangement of groundwater monitoring bores that is usually installed to monitor groundwater quantity and quality to inform how a groundwater system is responding to some applied stress, such as irrigation pumping and application, coal seam gas development, municipal water supply and climate variability
Groundwater quality	A measure of groundwater value expressed in physio-chemical terms, such as acidity / alkalinity, dissolved oxygen, dissolved salts, ions and contaminants like

Term	Definition ⁸
	hydrocarbons
Groundwater quantity	A measure of the amount of groundwater held within a groundwater system, usually expressed as groundwater head (elevation or pressure), volume or flux
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance
InSAR	Interferometric Synthetic Aperture Radar - a radar technology used in geodesy and remote sensing to assess motion of ground surface over time
Irrigation scheme	The use of water for agricultural production. In the case of the Narrabri Gas Project, treated water is proposed to be used for irrigation as part of the overall Produced Water Management Plan
Linear infrastructure	Project related infrastructure of a linear nature including gas and water gathering lines, gas and water pipelines, access tracks, power lines, communication lines and other service lines
Losing stream	Streams that lose water by outflow through the streambed. This can occur permanently or seasonally
Major facilities	Leewood facility and Bibblewindi facility
Managed release scheme	The managed release of treated water into Bohena Creek as one of the beneficial uses of produced water ¹⁰
Material harm	Material harm to the environment is defined in Section 147 of the POEO Act
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Project
Mitigation	Activities associated with reducing the impacts of the development
Namoi Alluvium	The Upper Namoi Alluvium, an aquifer made of coarse-grained river gravels and sands. The Lower Namoi Alluvium, a hydrostratigraphic unit made of shallow alluvial fan deposits associated with the Namoi River. These units contain a significant resource of readily accessible, good quality groundwater that is heavily utilised for irrigation, public water supply, private water supply and livestock
Non-compliance	An occurrence, set of circumstances or development that is a breach of the SSD 6456 consent
Petroleum Assessment Lease 2 (PAL 2)	A PAL is required to hold the exclusive right to prospect for petroleum and to assess any petroleum deposit over a specified area of land in NSW. A lease allows the holder to maintain a title over a potential area, without having to commit to further exploration. The holder can, however, continue prospecting operations and to recover petroleum in the course of assessing the viability of commercial mining. PAL 2 is held by Santos NSW Pty Ltd.
Petroleum Exploration Licence 238 (PEL 238)	Before exploring for minerals or petroleum in NSW, an explorer must first obtain a Petroleum Exploration Licence (PEL) under the Petroleum (Onshore) Act 1991. An exploration licence gives the licence holder exclusive rights to explore for petroleum or specific minerals within a designated area but it does not permit mining, nor does it guarantee a mining or production lease will be granted. PEL 238 is held by Santos NSW Pty Ltd.
Petroleum Production Lease 3 (PPL 3)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. PPL 3 is held by the following titleholders: <ul style="list-style-type: none"> • Santos QNT Pty Ltd;

¹⁰ Note that there will be no discharge to Bohena Creek for Phase 1.

Term	Definition ⁸
	<ul style="list-style-type: none"> • Santos NSW (Hillgrove) Pty Ltd; and • Santos NSW (Eastern) Pty Ltd.
Petroleum production lease application (PPLA)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. Development consent under the Environmental Planning and Assessment Act 1979 must be in place before a petroleum production lease can be granted. Santos, on behalf of its joint venture partner lodged four petroleum production lease applications under the PO Act in May 2014 for the Project area, being PPLAs 13, 14, 15 and 16. The ownership of the application is now held by Santos NSW Pty Ltd.
Pilot well	A well for gas and water extraction, for the purpose of exploration, appraisal and assessment of the gas field potential
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
Pollution incident	Has the same meaning as in the POEO Act
Produced water	Any form of groundwater that is actively extracted from a borehole, well or excavation, excluding incidental groundwater mixed with drilling fluids
Production well	A well for gas and water extraction, for the purpose of commercial gas production and/or use
Project area	The area of approximately 95,000 hectares that encompasses the Project
Project footprint	The area of surface expression being about 1,000 hectares occupied by the infrastructure components of the Narrabri Gas Project
Project-related infrastructure	All infrastructure and other structures associated with the development. This includes linear infrastructure and non-linear infrastructure, surface infrastructure and subsurface infrastructure, major facilities, wells and well pads and other gas field infrastructure
Reasonable	Means applying judgement in arriving at a decision, considering mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Recharge spring	A spring supported by water that recharges sandstone sediments that outcrop on the margins of the Great Artesian Basin and discharge locally after relatively short residence times.
Red-brown Clays	A type of soil described as gradational brown to red-brown cracking sandy clays
Red-brown Earths	A type of soil described as gradational red-brown clay loams
Registered bore	A water bore whose presence has been notified to the Water NSW and included in its registered groundwater bore database. The database typically includes details on bore location, construction and where possible, the source aquifer.
Rehabilitation	The restoration of land disturbed by the development to ensure it is safe, stable and non-polluting over the short, medium and long term
Riparian	Situated along or near the bank of a watercourse
RREO	Resource Recovery Exemption under clauses 91 and 92, and/or Resource Recovery Order under clause 93, of the Protection of the Environment (Waste) Regulation 2014
Spring	A naturally occurring discharge of groundwater flowing out of the ground, often forming a small stream or pool of water. Typically, it represents the point at which the water table intersects the ground level.

Term	Definition ⁸
Scour	Erosion of sediment that occurs around structures in a watercourse due to increased velocity
Sediment	Particles derived from rocks or biological materials that have been transported by air or water
Sedimentation	Deposition or accumulation of mineral or organic matter deposited by air or water
Strahler stream order	The stream order classification system based on Strahler, A.N. (1952) Dynamic basis of geomorphology. Geological Society of America Bulletin, 63, 923-938
Treated water	Produced water that has undergone treatment to enable it to be used for beneficial reuse purposes including irrigation, stock watering, drilling ¹¹ , construction and dust suppression, and/or for managed release to Bohena Creek ¹²
Watercourse	A river, creek or other stream, including a stream in the form of an anabranch or tributary, in which water flows permanently or intermittently, regardless of the frequency of flow events: In a natural channel, whether artificially modified or not, or in an artificial channel that has changed the course of the stream. It also includes weirs, lakes and dams
Water sharing plan	Legislated plans under the <i>Water Management Act 2000</i> that establish rules for sharing water between the environment and water users. Water licences are issued to water users in accordance with water sharing plans
Well	Pilot wells and production wells
Well pad	An area of up to 1 hectare in size upon which the gas wells are to be located, with the area decreasing to no more than 0.25 hectares following rehabilitation ¹³ , or other area as may be approved in the Field Development Plan

¹¹ Note that when 'drilling' is stated in consent conditions, where relevant this has been interpreted to mean 'drilling and completions'.

¹² Note that there will be no discharge to Bohena Creek during Phase 1.

¹³ Workover activities will be contained within the operational area of the well pad area of around 0.2 ha, with an additional laydown area that could be approximately 0.2 ha in size.

Appendix A - Consultation records



Ms Cassie Hay
Senior Environmental Advisor
Onshore Oil & Gas
Santos Limited
By email: cassie.hay@santos.com

17/02/2021

Dear Ms Hay

**Narrabri Gas Project (SSD 6456)
Approval of Experts**

I refer to your request dated 12 February 2021 for the Planning Secretary's approval of suitably qualified persons to prepare the Water Management Plan for the Narrabri Gas Project, as required by Condition B41 of Development Consent SSD 6456.

The Department has reviewed the information you have provided and is satisfied that the nominated experts are suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of:

- Mr David Gornall of Santos,
- Mr Mark Vile of Onward Consulting;
- Dr. Richard Cresswell of Eco Logical (to prepare the Groundwater Management Plan); and
- Dr Detlef Bringermeier of CDM Smith (to prepare the Groundwater Modelling Plan);

If you wish to discuss the matter further, please contact Rose-Anne Hawkeswood on 9274 6324.

Yours sincerely

A handwritten signature in black ink, appearing to be 'S O'Donoghue'.

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary



Natural Resources
Access Regulator

Contact: Tim Baker
Phone: 0428 162 097
Email : Tim.Baker@nrar.nsw.gov.au

Our ref: V15/3875-5#53
File No:
Your Ref:

27 September 2021

Dave Gornall
Santos Limited
email: David.Gornall@santos.com

Dear Dave

Re: Narrabri Gas Project - Water Management Plans second batch

Thank you for the opportunity to provide comment on the second set of plans under the Water Management Plan requirement for Phase 1 of the Narrabri Gas Project. It is understood this consultation is in accordance with the Condition B41 of Project Approval SSD 6456. The plans reviewed include the Water Management Plan, Erosion and Sediment Control Plan, Produced Water Management Plan, Irrigation Management Plan and the Pollution Incident Response Management Plan. NRAR is satisfied the consultation requirements have been met in respect to the plan preparation and provides the following comments.

- It is recommended the Water Management Plan include a map that depicts the location of the existing and proposed infrastructure for the Phase 1 activities.
- In Section 4.2 of the Produced Water Management Plan it is noted 1.26ML/d of produced water is predicted from operation of the existing and proposed pilot wells. It is recommended a reference be included to how this water take is to be accounted for by inclusion of relevant Water Access Licence numbers and entitlement, and relevant linked Work Approval/Miscellaneous Work numbers.
- The Erosion and Sediment Control Plan refers to water needed for dust suppression, but no details are provided on the volumes/water source and any relevant water license details. It is recommended this information be included in this plan or the separate Dust Suppression Protocol.
- It is recommended Section 5.9 of the Erosion and Sediment Control Plan include a reference to the need to design works in watercourses in accordance with the "Guidelines for Controlled Activities on Waterfront Land (NRAR 2018)". It is also recommended that these guidelines are reviewed against the proposed design for works within waterfront land such as Appendix D and E. The guidelines are accessible at the following link: <https://www.nrar.nsw.gov.au/how-to-apply/controlled-activities/guidelines-for-controlled-activities>

2

For further information please contact Tim Baker, Senior Water Regulation Officer on 0428162097 or e: Tim.Baker@nrar.nsw.gov.au

Yours sincerely



Tim Baker

for

Shavaun Tasker

A/Manager Licensing and Approvals – Water Regulatory Operations - West

Natural Resources Access Regulator

Department of Planning, Industry and Environment

Santos

Management Plan Consultation Feedback Form

DOCUMENT TITLE: Water Management Plan

STAKEHOLDER: NSW Environment Protection Authority

CONSULTATION RELEASE DATE: 3 August 2021

COMMENTS DUE DATE: 11 October 2021

General Feedback

Key Issues	<p><u>Water guidelines</u></p> <p>Section 3.4.7, p27, states that: "In reference to Appendix 6, it is to be noted however that there is some ambiguity around the performance measure in Table 7 of the CoC which requires 'all produced water to be treated to meet the treated water quality criteria in Appendix 6'. Appendix 6 includes multiple columns of criteria, including 'target values' which were derived purely theoretically prior to commissioning of the WBTP during the preparation of the EIS. Actual operational values are now available, and these should be used rather than the target values, which were for design purposes only and should be discarded. The use of operational values rather than 'target values' is further addressed in the PWMP, IMP, Dust Suppression Protocol and the Site Water Balance. Operational values have been incorporated into the relevant tables in the plans and protocols together with the values reproduced from Appendix 6 of the CoC."</p> <p>Operational values are generally suitable to be used in the same manner as intended in the Consent, except for the key analyte of Sodium Adsorption Ratio. Sodium Adsorption Ratio for treated water (unamended effluent) is noted as "n/a" (not analysed) which is a significant omission if operational values are proposed to be replacing target values for some proposed or potential uses of unamended effluent. This needs to be addressed - see EPA's related comments on the Produced Water Management Plan.</p>
Suggestions for improvement	<p> </p> <p> </p> <p> </p> <p> </p> <p> </p>

Section	Type	Specific Feedback
<i>Detail specific issues with certain sections in the document</i>		
eg Section 2	Legislative + Regulatory reqs./ Readability / Usability /	Further detail is required about when a report is required and how the report is to be submitted.

Water Management Plan – NRAR comments received on Revision C (draft)

Item	Section #	Section heading	Existing text	Comment	Draft response
1		No reference	No specific text reference	It is recommended the Water Management Plan include a map that depicts the location of the existing and proposed infrastructure for the Phase 1 activities	Figure 1.2 provides the key assets and infrastructure for Phase 1. The final map with exact locations will be dependent on the approved Field Development Plan.

Water Management Plan – EPA comments received on Revision C (draft)

Item	Section #	Section heading	Existing text	Comment	Draft response
1	3.4.7	ANZECC Guidelines	<i>"In reference to Appendix 6, it is to be noted however that there is some ambiguity around the performance measure in Table 7 of the CoC which requires 'all produced water to be treated to meet the treated water quality criteria in Appendix 6'. Appendix 6 includes multiple columns of criteria, including 'target values' which were derived purely theoretically prior to commissioning of the WBTP during the preparation of the EIS. Actual operational values are now available, and these should be used rather than the target values, which were for design purposes only and should be discarded. The use of operational values rather than 'target values' is further addressed in the PWMP, IMP, Dust Suppression Protocol and the Site Water Balance. Operational values have been incorporated into the relevant tables in the plans and protocols together with the values reproduced from Appendix 6 of the CoC."</i>	Operational values are generally suitable to be used in the same manner as intended in the Consent, except for the key analyte of Sodium Adsorption Ratio. Sodium Adsorption Ratio for treated water (unamended effluent) is noted as "n/a" (not analysed) which is a significant omission if operational values are proposed to be replacing target values for some proposed or potential uses of unamended effluent. This needs to be addressed - see EPA's related comments on the Produced Water Management Plan.	Refer to the responses to the EPA comment in the Produced Water Management Plan, and the Dust Suppression Protocol. There are no proposed uses for unamended treated water during Phase 1.

Water Management Plan – WTAG comments received on Revision C

Comments received from Randall Cox, Jack Warnock and Michael Williams

Item	Section #	Section heading	Existing text	Comment	Final response
1	1.6	Structure of this Plan	No specific text reference	[Jack Warnock] Should the Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources be included in the Appendices?	Third-party, publicly available documents (e.g. legislation) are typically not appended to management plans, with these documents subject to amendment. It is deemed best practice to cross-reference to avoid future inconsistency. Note that the <i>Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2019</i> was repealed on 30 June 2020, and replaced by the <i>Water Sharing Plan for the Namoi Alluvial Groundwater Sources 2020</i> .
2	3.1.1	Commonwealth legislation	The plan aims to achieve a balance between environmental, economic and social considerations and limits water use to environmentally sustainable levels for both surface water and groundwater resources.	[Randall Cox] Sub heading 'Water Act 2007' - 2nd last line – should be 'limit' not 'limits'	The use of 'limits' is correct in this instance.
3	3.3.4	Development consent SSD 6456	Table 3.1	[Jack Warnock] In Feature: "irrigation and beneficial reuse management". Should "No <u>irrigation</u> ..." be replace with: "No <u>water use</u> ..."??	This is verbatim from Condition B37 Table 7 of the Project Approval
4	3.4.2	Well integrity code	No specific text reference	[Michael Williams] Should note that these requirements exceed 'Minimum Construction Requirements for Water Bores' which is a foot note on page (iv) of the Code of Practice.	Noted. This has been added to the text.
5	3.5	EIS commitments	The EIS commitments relevant to the management of water associated with the development have been listed Table 3.3, in accordance with consent condition D3(c) which states that STO must ensure....	[Jack Warnock] Page 28: I don't understand the reference in the first paragraph "... in accordance with consent condition D3(c) which states that STO..." Also, what does "STO" mean?	STO is short-form for Santos and has been corrected. The text has been amended to the following: The EIS commitments relevant to the management of water associated with the development have been listed Table 3.3, in accordance with consent condition D3(c) which states that Santos must ensure....
6	5	Monitoring and reporting	Consent condition B41(ix) states that this WMP must include a protocol...	[Jack Warnock] Page 33: First sentence" Consent condition B41(ix)..." doesn't relate to this condition in the document "Development Consent" that I have.	Correction made - this should be Condition B41(d)(xi). The text has been amended as follows: Consent condition B41(d)(xi) states that this WMP must include a protocol...
7	5	Monitoring and reporting	No specific text reference	[Randall Cox] Item 'b' of the CoC D8 has been left blank as '....'; Was this intended?	Correct, this was intentional. Item (b) relates to the reporting on the progress of biodiversity credit retirements, which is not relevant to the Water Management Plan. A footnote has been inserted in the Plan explaining the exclusion.
8	5	Monitoring and reporting	No specific text reference	[Michael Williams] Add: <i>Report on the progress of biodiversity credits retirements and the associated actual versus proposed surface disturbance for each stage</i> from CoC D8 b)	Refer to the response at item #7 above.
9	6	TARPs	No specific text reference	[Michael Williams] Are the measures to be made available in a consolidated form?	The TARPs are better off being located in the document in which they are mentioned rather than providing a stand-alone document which provides the TARPs all in one place. This is to ensure TARPs are presented in the right context and to meet a specific purpose.
10	7	Record keeping	No specific text reference	[Jack Warnock] 2 nd paragraph: What does "EQUIS" mean? It is not in the Acronym list.	EQUIS (Environmental Quality Information System) is a proprietary software application. A footnote with this information has been added to the text.
11	9	Glossary	Namoi Alluvium	[Michael Williams] It is unclear if this is referring to the 2 Water Sources (which seems most appropriate) or the alluvial deposits	The term in the glossary has been amended to the following: <i>Namoi Alluvium water source</i> This has been amended in all management plans and protocols.

Item	Section #	Section heading	Existing text	Comment	Final response
12	9	Glossary	Groundwater quantity	[Michael Williams] A measure of the amount of groundwater held within a groundwater system, usually expressed as groundwater head (elevation or pressure), <i>volume or flux</i> (Add)	The term in the glossary has been amended as proposed: A measure of the amount of groundwater held within a groundwater system, usually expressed as groundwater head (elevation or pressure), <i>volume or flux</i> .
13	9	Glossary	Alluvium	[Michael Williams] General term for unconsolidated <i>fluvio-lacustrine</i> deposits..... (Add)	The term in the glossary has been amended as proposed: General term for unconsolidated <i>fluvio-lacustrine</i> deposits of inorganic materials (clay, silt, sand, gravel, and boulders) deposited following a decrease in velocity of flowing water.
14	Appendix B	Data management system	Figure B1	[Jack Warnock] The Chart was VERY difficult to read	The chart has been revised to be clearer and legible.
15	Appendix C	WSP Area for the Naoi and Peel Unregulated Rivers Water Sources 2012	Figure C1	[Jack Warnock] What about the Water Sharing Plan for the Upper and Lower Namoi Groundwater Water Sources??	Note that the <i>Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2019</i> was repealed on 30 June 2020, and replaced by the <i>Water Sharing Plan for the Namoi Alluvial Groundwater Sources 2020</i> .

Note:

The numbering of the sections and appendices between the draft and final version of the document may have changed.

Appendix B - Compliance conditions relevant to the WMP

Table B1 - SSD 6456 consent conditions directly relevant to this WMP

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<p>Consent condition A1</p> <p>In meeting the conditions of this consent, the Applicant must implement all reasonable and feasible measures to prevent and, if prevention is not reasonable and feasible, minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the development.</p>	Section 1.6
<p>Consent condition A5</p> <p>The Applicant may only undertake the development in the following stages:</p> <p>a) Phase 1, comprising ongoing exploration and appraisal activities;</p> <p>b) Phase 2, comprising construction activities for production wells and related infrastructure;</p> <p>c) Phase 3, comprising gas production operations; and</p> <p>d) Phase 4, comprising gas well and infrastructure decommissioning, rehabilitation and mine closure.</p>	Section 1.1.2 Section 1.2
<p>Consent condition A23</p> <p>With the approval of the Planning Secretary, the Applicant may:</p>	
<p>a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program</p>	Section 1.2
<p>b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined);</p>	No combination proposed as part of this Plan
<p>c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development); and</p>	Section 1.2 Section 9.4
<p>d) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by a consent</p>	No combination proposed as part of this Plan
<p>Consent condition B26</p> <p>The Applicant must install and maintain suitable erosion and sediment control measures in the project area, in accordance with the relevant requirements in the guidance series <i>Managing Urban Stormwater: Soils and Construction - Volume 1</i> (Landcom, 2004) and <i>2E Mines and Quarries</i> (DECC, 2008).</p>	Refer to the ESCP in Attachment 1
<p>Consent condition B27</p> <p>The Applicant must ensure that it has enough water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.</p>	Refer to the SWB in Attachment 2

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<p>Consent condition B28</p> <p>Prior to the commencement of each Phase of the development, the Applicant must demonstrate that it has adequate water licences to account for the maximum predicted water take for the applicable Phase (including both short term and long term direct and indirect water take), to the satisfaction of the Planning Secretary.</p> <p><i>Note: The maximum predicted water take will be based on the most recent update of the water model.</i></p>	<p>Refer to the SWB in Attachment 2</p>
<p>Consent condition B29</p> <p>The Applicant must report on water extracted by the development each year (direct and indirect) in the Annual Review, including water taken under each water licence.</p> <p><i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development, including during rehabilitation and post closure.</i></p>	<p>Refer to the GMP in Attachment 4</p>
<p>Consent condition B30</p> <p>The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted (other than an impact that is minor or negligible) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Planning Secretary.</p>	<p>These conditions are not expected to be triggered during Phase 1.</p> <p>They will be further addressed in the updated management plans for future Projects phases.</p>
<p>Consent condition B31</p> <p>In the event of any doubt as to whether compensatory water supply is required to be provided under condition B30, it is a matter for the Applicant to demonstrate that any adverse and direct impact to a water supply that has been identified (other than an impact that is minor or negligible) is not as a result of the development.</p>	
<p>Consent condition B32</p> <p>The compensatory water supply measures must provide an alternative supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply must be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.</p>	
<p>Consent condition B33</p> <p>If the Applicant and the landowner cannot agree on whether the loss of water is to be attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.</p>	
<p>Consent condition B34</p> <p>If the Applicant is unable to provide an alternative supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary.</p>	

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<p>Consent condition B35</p> <p>Prior to commencement of Phase 4, the Applicant shall make arrangements to provide security for any compensation to be provided under condition B34. The arrangements for security should address the following matters to the satisfaction of the Planning Secretary:</p> <ul style="list-style-type: none"> (a) who the security is provided to; (b) the nature of the security; (c) how the security is to be calculated; (d) how the security may be accessed or returned; and (e) how the balance of the security is to be dealt with. <p>Notes: <i>The Water Management Plan is required to include trigger levels for investigating potentially adverse impacts on water supplies.</i></p>	Not relevant to Phase 1
<p>Consent condition B36</p> <p>The Applicant must ensure that all surface discharges from the development comply with:</p>	
<ul style="list-style-type: none"> a) discharge limits (both volume and quality) set for the development in any EPL or Resource Recovery Exemption and Order (RREO); and 	Refer to the SWMP in Attachment 3
<ul style="list-style-type: none"> b) relevant provisions of the POEO Act. 	
<p>Consent condition B37</p> <p>The Applicant must ensure that the development complies with the water management performance measures in Table 7 [of the CoC]:</p>	
<ul style="list-style-type: none"> • Water management -general 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Maximise water recycling, reuse and sharing opportunities 	Refer to the PWMP in Attachment 5
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Maximise beneficial reuse of treated water 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Minimise the need for discharge of treated water to Bohena Creek 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install, operate and maintain water management infrastructure in a proper and efficient manner 	Refer to the SWMP in Attachment 3
<ul style="list-style-type: none"> • Namoi alluvial aquifers and Great Artesian Basin aquifers 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Negligible environmental consequences to the aquifers beyond those predicted in the EIS, including: <ul style="list-style-type: none"> • negligible change in groundwater levels; • negligible change in groundwater quality; and • negligible impact to other groundwater users 	Refer to the GMP in Attachment 4
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ No exceedance of the minimal harm considerations in the <i>Aquifer Interference Policy</i> (DPI, 2012) 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Negligible change to baseline methane levels in groundwater user bores 	
<ul style="list-style-type: none"> • Gunnedah Oxley Basin aquifers 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Drawdown and water take to be generally consistent with the 'base case' predictions and produced water profile in the EIS 	Refer to the GMP in Attachment 4
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Negligible change in groundwater quality 	

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<ul style="list-style-type: none"> • Riparian and aquatic ecosystems 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Maintain or improve baseline channel stability in affected watercourses 	Refer to the ESCP in Attachment 1
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Negligible change to surface water quality in any watercourse 	Refer to the SWMP in Attachment 3
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Negligible impact on groundwater dependent ecosystems 	Refer to the GMP in Attachment 4
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1</i> (Landcom, 2004) and <i>2E Mines and Quarries</i> (DECC, 2008) 	Refer to the ESCP in Attachment 1
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012) 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install and maintain any creek crossings generally in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013) and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries, 2003) 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Develop site-specific in-stream water quality objectives in Bohena Creek in accordance with the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> (ANZECC & ARMCANZ, 2000) and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW</i> (DEC, 2006) 	Refer to the SWMP in Attachment 3
<ul style="list-style-type: none"> • Well integrity 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, construct, maintain and decommission gas wells in accordance with the <i>Code of Practice for Coal Seam Gas Well Integrity</i> (2012, as may be updated or amended), unless approval is granted to vary this standard by the Planning Secretary 	Refer to Table 3.1
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Minimise leakage of methane, carbon dioxide, drill fluids, saline groundwater and other potential contaminants to the environment 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ No oil-based or synthetic based drill fluids to be used in well construction 	Section 3.4.2
<ul style="list-style-type: none"> • Produced water management 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Implement all reasonable and feasible measures to minimise risk of leaks and spills 	Refer to the PWMP in Attachment 5
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install and maintain leak detection systems and fail-safe measures on the produced water management system 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ Design, install and maintain all produced water storage ponds to provide sufficient freeboard to accommodate a 72 hour 1 in 100-year ARI flood event 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ▪ All produced water to be treated to meet the treated water quality criteria in Appendix 6 of the CoC, unless otherwise authorised in an EPL 	

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<ul style="list-style-type: none"> ▪ Design, install and maintain produced water infrastructure in accordance with the <i>Exploration Code of Practice: Produced Water Management, Storage and Transfer</i> (DPE, 2017) 	
<ul style="list-style-type: none"> • Irrigation and beneficial reuse management 	
<ul style="list-style-type: none"> ▪ Negligible change to soil quality and groundwater quality and levels in irrigation areas and other areas subject to treated water application 	Refer to the IMP in Attachment 6
<ul style="list-style-type: none"> ▪ Only amended treated water to be used for reuse activities (except for firefighting), unless other use of treated water has been approved as part of the Water Management Plan 	
<ul style="list-style-type: none"> ▪ No irrigation in forested area, apart from dust suppression and construction activities on operational areas and access roads 	
<ul style="list-style-type: none"> • Bohena Creek water discharge 	
<ul style="list-style-type: none"> ▪ No discharge of treated water to Bohena Creek when the creek is flowing less than 100 ML/day (at the gauging station identified in the Water Management Plan) 	Refer to the PWMP in Attachment 5
<ul style="list-style-type: none"> ▪ Maximum discharge of 10 ML/day of treated water to Bohena Creek, unless otherwise authorised by an EPL 	
<ul style="list-style-type: none"> • Salt Management 	
<ul style="list-style-type: none"> ▪ Maximise beneficial reuse of produced salt, as far as reasonable and feasible 	Refer to the PWMP in Attachment 5
<ul style="list-style-type: none"> ▪ Classify produced salt in accordance with the EPA's Waste Classification Guidelines 	
<ul style="list-style-type: none"> ▪ Store produced salt on-site within weather-proof structure, prior to off-site transport for reuse or disposal 	
<ul style="list-style-type: none"> ▪ Dispose salt waste not able to be beneficially reused to appropriately licenced waste facility 	
<ul style="list-style-type: none"> • Chemical and hydrocarbon storage 	
<ul style="list-style-type: none"> ▪ Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard 	Refer to the SWMP in Attachment 3
<p>Consent condition B41</p> <p>Prior to the commencement of Phase 1, the Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:</p>	
<p>a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;</p>	Section 1.5
<p>b) be prepared in consultation with DPE Water, EPA and the Water Technical Advisory Group;</p>	Section 1.5
<p>c) describe the measures to be implemented to ensure that Santos complies with the water management performance measures (see CoC Table 7);</p>	Table 3.1
<p>d) include a:</p>	
<p>(i) Erosion and Sediment Control Plan;</p>	Refer to Attachment 1
<p>(ii) Site Water Balance;</p>	Refer to Attachment 2

SSD 6456 consent conditions directly relevant to this WMP	Section reference
(iii) Surface Water Management Plan;	Refer to Attachment 3
(iv) Groundwater Management Plan;	Refer to Attachment 4
(v) Produced Water Management Plan;	Refer to Attachment 5
(vi) Irrigation Management Plan;	Refer to Attachment 6
(vii) Dust Suppression Protocol;	Refer to Attachment 7
(viii) Managed Release Protocol;	Refer to section 6 of the PWMP (Attachment 5)
(ix) Salt Management Plan;	Refer to section 7 of the PWMP (Attachment 5)
(x) Pollution Incident Response Management Plan, and	Refer to Attachment 8
(xi) a protocol to report on the measures, monitoring results and performance criteria identified above, in the Annual Review.	Section 9.1
Consent condition D3 The Applicant must ensure that (where relevant) the management plans required under this consent include:	
a) a summary of relevant background or baseline data;	Refer to the Attachments 1 to 7
b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 3
(ii) any relevant limits or performance measures and criteria; and	Refer to the sub-plans and protocols
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 1.4
c) any relevant commitments or recommendations identified in the documents that together comprise the NGP EIS;	Section 3.5
d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Refer to the sub-plans and protocols
e) a program to monitor and report on the:	Refer to the attached sub-plans and protocols
(i) impacts and environmental performance of the Project; and	
(ii) effectiveness of the management measures set out pursuant to paragraph (d);	
f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Refer to section 8 of each sub-plan and protocol
g) a program to investigate and implement ways to improve the environmental performance of the development over time	Refer to section 10 of each sub-plan and protocol
h) a protocol for managing and reporting any:	Section 6

SSD 6456 consent conditions directly relevant to this WMP	Section reference
(i) incident, non-compliance or exceedance of any impact assessment criterion and performance criterion	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements; and	
i) a protocol for periodic review of the plan.	Section 8
<p>Consent condition D4</p> <p>Within 2 months of:</p> <ul style="list-style-type: none"> (a) the submission of an incident report; (b) the submission of an Annual Review; (c) the submission of an Independent Environmental Audit; (d) the submission of a Field Development Plan; (e) the submission of a Groundwater Model Update; or (f) the approval of any modification of the conditions of this consent, <p>the Applicant must review the suitability of existing strategies, plans and programs required under this consent.:</p>	Section 9.3
<p>Consent condition D5</p> <p>If the review determines that the strategies, plans and programs required under this consent require revision – to either improve the environmental performance of the development, cater for a modification or comply with a direction - then the Applicant must submit the revised document to the Secretary for approval within 6 weeks of the review.</p> <p>Note: <i>This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 9.3
<p>Consent condition D6</p> <p>The Applicant must notify the Department and any other relevant agencies via the Major Projects Portal immediately after it becomes aware of the incident. This notice must describe the location and nature of the incident.</p>	Section 8.1
<p>Consent condition D7</p> <p>Within 7 days of becoming aware of a non-compliance with the conditions of this consent, the Applicant must notify the Department of the non-compliance via the Major Projects Portal. This notice must set out the non-compliance, the reasons for the non-compliance (if known) and what actions have been taken, or will be taken, to address the non-compliance.</p> <p>Note: <i>A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance</i></p>	Section 8.1
<p>Consent condition D8</p> <p>By the end of March each year, unless the Planning Secretary agrees otherwise, the Applicant must submit an Annual Review of the environmental performance of the development to the Department via the Major Projects Portal.</p>	Section 9.1
<p>Consent condition D9</p> <p>Within one year of commencement of Phase 1 and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development.</p>	Section 9.2

SSD 6456 consent conditions directly relevant to this WMP	Section reference
<p>Consent condition D13</p> <p>From the commencement of Phase 1, until the completion of all rehabilitation required under this consent, the Applicant must:</p>	
<p>a) make copies of the following information publicly available on its website:</p> <ul style="list-style-type: none"> (i) the document/s listed in condition A2(c); (ii) current statutory approvals for the development; (iii) approved strategies, plans and programs; (iv) detailed plans for the Phases of the development; (v) minutes of CCC and Advisory Group meetings; (vi) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; (vii) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (viii) a summary of the current phase/s and progress of the development; (ix) contact details to enquire about the development or to make a complaint; (x) a complaint register, updated monthly; (xi) a record of all incidents and non-compliances; (xii) the Annual Reviews of the development; (xiii) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and (xiv) any other matter required by the Planning Secretary; and 	Section 1.8
<p>b) keep such information up to date.</p>	Section 1.8

Table B2 - EPBC 2014/7376 approval conditions directly relevant to this WMP

EPBC 2014/7376 approval conditions directly relevant to this WMP	Section reference
<p>Approval condition 5</p> <p>For the protection of water resources, the approval holder must comply with conditions A15-A17 and B26-B42 of the NSW approval relating to water management.</p> <p>The approval holder must achieve and maintain the performance measures in the NSW approval to demonstrate that the outcomes and sub-outcomes specified in Appendix B [of the CoA] are being achieved and maintained.</p>	<p>This WMP</p> <p>Table 3.1</p> <p>Table 3.2</p>
<p>Approval condition 6</p> <p>The approval holder must provide DCCEEW with the approved Water Management Plan required by condition B41 of the NSW approval within 2 business days of its approval by the NSW Planning Secretary. The approval holder must notify DCCEEW within 2 business days of any proposed changes to the approved Water Management Plan. If the NSW Planning Secretary approves a revised version of the Water Management Plan, the approval holder must provide DCCEEW with the approved revised Water Management Plan within 2 business days of its approval by the NSW Planning Secretary.</p>	<p>Section 8</p>
<p>Approval condition 7</p> <p>The approval holder must establish an early warning monitoring system to detect groundwater pressure changes in deeper hydrostratigraphic units, so as to be able to take corrective actions in sufficient time to prevent impacts in shallow productive aquifers and GDEs. In addition to the monitoring requirements specified in the approved Groundwater Management Plan required under condition B41 of the NSW approval, Santos must:</p> <ul style="list-style-type: none"> a) establish and maintain a network of groundwater monitoring bores across the Project area in the Napperby Sandstone. In the Project area where the Napperby Sandstone is in direct contact with the Namoi Alluvium, an appropriate network of groundwater monitoring bores must also be established and maintained in those areas in the Digby Formation. These monitoring bores must be installed prior to the commencement of Phase 2; b) monitor groundwater levels in these bores at a minimum of 3-monthly intervals from the commencement of Phase 1 or bore construction (whichever is first) until the completion of the Project; and c) publish all groundwater monitoring data from all bores, updated to add the most recent readings each quarter, on the website, and maintain that data on the website until the completion of the Project. The monitoring data must include hydrographs for all monitoring bores and explain what the data means in relation to the groundwater performance criteria specified in the NSW-approved Groundwater Management Plan. 	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 8</p> <p>If, at any time until the end date of this approval:</p>	
<ul style="list-style-type: none"> a) the approval holder detects an exceedance of any groundwater performance criterion (including trigger levels), specified in the approved Groundwater Management Plan required by condition B41 of the NSW approval; and/or 	<p>Refer to the GMP in Attachment 4</p>
<ul style="list-style-type: none"> b) the groundwater model, including any update required under condition B39 of the NSW approval, predicts an exceedance of the groundwater performance criteria (including trigger levels), specified in the approved Groundwater Management Plan; 	

EPBC 2014/7376 approval conditions directly relevant to this WMP	Section reference
<p>the approval holder must notify DCCEEW of the exceedance within 10 business days of detecting or predicting the exceedance.</p>	
<p>Approval condition 9 The approval holder must, within 6 months of detecting or predicting an exceedance as described in condition 8, publish on the website a report describing:</p> <ul style="list-style-type: none"> a) all potential and actual impacts to water resources arising from the exceedance; b) any further investigations undertaken to determine the cause of and remedy for the exceedance; and c) the mitigation and management measures that Santos has taken and proposes to take to reverse the exceedance, including data demonstrating the effectiveness of the mitigation and management measures. 	<p>Refer to the GMP in Attachment 4</p>
<p>The approval holder must notify DCCEEW within 2 business days of the report being published and retain the report on the website for the life of the approval.</p>	
<p>Approval condition 10 If, after the implementation of condition 9 the approval holder detects or predicts that the outcomes specified in CoA Appendix B cannot or will not be achieved, or the Minister considers that the outcomes specified in CoA Appendix B cannot or will not be achieved, then the approval holder must provide a site-specific assessment for the Minister's written approval within 3 months of making the prediction or of receiving a request from the Minister.</p>	
<p>Approval condition 11 Each site-specific assessment must incorporate data collected from the groundwater monitoring bores required by CoA 7 and be prepared by a suitably qualified water resources expert to derive a scientifically robust cease-work limit. Each site-specific assessment must include justification for how the outcomes specified in CoA Appendix B will be achieved and maintained and include:</p> <ul style="list-style-type: none"> a) multiple lines of evidence and field data to support the assessment of the environmental value and groundwater-dependence of any potential GDEs identified in the area of predicted impact; b) conceptual modelling, including a review of all historical monitoring data to determine the stressor-response relationships for any potential GDEs and consideration of potential contributing activities; c) local scale numerical modelling with consideration of potential contributing activities and identification of potential contributing well/s; and d) a peer review undertaken by an independent suitably qualified water resources expert including details of how the approval holder has addressed any inadequacies raised in the peer review. 	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 12 The approval holder must publish each site-specific assessment approved by the Minister on its website within 5 business days of receiving approval for the site-specific assessment and for the remainder of the life of the Project.</p>	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 13 The Minister may specify an interim cease-work limit to manage groundwater impacts where the Minister is not satisfied that the cease-work limit proposed by the approval holder in accordance with CoA 11 will ensure the outcome/s specified in CoA Appendix B will be, or are likely to be, achieved and maintained.</p>	<p>Refer to the GMP in Attachment 4</p>

EPBC 2014/7376 approval conditions directly relevant to this WMP	Section reference
<p>Approval condition 14</p> <p>If The approval holder detects or is informed that a cease-work limit has been exceeded, the approval holder must, in addition to the incident reporting requirements of CoA 35, provide in writing details of the contributing well/s to DCCEE within 10 business days of the detection or of being informed.</p>	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 15</p> <p>Unless otherwise notified by the Minister in writing, the approval holder must cease groundwater extraction associated with any contributing well/s within 10 business days of reporting the exceedance of a cease-work limit to DCCEE.</p> <p><i>Note: The Minister, in determining whether to give notice to the approval holder that it is not required to cease groundwater extraction, will consider all relevant information including but not limited to legislation and policy, information provided by the approval holder, and any other information available to the Minister at the time of the decision.</i></p>	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 16</p> <p>If the approval holder has been required to cease groundwater extraction pursuant to CoA 15, the approval holder must implement corrective actions so as to achieve and maintain the outcomes and sub-outcomes specified in CoA Appendix B.</p>	<p>Refer to the GMP in Attachment 4</p>
<p>Approval condition 17</p> <p>The approval holder must not recommence groundwater extraction from any contributing well/s until it can be demonstrated that the outcomes and sub-outcomes specified in CoA Appendix B are being achieved and the Minister approves in writing groundwater extraction from those contributing well/s.</p> <p><i>Note: Approval to recommence groundwater extraction may be subject to conditions that the Minister considers reasonable.</i></p>	<p>Refer to the GMP in Attachment 4</p>

Appendix C - Data management system

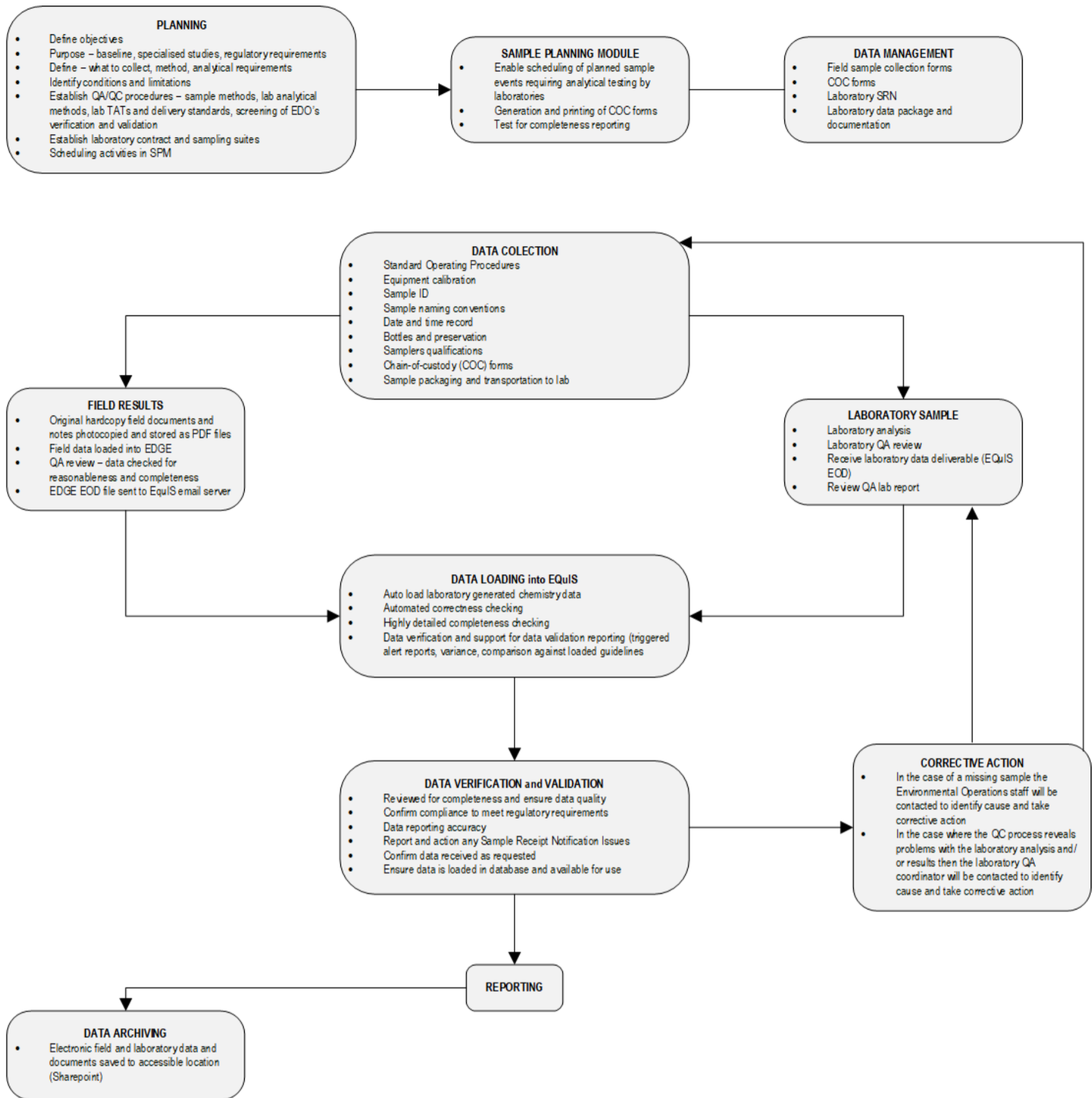


Figure C1 - Data management system process

Appendix D - WSP area for the Namoi and Peel Unregulated Rivers Water Sources 2012

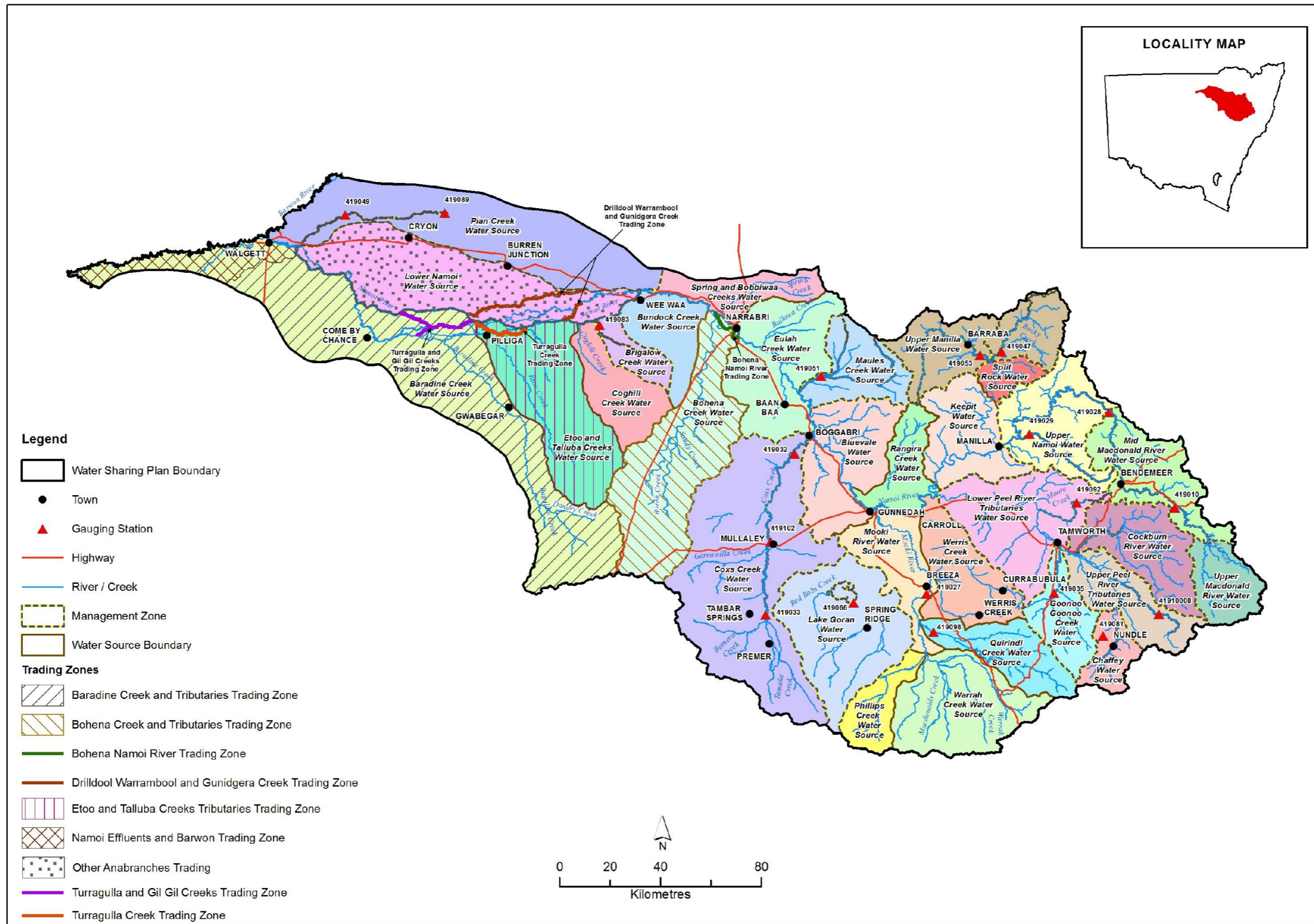


Figure D1 - Water sharing plan area for the Namoi and Peel Unregulated Rivers Water Sources 2012

Attachment 1

Erosion and Sediment Control Plan

Attachment 2

Site Water Balance

Attachment 3

Surface Water Management Plan

Attachment 4

Groundwater Management Plan

Attachment 5

Produced Water Management Plan

Attachment 6

Irrigation Management Plan

Attachment 7

Dust Suppression Protocol

Attachment 8

Pollution Incident Response Management Plan (PIRMP)