NARRABRI GAS PROJECT

Field Development Plan

PHASE 1

0041-150-PLA-0023

Date	Revision	Reason for Issue	Author	Checked	Approved
25 September 2023	0B	Dewhurst 34 location change	Onward Consulting	[redacted]	[redacted]

Prepared by:

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This document has been prepared by Onward Consulting to comply with the Narrabri Gas Project conditions of consent and has relied upon the relevant information available at the time of writing and all findings, conclusions or recommendations contained herein are based thereon. This document is for the use of Santos Ltd and no responsibility will be taken for its use by other parties. Santos Ltd may, at its discretion, use this document to inform regulators and the public.

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Document review history

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

Review Date	Reason for review	Reviewed by	Revision required (Y/N)

Acronyms and abbreviations

Acronym	Description
ACHAG	Aboriginal Cultural Heritage Advisory Group
ACHMP	Aboriginal Cultural Heritage Management Plan
AHD	Australian height datum
AEP	annual exceedance probability
ARI	average recurrence interval
AS/NZS	Australian Standard/New Zealand Standard
BAG	Biodiversity Advisory Group
BMP	Biodiversity Management Plan
cm	centimetre
CCC	Community Consultative Committee
CoC	Conditions of consent for the NGP SSD 6456
CSG	coal seam gas
DoI	The former NSW Department of Industry
DPE	NSW Department of Planning and Environment
DPE Water	The Water Group within DPE
DPI	The former NSW Department of Primary Industries
DPIE	The former NSW Department of Planning, Industry and Environment
EEC	endangered ecological community
EIS	environmental impact statement
EMP	environmental management plan
EMS	Environmental Management Strategy
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	environment protection licence under the POEO Act
EQuIS	Environmental Quality Information System
ESF	Ecological Scouting Framework
ESCP	Erosion and Sediment Control Plan
FCNSW	Forestry Corporation of NSW
FDP	Field Development Plan (this document)
GGEAG	Greenhouse Gas Emissions Advisory Group
GIS	Geographic Information System
GMP	Groundwater Management Plan
ha	hectare
HBT	hollow bearing tree

Acronym	Description
HHMP	Historic Heritage Management Plan
HSE	Health, Safety and Environment
HSER	Health, Safety, Environment and Risk
IEA	Independent Environmental Audit
IMP	Irrigation Management Plan
L	litre
LNG	liquefied natural gas
m	metre
m^3	cubic metre
ML	megalitre
ML/day	megalitre per day
mm	millimetre
NMP	Noise Management Plan
PAL	petroleum assessment lease under the PO Act
PCT	Plant Community Type
PEL	petroleum exploration licence under the PO Act
PO Act	*Petroleum (Onshore) Act 1991* (NSW)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
POEO Regulation	Protection of the Environment Operations (General) Regulation 2009
POP	Petroleum Operations Plan
PPL	petroleum production lease under the PO Act
PPLA	petroleum production lease application
Protocol	Field Development Protocol (specific for this document)
PWMP	Produced Water Management Plan
RMP	Rehabilitation Management Plan
SAL	sensitive archaeological landform
SMS	Santos Management System
SWB	Site Water Balance
SWMP	Surface Water Management Plan
TARP	trigger action response plan
WBTP	water and brine treatment plant
WMP	Water Management Plan
WTAG	Water Technical Advisory Group

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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 Tintsfield 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 subsequent 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 Narrabri Gas 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:

- Tintsfield 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 bores (converted coreholes);
- new shallow water monitoring bores;
- associated linear infrastructure;
- seismic surveys (see note below); and
- continued operation of Santos' existing exploration and appraisal activities, including workover activities (see note below).

Note that as detailed in section 5, the seismic surveys and workover activities are not in the scope of this Field Development Plan (**FDP** or **the Plan**), and will be included in future revisions of the FDP.

The 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.

Further details regarding the NGP, including 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, are provided in the Environmental Management Strategy (**EMS**).

1.2 Purpose and scope of the Field Development Plan – Phase 1

Santos has developed this FDP in accordance with the requirements of the SSD 6456 conditions of consent (**CoC**), specifically conditions B1 and B4 to B6. It provides detailed information of the existing gas field infrastructure in the Project area relevant to Phase 1, and considers in detail the proposed Phase 1 gas field infrastructure against the provision of the Field Development Protocol (the **Protocol**). The FDP, like the Protocol, relates to the activities required for the development of natural gas from the Gunnedah Basin under the existing tenures, being PEL 238, PAL 2 and PPL 3, or undertaken under the petroleum production leases, when granted, in respect of petroleum production lease application (**PPLA**) PPLA 13, PPLA 14, PPLA 15 and PPLA 16[1]. The FDP does not apply to the infrastructure existing at the time the Project was approved.

The FDP provides the results of the iterative planning and development process that has been applied to ensure the Project infrastructure proposed for Phase 1 is sited in accordance with the gas field development locational criteria, and to systematically avoid certain attributes and maximise avoidance of the most sensitive ecological features to minimise the impacts of the Project. The final locations of the proposed infrastructure are determined by the resource, proximity to existing infrastructure, constructability, landholder agreements and environmental constraints.

Development of the FDP has followed the four stages of constraints planning as detailed in the Protocol to ensure that the development of the Project takes place in accordance with:

- the Project commitments;
- relevant State and Commonwealth legislation;
- the environmental constraints and limits identified in the impact assessment reports;
- the environmental management plans, protocols and procedures; and
- conditions of consent.

This FDP is to be read in conjunction with the Field Development Protocol. Note that the FDP is on occasions referred to as the Plan of Operations in the EIS.

In accordance with CoC B5, Santos will not commence Phase 1 (or any subsequent phase of the Project) until the FDP for the relevant gas field infrastructure and any associated management plan, program or strategy updates are approved by the Planning Secretary. Further, as required by CoC B6, Santos will implement the latest revision of the FDP once approved by the Planning Secretary.

At least two weeks prior to commencement or completion of each Phase of the development, Santos will notify the DPE of the relevant date via the Major Project Portal. If petroleum mining operations are suspended during Phase 1, Santos will notify the DPE immediately via the Major Projects Portal of the suspension, and then again prior to the recommencement of operations.

This revision of the FDP has been prepared to reflect a location change for well pad Dewhurst 34 (DWH 34). The original site identified for DWH 34 was on a private property and discussions had been held over several years with a registered titleholder that was residing on the property. A land access agreement was provided to the titleholders, all titleholders were not agreeable to the activity progressing and the agreement was not finalised. On this basis, the location for well pad DWH 34 has been moved from private property to State forest, as described in this FDP.

Minor adjustments and corrections have also been made throughout the document.

[1] Santos lodged four PPLAs in May 2014 covering the Project area, being PPLAs 13, 14, 15 and 16. The Project area and the petroleum titles are presented in the EMS.

1.3 Objectives

The objectives of this Field Development Plan are to provide the following:

- detailed plans of both existing and the proposed Phase 1 infrastructure;
- the results of all the surveys undertaken as part of the in-field micro-siting;
- detailed consideration of the constraints and requirements outlined in the Protocol; and
- descriptions of the performance criteria to achieve the water performance measures and the rehabilitation objectives, including a trigger action response plan and a contingency plan.

1.4 Performance measures

The FDP is largely a summary of the requirements and obligations outlined in the management plans developed for the Project as stipulated by the various consent conditions. The key management plans (and relevant subplans) that determine the final locations of the infrastructure and associated construction activities under this FDP are the following:

- Biodiversity Management Plan (**BMP**);
- Aboriginal Cultural Heritage Management Plan (**ACHMP**);
- Water Management Plan (**WMP**), including the Groundwater Management Plan (GMP) and the Produced Water Management Plan (**PWMP**);
- Noise Management Plan (**NMP**);
- Historic Heritage Management Plan (**HHMP**); and the
- Rehabilitation Management Plan (**RMP**).

In accordance with CoC B4(g)(i), the performance criteria to be implemented to ensure compliance with the water performance measures in Table 7 [of the CoC] are listed in Table 1.1, reproduced from Table 3.1 in section 3.3.4 of the WMP. Note that Table 1.1 generally refers to the WMP and subplans which fully address the relevant performance measures. The list of relevant subplans to the WMP are:

- Groundwater Management Plan (**GMP**);
- Produced Water Management Plan (**PWMP**);
- Erosion and Sediment Control Plan (**ESCP**);
- Salt Management Plan;
- Site Water Balance (**SWB**)
- Irrigation Management Plan (**IMP**); and the
- Surface Water Management Plan (**SWMP**).

Similarly, the performance criteria to be implemented to meet the rehabilitation objectives in Table 11 [of the CoC] are listed in Table 1.2, reproduced from Table 1.1 in section 1.4 of the RMP. The rehabilitation objectives are fully addressed in the RMP.

All approved Phase 1 management plans are available from the Narrabri Gas Project website https://narrabrigasproject.com.au/about/environment/

Table 1.1 - 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	SWMP	Section 5
Namoi alluvial aquifers and Great Artesian Basin aquifers	Negligible environmental consequences to the aquifers beyond those predicted in the EIS, including: • negligible change in groundwater levels; • negligible change in groundwater quality; and • negligible impact to other groundwater users	GMP	Section 8.0
	No exceedance of the minimal harm considerations in the *Aquifer Interference Policy* (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
	Design, install and maintain erosion and sediment controls in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004) and *2E Mines and Quarries* (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 *Controlled Activities on Waterfront Land* (DPI Water,	ESCP	Section 5.9

Feature	Performance Measure	Plan and Section Reference	
		Plan	Section
	2012)		
	Design, install and maintain any creek crossings generally in accordance with the Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013) and Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)	ESCP	Section 5.9
	Develop site-specific in-stream water quality objectives in Bohena Creek in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)	SWMP	Section 3.2.4
Well integrity	Design, construct, maintain and decommission gas wells in accordance with the *Code of Practice for Coal Seam Gas Well Integrity* (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 9.0
	Design, install and maintain leak detection systems and fail-safe measures on the produced water management system	PWMP	Section 8.0
	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 8.0
	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 *Exploration Code of Practice: Produced Water Management, Storage and Transfer* (DPE, 2017)	PWMP	Section 3.2.1
Irrigation and beneficial reuse	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

Feature	Performance Measure	Plan and Section Reference	
		Plan	Section
management	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

Table 1.2 - Rehabilitation objectives

Feature	Objective
All areas of the project area affected by the development	• Safe, stable and non-polluting • Fit for the intended post-gas extraction land use/s
Areas proposed for Ecological Rehabilitation	• For each plant community type, establish self-sustaining native woodland ecosystems that meet the performance and completion criteria approved under the Rehabilitation Management Plan • For each threatened flora species, establish a self-sustaining population that meets the performance and completion criteria approved under the Rehabilitation Management Plan • For each threatened fauna species, establish self-sustaining habitat that meets the performance and completion criteria approved under the Rehabilitation Management Plan
Areas proposed for native woodland	• Restore self-sustaining native woodland ecosystems using species found in the local area and complement the areas proposed for Ecological Rehabilitation • Establish areas of self-sustaining: ▪ riparian vegetation, within any diverted and/or re-established creek lines and retained water features; ▪ habitat resources for threatened flora and fauna species; and • Vegetation connectivity and wildlife corridors, as far as is reasonable and feasible
Areas proposed for agricultural land	• Establish/restore agricultural areas to support sustainable agricultural activities • No reduction in land and soil capability class
Surface infrastructure	• To be decommissioned and removed, unless the Resources Regulator agrees otherwise; and ▪ FCNSW agrees otherwise; or ▪ the landholder agrees otherwise.
Wells and gas field infrastructure	• Wells to be progressively decommissioned and rehabilitated in accordance with the *Code of Practice for Goal Seam Gas Well Integrity* (2012, as may be updated or amended) • Well cementing to include sub-vertical and horizontal well sections, where reasonable and feasible • Gas field infrastructure to be progressively decommissioned and rehabilitated in accordance with the *Exploration Code of Practice Rehabilitation* (2017, as may be updated or amended)
Rehabilitation materials	• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources, to the greatest extent practicable
Water quality	• Water retained in the project area is fit for the intended post-mining land use/s • Water discharged from the development is suitable for receiving waters and fit for aquatic ecology and riparian vegetation
Community	• Ensure public safety • Minimise adverse socio-economic effects associated with petroleum development closure

1.5 Preparation of this Plan

This Plan has been prepared by Mr. Servaes van der Meulen and Mr. Mark Vile of Onward Consulting Pty Ltd, who are qualified and competent environmental practitioners with more than 20 years' experience each. Considering their individual and combined industry experience and professional expertise, both Servaes and Mark are deemed to be suitably qualified and experienced for the preparation of this FDP, as required by CoC B4(a).

1.6 Consultation

As required by consent condition B4(b), extensive consultation with government agencies, landholders, committees and various advisory groups has been undertaken during the preparation and finalisation of this FDP, including the following:

- the NSW Environment Protection Authority (**EPA**);
- the Water group within the NSW Department of Planning and Environment (**DPE**) (generally referred to as **DPE Water**);
- the Biodiversity, Conservation & Science directorate (**BCS**) within DPE (formerly the Biodiversity Conservation Division [**BCD**]);
- the Resources Regulator;
- Narrabri Shire Council (**Council**);
- owners of land not owned by the Applicant, upon which gas field infrastructure is proposed to be located (including the Forestry Corporation of NSW [**FCNSW**]);
- the Community Consultative Committee (**CCC**);
- the Water Technical Advisory Group (**WTAG**);
- the Greenhouse Gas Emissions Advisory Group (**GGEAG**);
- the Aboriginal Cultural Heritage Advisory Group (**ACHAG**); and the
- the Biodiversity Advisory Group (**BAG**).

The feedback received from the ACHAG identified a number of minor issues including the request to include a figure showing the sites identified in the cultural heritage survey. Figure 6.8 has now been included to present the findings in relation to the Phase 1 infrastructure. Note that this figure has been redacted from the approved FDP to be made public on the Santos and DPE websites.

The comment received from the BAG, including the BCS, centred around newly listed species or undetected ecological communities, the requests for lists of threatened species and details of the micro-siting process. All these items are addressed in the BMP, which is also stated in section 1.4 above.

The comments provided by the CCC were generally of a non-specific nature, with some requests for further information and clearer figures. A few comments also referred to information which is already presented in the other management plans required under the CoC. High definition figures have been included in the approved version of the FDP.

Neither the GGEAG nor DPE Water provided any comments, with the Resources Regulator's single comment regarding a discrepancy on one of the well pad locations. Council provided positive verbal feedback on the FDP during an individual consultation session, with the majority of the comments received identifying minor errors and gaps in the draft document. The EPA provided useful comments related to document cross-referencing, codes and standards, and items missing from the glossary.

Comments received from the private landholders and FCNSW were generally related to the Forestry Agreement between FCNSW and Santos, and a general caution about bushfires in the Pilliga. The WTAG provided constructive feedback related to cross-referencing to other management plans, some general errors and omissions in the FDP, and the review of maximum clearing limits approved under the development consent.

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

1.7 Structure of this Plan

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 implementation of the proposed Phase 1 infrastructure as detailed in the FDP
Section 3	Outlines the statutory provisions relevant to the NGP
Section 4	Describes the existing gas field infrastructure for Phase 1
Section 5	Describes the proposed gas field infrastructure for Phase 1, relevant to this FDP
Section 6	Provides detailed descriptions of the locational criteria and constraints, including constraints mapping and cumulative figures Section 6 refers extensively to Appendix C, D, E and F.
Section 7	Presents the trigger, action and response plans to assess and respond to a deviation from the approved siting mechanisms described in this Plan.
Section 8	Provides details on the process that is implemented to manage data and records in a consistent, efficient and effective manner
Section 9	Details the actions required for incidents and non-compliances and provides the contingency plan for the FDP. This section also presents the process for managing complaints.
Section 10	Describes the reporting, evaluation and review process of this FDP, including the annual review, independent audits and environmental improvement measures
Section 11	References
Section 12	Glossary

Appendices

Appendix A	Consultation records
Appendix B	Consent conditions directly relevant to FDP
Appendix C	Ecological micro-siting survey adjustments
Appendix D	Ecological micro-siting survey modifications
Appendix E	Cultural Heritage Compliance Report
Appendix F	Cumulative constraints mapping for each well pad
Appendix G	Trigger action response plans

Attachments

Attachment 1	Public Safety Management Plan
Attachment 2	Property Management Plans (provided separately to the DPE)

1.8 Distribution

A copy of the approved FDP 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), will be publicly available on the Project website (at https://narrabrigasproject.com.au), once these have been approved by the Planning Secretary. This information will be kept up to date.

In accordance with specific licence, approval or code of practice conditions, a copy of this FDP is available 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 FDP 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 will be 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 FDP. All roles, responsibilities and accountabilities have been assigned in accordance with Santos Management System *SMS-MS_14 People Management Standard*.

The roles and responsibilities in Table 2.1 relevant to the implementation and management of the FDP reflect those that are defined in the EMS.

Table 2.1 - Roles and responsibilities

Position	Responsibility
Area Manager, Arcadia, Scotia and Narrabri Operations	• Responsible for the operation of all gas transmission and electricity generation infrastructure. • Ensure the environmental performance of the project is consistent with the conditions of approval Santos SMS. • Responsible for legislative compliance, observation of contractual obligations and the maintenance of resources to achieve the main objectives of the FDP.
HSER Manager – Onshore	• Reports to the Executive Vice President Onshore Oil and Gas. • Accountable to ensure awareness of the compliance requirements of the FDP. • Ensures adequate resources are available to advise on the implementation of the FDP and to undertake assurance of compliance in its implementation.
D&C Project Lead or D&C Manager	• Responsible for the drilling and development of the well to operational handover. • Ensures the environmental performance of the project is consistent with the conditions of approval Santos SMS during drilling & completions activities. • Responsible for legislative compliance, observation of contractual obligations and monitoring contractor risk controls and assurance activities to achieve the main objectives of the FDP.
Team Leader Narrabri Operations	• Reports to the Area Manager, Arcadia, Scotia and Narrabri Operations. • Maintains accountability, either directly or by delegation, for the overall management of the Project site and the operation of Project components. • Retains responsibility for the conveyance of the FDP and its objectives to all employees and contractors entering site.
Team Leader, – Onshore Environment	• Reports to the HSER Manager – Onshore. • Maintains responsibility for the implementation, maintenance and monitoring of compliance with the FDP. • Advises operations, development and drilling & completions management on environmental issues. • Reviews contractor HSE and EMP documentation (where applicable).
Environmental Advisor	• Reports to the Team Leader – Onshore Environment. • Maintains accountability for the monitoring of compliance with the FDP.

Position	Responsibility
	• Advises operations field staff on environmental issues. • Responsible for assessing, developing and validating the implementation of erosion and sediment plans. • Undertakes site inspections.
Construction Field Supervisor	• Reports to the Construction Manager, Development. • Responsible for ensuring implementation of the FDP during construction phase. • Communicates the FDP compliance during construction phase.
Santos personnel and contractors	• Undertake all activities in accordance with the FDP. • Undertake site inspections. • Undertake all activates in accordance with the full suite of approved EMPs.

3. Regulatory requirements

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 4.1 of Part 4 of the EP&A Act and was approved 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 *Petroleum (Onshore) Act 1991* (NSW) (**PO Act**) and relevant codes of practice;
- EPL 20350 issued by the EPA and the provisions of the *Protection of the Environment Operations Act 1997* (**POEO Act**); and the
- conditions of consent for the NGP SSD 6456.

Further details regarding the NGP, including a full overview of the regulatory framework and statutory provisions of the NGP and the current approvals, leases and licences is provided in the EMS.

3.1 Compliance conditions

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

- 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;
- EPL 20350; and
- SSD 6456.

3.1.1 PEL 238, PAL 2 and PPL 3

There are no specific conditions or obligations in PEL 238, PAL 2 and PPL 3 related to this FDP.

3.1.2 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 no specific conditions related to this FDP.

Note that the new groundwater monitoring bores as part of the Phase 1 scope are included in the variation to the EPL.

3.1.3 Development Consent SSD 6456

The requirements for an FDP as stipulated in consent conditions B4 have been outlined below. Table B1 in Appendix B specifies where each of the requirements of CoC B4 and all other relevant SSD 6456 consent conditions are addressed in this Plan.

Prior to the construction of any gas field infrastructure, Santos will prepare an FDP for the applicable gas field infrastructure for each phase to the satisfaction of the Planning Secretary. The FDP will:

- be prepared by a suitably qualified and experienced person/s;
- include detailed plans of existing gas field infrastructure in the Project area, and proposed gas field infrastructure to be developed under the Field Development Plan;
- include incremental and cumulative analysis of compliance with the locational criteria;
- provide detailed consideration of the proposed gas field infrastructure for each phase against the provisions of the Field Development Protocol. There may be multiple plans for each phase, with the Field Development Plan being revised and updated to reflect the scope of the proposed infrastructure, including wells, core holes, groundwater monitoring wells, gathering lines, roads, tracks, seismic surveys, flaring infrastructure, utilities and services;
- provide the results of all surveys undertaken as part of in-field micro-siting;
- describe the performance criteria to be implemented to ensure compliance with the water performance measures in Table 7 of the CoC, and to meet the rehabilitation objectives in Table 11 of the CoC, including a:
  - TARP to identify risks and actions to avoid exceedances of the performance criteria, including tiered triggers to provide for early detection of impacts; and
  - contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of the performance criteria, or where an exceedance appears likely;
- include a:
  - Public Safety Management Plan, prepared in consultation with Rural Fire Service, the Forestry Corporation of NSW and NSW Health, to ensure public safety and manage access in the Project area, including verification of minimum safe separation distances between all potentially hazardous facilities; and
  - Property Management Plans, prepared in consultation with landowners upon which gas field infrastructure is proposed to be located, to manage impacts and access arrangements on the properties.

The FDP has been prepared in consultation with the government agencies, landholders, committees and various advisory groups as listed in section 1.6. It will be submitted to DPE for approval prior to implementation. Digital spatial datasets of existing and proposed infrastructure will also be provided.

Management plans as required under the CoC have been developed to incorporate Commonwealth and State regulatory requirements. These plans also incorporate the Santos corporate values, policies and the SMS into Project-level documents that set out measures and commitments to manage the risk of adverse impacts to environmental values. Table 3.1 details the key management plans that have been developed for the Project, and the associated management strategies and approaches for each plan and protocol. The FDP is a summary and culmination of the EMPs listed in Table 3.1, and cross-references extensively to these documents in order to avoid repeat and overlap between the various management plans required under the CoC and the FDP.

Table 3.1 - Management plan summary

Management Plan		Management strategies and approaches
Water Management Plan		Describes the measures to be implemented to ensure that Santos complies with the water management performance measures, and includes the following 10 sub-plans and protocols as the appendices:
Attachment 1	Erosion and Sediment Control Plan (**ESCP**)	Prepared in accordance with the Blue Book. Identifies details including but not limited to activities that could cause soil erosion, generate sediment or affect flooding; the location, function, and capacity of erosion and sediment control structures and flood management structures; and measures to manage any effects of soil erosion, sediment transport and flooding.
Attachment 2	A Site Water Balance	Includes details of the inflows and outflows in the Project area; sources and security of water supply for the life of the Project; water storage and treatment capacity; water use and management, including sharing and transfers; licenced discharge points; and reporting procedures, including the annual preparation of an updated site water balance.
Attachment 3	Surface Water Management Plan	Provides specific details on baseline data on surface water flows and quality of watercourses; the surface water management system; detailed plans, design objectives and performance criteria for water infrastructure; performance criteria; a program and procedures for monitoring, evaluation and reporting; and plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development.
Attachment 4	Groundwater Management Plan	Provides details of baseline data of hydrogeology and groundwater levels, formation parameters and quality for groundwater resources; a description of the groundwater management and monitoring system; performance criteria, trigger and response levels; a program and procedures for monitoring, evaluation and reporting; and a plan to respond to any exceedances of the groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the Project.
Attachment 5	Produced Water Management Plan (**PWMP**)	Provides detailed baseline data on produced water yield and quality, and includes but is not limited to details regarding the produced water management system; performance criteria, including trigger levels; and a program and procedures for monitoring, evaluation and reporting.
Attachment 6	Irrigation Management Plan	Provides details on managing beneficial reuse of treated water for crop irrigation and stock watering, including details regarding site selection and assessment; agreements with third parties; baseline soil and groundwater conditions and quality; a protocol for operation of the irrigation management system; and measures to manage any effects on soils structure, erosion, groundwater quality and maintain a water balance.
Attachment 7	Dust Suppression Protocol	Provides details on managing beneficial reuse of treated water for dust suppression and construction activities including but not limited to details of site selection and assessment; baseline soil and groundwater conditions and quality; a protocol for operation of the dust suppression system; and measures to manage any effects on soils structure, erosion, surface water runoff, groundwater quality and groundwater levels.
	Managed Release Protocol	Not relevant for Phase 1, however brief description included as section 6 of the Produced Water Management Plan. Provides details on managing disposal of treated water to Bohena Creek, that includes but is not limited to details of water flows, quality and health; predicted plume dispersal; a protocol and detailed procedures for managed release; and measures to manage any effects of water quality, stream and riparian health, erosion and sedimentation and downstream flooding.

	Salt Management Plan	Not relevant for Phase 1, however brief description included as section 7 of the Produced Water Management Plan. Provides details on salt and other waste volumes and composition generated by the produced water management system; a program for investigating and implementing beneficial reuse options for the salt product; and a protocol and procedures for the full-cycle management of salt and salt-related waste products.
Attachment 8	Pollution Incident Response Management Plan	Prepared in accordance with the Protection of the Environment Operations (General) Regulation 2009 (POEO Regulation) and includes detailed procedures 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.
Aboriginal Cultural Heritage Management Plan (ACHMP)		Provides the framework for avoiding or minimising impacts from the Project on Aboriginal cultural heritage and promotes the responsible management of Aboriginal cultural heritage values in connection with the undertaking of the Project.
Biodiversity Management Plan (BMP)		Provides the framework for the management of biodiversity values associated with the project. More specifically, the Biodiversity Management Plan describes the specific management actions required to avoid, minimise, mitigate, rehabilitate and offset impacts on these values. The Biodiversity Management Plan includes a Pest Plant and Animal Control Protocol.
Noise Management Plan (NMP)		Outlines the strategies and procedures to manage noise requirements associated with the development, operation, decommissioning and rehabilitation of the Project.
Air Quality and Greenhouse Gas Management Plan		Note that this management plan is only required to be approved prior to the commencement of Phase 2. Provides details on the management and mitigation of air emissions during construction and operation to minimise any negative effect on air quality, and details the monitoring and reporting requirements associated with the potential air quality and greenhouse gas impacts of the Project.
Historic Heritage Management Plan (HHMP)		Provides details on the management and mitigation of historic heritage during construction and operation of the Project development to minimise any negative effect on historic heritage.
Fire Management Plan		Provides an ongoing management framework for preparedness and review of the Project's operational areas and its assets, and provides information on site responsibilities, actions, reporting requirements and resources required to ensure effective and timely preparedness is undertaken to prevent any potential bushfire incident or emergency.
Waste Management Plan		Provides a framework and suitable management measures to control and manage waste generated from the construction, operation and decommissioning of the Project.
Rehabilitation Management Plan (RMP)		Provides a clear set of on-ground work methods, objectives and completion criteria for rehabilitation of each management domain (production wells, gathering systems and associated infrastructure and auxiliary sites). It contains detailed information on rehabilitation methods, schedules and monitoring methods based on the Project's rehabilitation strategy.

3.2 Relevant codes, standards, policies and guidelines

There are no specific codes, standards, policies and guidelines applicable to the FDP.

A summary of all applicable codes, standards, policies and guidelines for the Phase 1 management plans is provided in Section 3.4 of the EMS. Individual management plans also describe the codes, standards, policies and guidelines relevant to the management plan topic.

3.3 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 FDP have been reproduced below in Table 3.2, 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.

Table 3.2 - EIS commitments relevant to field development and infrastructure siting

Number	EIS Commitment relevant to the FDP	Section reference
1.1	Infrastructure will be sited in accordance with the Field Development Protocol to avoid or minimise potential impacts	Section 1.2
8.1, 14.1	Land Access Agreements and Farm Management Plans will be developed in consultation with affected landholders	Section 1.6, Attachment 2
8.2	The Forestry Corporation of NSW will be consulted in accordance with the agreed Occupation Permit.	Section 1.6 Attachment 2
8.4	Unless a written agreement is in place with the relevant landholder, no project infrastructure will be located within 200 m of an occupied residence on that property	Section 6.2.1

As described in section 10 of this Plan and section 8 of the EMS, this Plan will be subject to regular evaluation and review. This will include the EIS commitments to ensure they remain current, applicable, and generally improve the environmental performance of the Project.

4. Existing gas field infrastructure - Phase 1

As detailed in section 1.1.2, Santos' existing exploration and appraisal activities in PEL 238 and PAL 2 include:

- Tintsfield Pilot;
- Bibblewindi East Pilot (SSD 5934);
- Bibblewindi West Pilot;
- Dewhurst North Pilot;
- Dewhurst South Pilot (SSD 6038);
- Dewhurst northern and southern flow lines;
- Leewood Water Management Facility including ponds, WBTP and irrigation area;
- Bibblewindi Facility including gathering system, water balance tank, compressor and flare; and
- Bibblewindi to Leewood buried gas pipeline.

Table 4.1 provides a detailed overview of the existing gas field infrastructure, and the status of the various items during Phase 1.

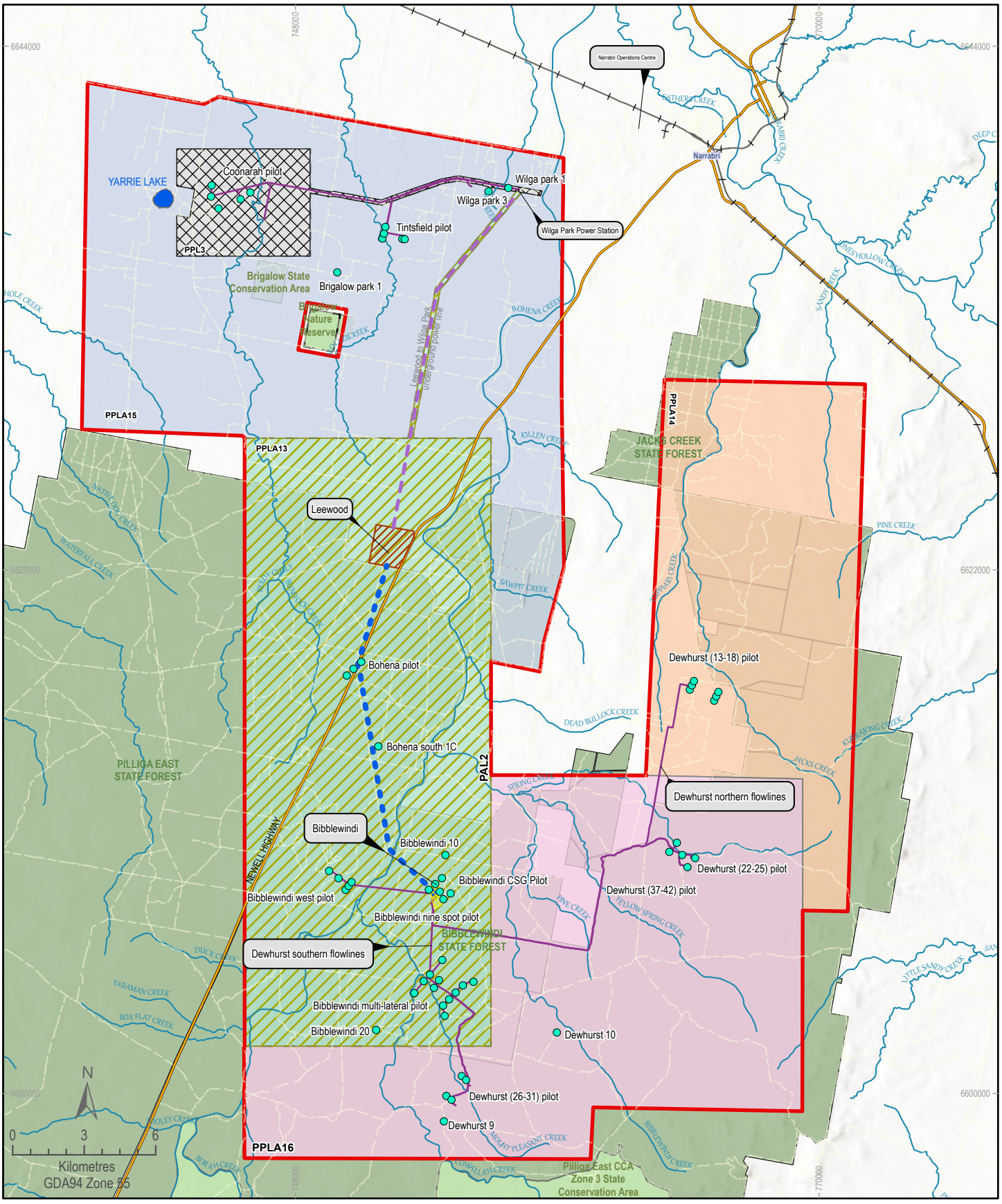
Table 4.1 - Existing gas field infrastructure

Project name	Infrastructure	Phase 1 status
Coonarah Pilot	• Coonarah 1, 4, 6, 7	Shut in
Bohena Pilot	• Bohena 3, 7 and 9	Shut in
Bohena South	• Single well	Shut in
Wilga Park	• Wilga Park wells 1 and 3	Shut in
Brigalow Park	• Brigalow Park 1	Shut in
Wilga Park power station	• encompasses a gas gathering system, a gas flow line from Bibblewindi to Wilga Park within a 10 m corridor with a riser at Leewood	Operational at reduced capacity 12 MW out of 22 MW. May operate up to 22 MW during Phase 1 depending on gas produced.
Leewood Produced Water and Brine Management Ponds	• 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.	Operational
Leewood Produced Water Treatment and Beneficial Reuse Project, Phase 2	• WBTP to treat, manage and beneficially reuse produced water and brine from exploration and appraisal activities.	RO plant operational, on stand-by
Bibblewindi Ponds 1, 2 and 3	• Pond 1 has been decommissioned; • Although not part of Phase 1, the design and construction of Ponds 2 and 3 will be reviewed	Operational. Bibblewindi Ponds 2 and 3 are disused.

Project name	Infrastructure	Phase 1 status
	and the necessary upgrades undertaken to ensure they meet relevant regulatory requirements and standards.	
Tintsfield 2-7 Pilot	• Tintsfield Pond 1 and 2; and • Flare	Tintsfield Pond 1 will be used once it has been upgraded to comply with the *Exploration Code of Practice: Produced Water Management, Storage and Transfer*. It is unlikely that Pond 2 will be used to support the initial activities of the Project.
Dewhurst 9 and 10	• Single wells	Shut in
Dewhurst Pilot Expansion	• Dewhurst 13-18, • Dewhurst 30-31	Will not be operating during Phase 1
Dewhurst 22-25 Pilot	• Four appraisal wells, converting an existing core hole (Dewhurst 6) to an appraisal well and operating the pilot set.	Shut in
Dewhurst 26-29 Pilot	• Drilling and operating four appraisal wells	Operating - dewatering
Dewhurst Northern Flow Lines	• Gas and water gathering lines	Operation of both the gas and water flow lines.
Dewhurst Southern Flow Lines	• Gas and water gathering lines	Operation of both the gas and water flow lines.
Bibblewindi West Pilot	• Bibblewindi 22-26	Operating - dewatering
Bibblewindi East Pilot	• Bibblewindi multilateral pilot	Operating - dewatering
Bibblewindi Nine Spot Pilot	• Bibblewindi 1-9	Plugged and abandoned
Bibblewindi 20	• Single well	Shut in

Figure 4.1 provides an overall overview of the location of the Project infrastructure, showing the Project area and the various petroleum production lease application (**PPLA**) areas. This figure is split in four sections (northwest, northeast, southwest and southeast) as presented in Figure 4.2 to Figure 4.5, to provide the existing infrastructure in more detail.

Note that further information of the existing infrastructure at Leewood and Bibblewindi is presented in the Produced Water Management Plan and the Site Water Balance, as subplans to the WMP.



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ONWARD CONSULTING

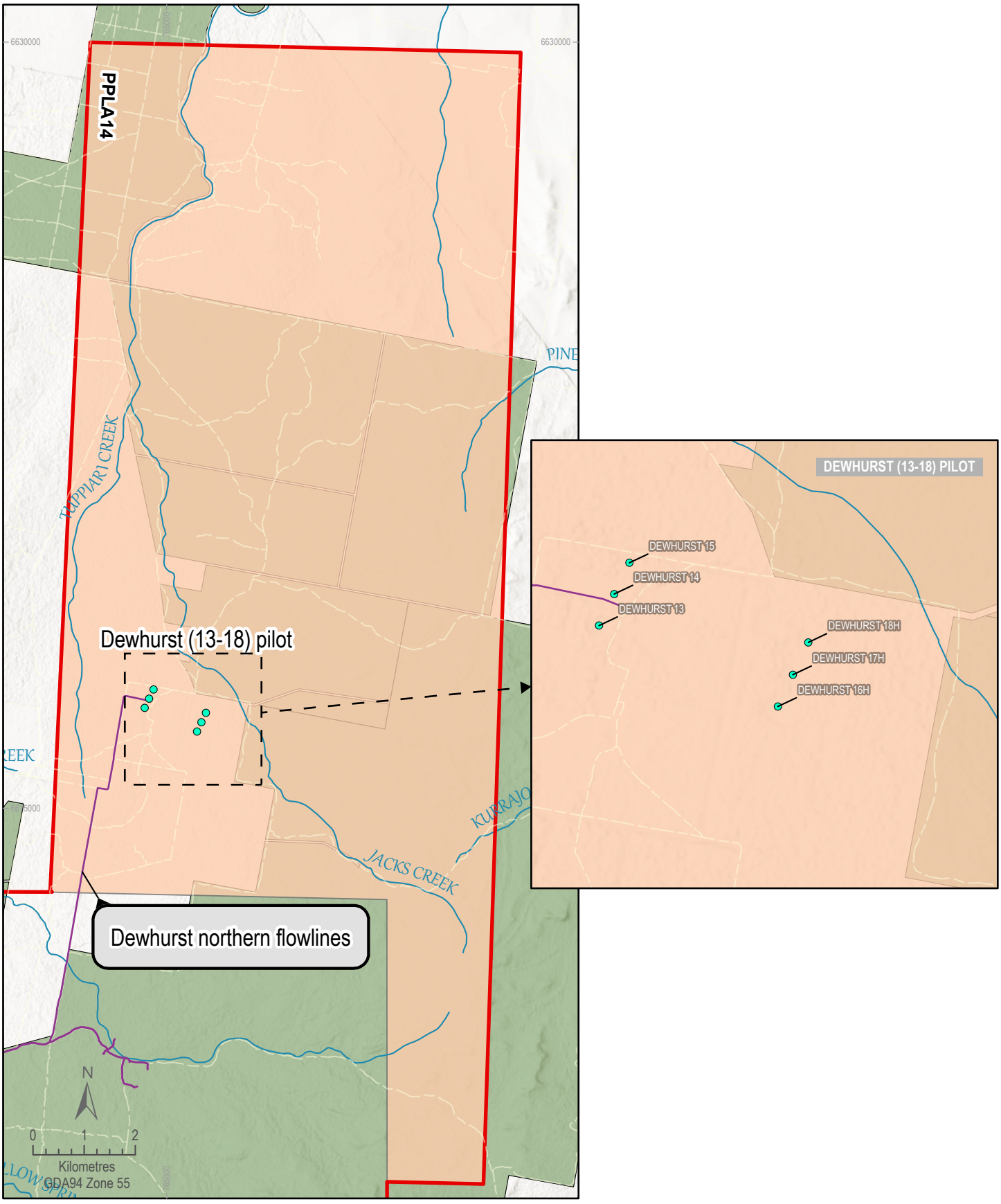
LEGEND

- NGP boundary
- PEL238
- PAL2
- PPL3
- PPLA13
- PPLA14
- PPLA15
- PPLA16
- Leewood
- Bibblewindi
- Bibblewindi to Leewood infrastructure corridor
- Leewood to Wilga Park infrastructure corridor
- Existing flowlines
- Existing wells
- Highway
- Roads and tracks
- Railway
- Watercourse
- State Forest
- Parks and reserves
- Lakes and dams

NARRABRI GAS PROJECT

Figure 4.1

Existing Project Infrastructure Overview



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LEGEND

- NGP boundary
- PPLA14
- Existing flowlines
- Existing wells
- Roads and tracks
- Watercourse
- State Forest

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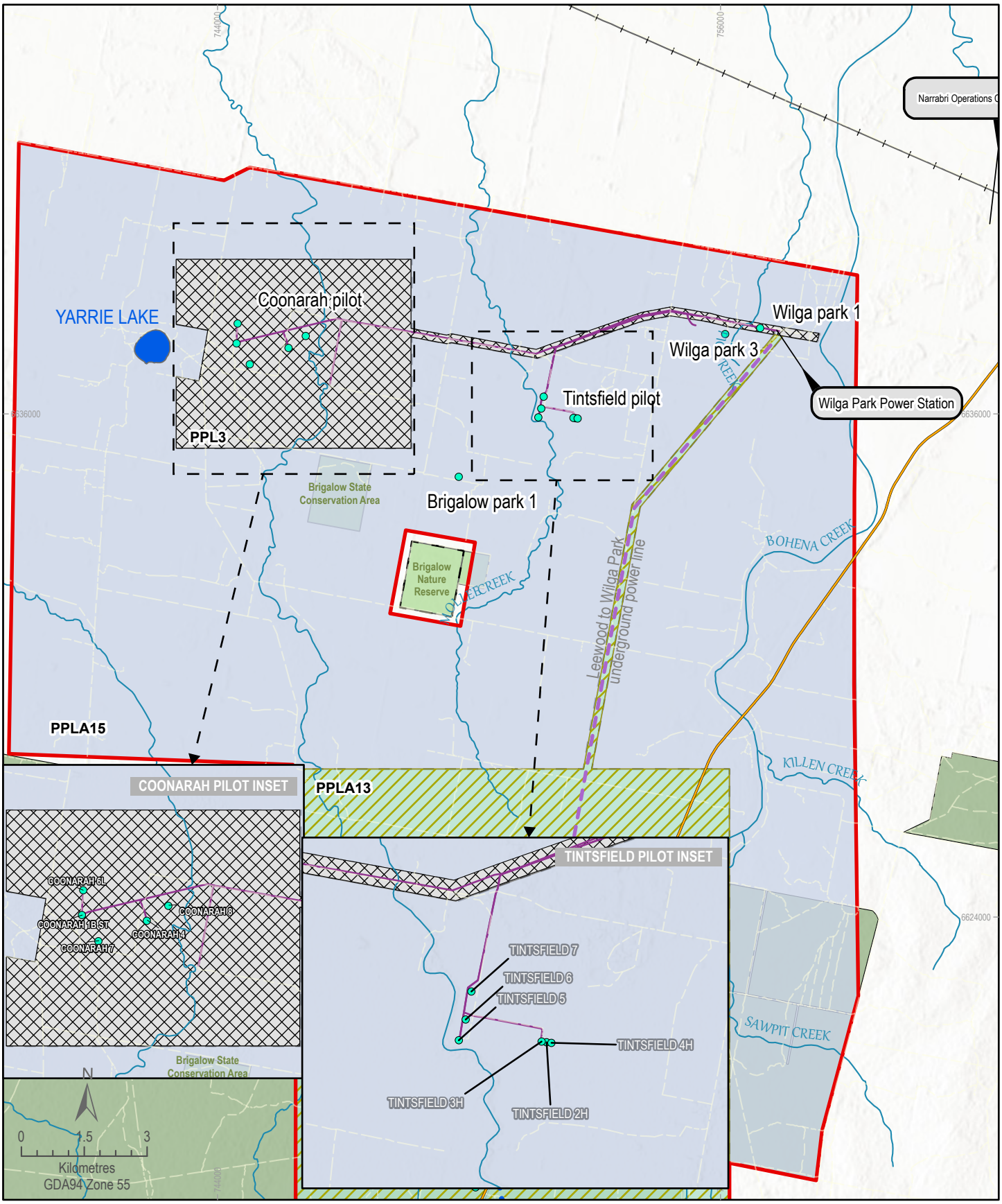
Figure 4.3

Existing Project Infrastructure Northeast



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ONWARD CONSULTING

LEGEND

- NGP boundary
- PEL238
- PAL2
- PPL3
- PPLA13
- PPLA15
- Leewood to Wilga Park infrastructure corridor
- Existing flowlines
- Existing wells
- Highway
- Roads and tracks
- Railway
- Watercourse
- State Forest
- Parks and reserves
- Lakes and dams

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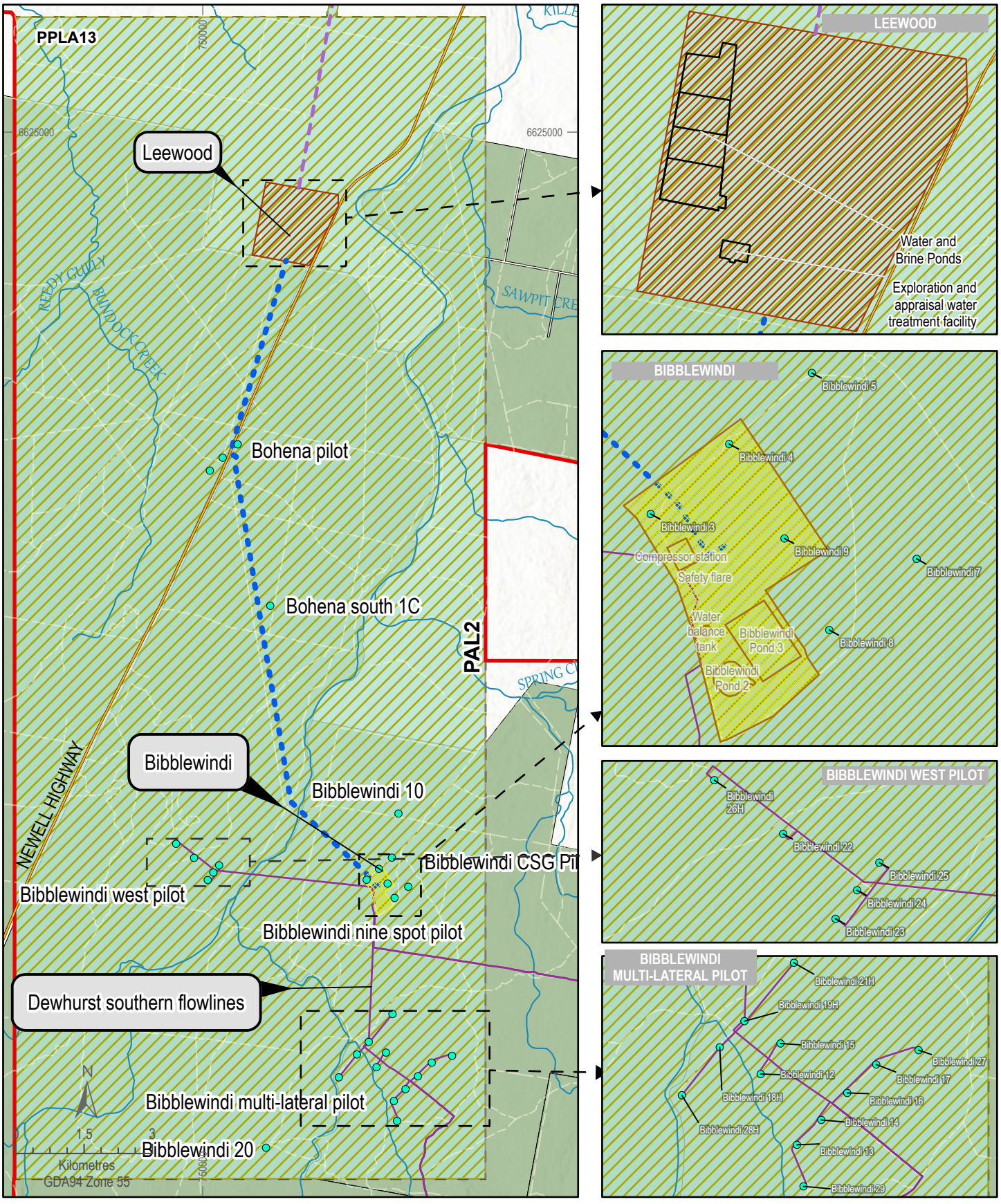
Figure 4.2

Existing Project Infrastructure Northwest



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ONWARD CONSULTING

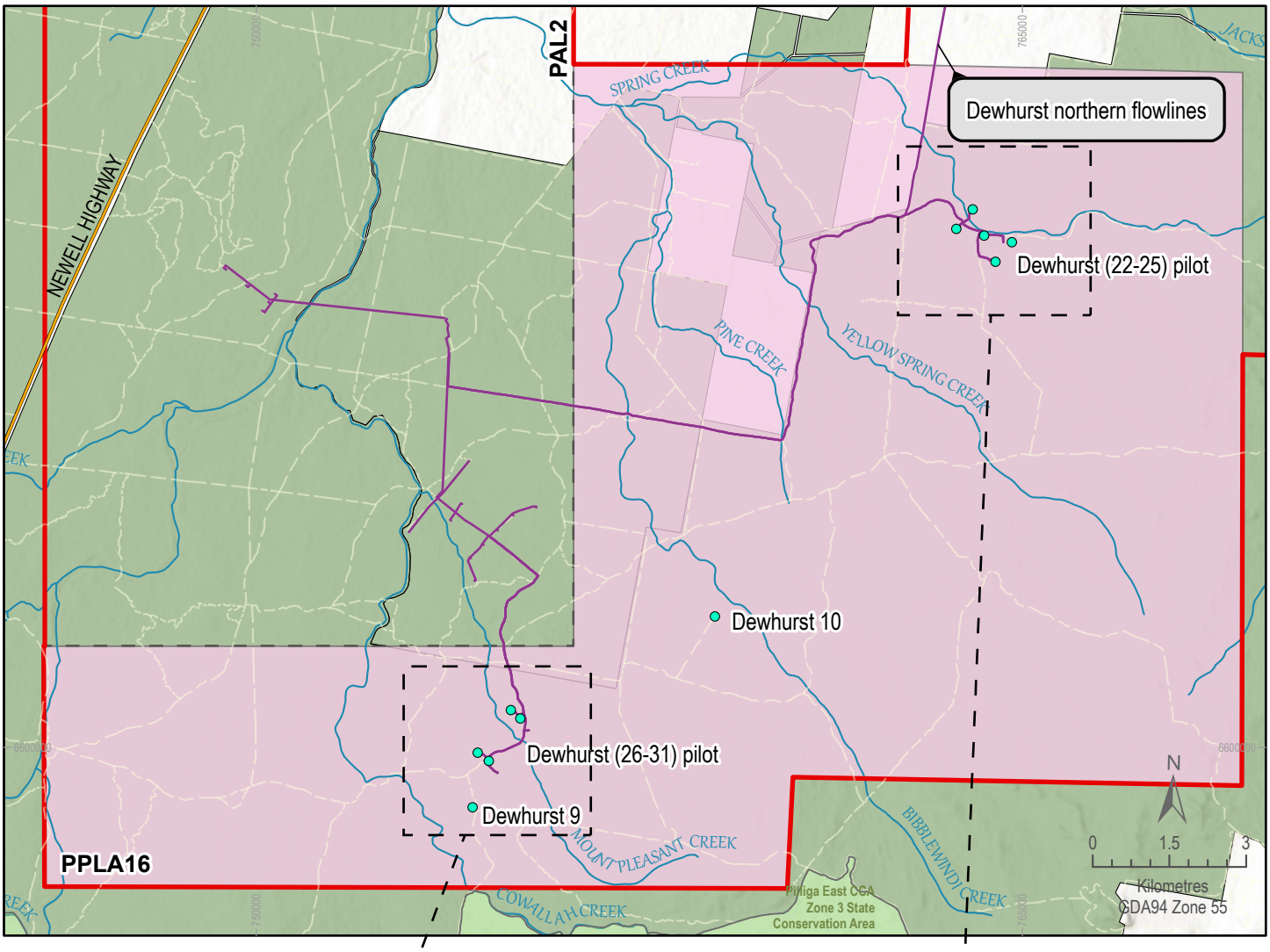
LEGEND

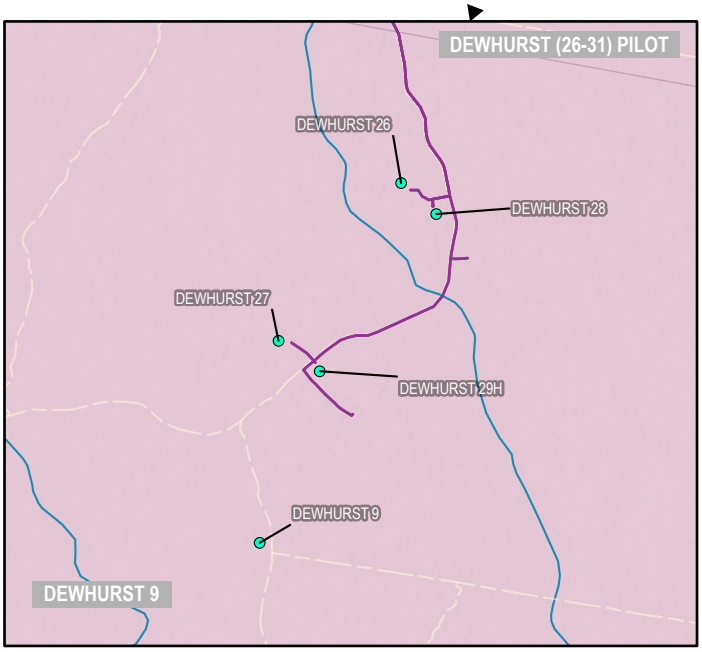
- NGP boundary
- PAL2
- PPLA13
- Leewood
- Bibblewindi
- Bibblewindi to Leewood infrastructure corridor
- Leewood to Wilga Park infrastructure corridor
- Existing flowlines
- Existing wells
- Highway
- Roads and tracks
- Watercourse
- State Forest

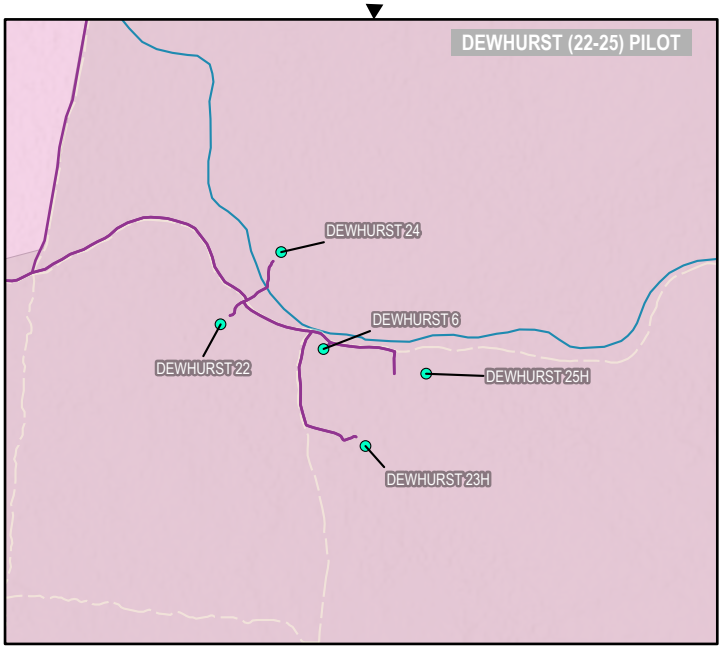
NARRABRI GAS PROJECT

Figure 4.4

Existing Project Infrastructure Southwest







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ONWARD CONSULTING

LEGEND

- NGP boundary
- PPLA16
- Existing flowlines
- Existing wells
- Highway
- Roads and tracks
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 4.5

Existing Project Infrastructure Southeast

5. FDP proposed gas field infrastructure

As detailed in section 1.1.2, the Phase 1 scope subject of this FDP will include the construction and operation of the following items, noting that that seismic surveys and workover activities are not in the scope of this FDP, and will be included in future revisions of the FDP:

- new shallow water monitoring bores;
- gas and water flow lines;
  - new access roads and upgrades to existing roads (approximately 6.82 km),
  - new gas and water flow lines (approximately 14.16 km); and
- 4 core holes;
- 6 pilot wells;
- 2 deep reservoir monitoring bores (converted core holes);
- continued operation of Santos' existing exploration and appraisal activities.

5.1 Shallow groundwater monitoring bores

New shallow groundwater monitoring bores will be installed at Bohena South 1C, Bibblwindi 6, Dewhurst 9, Dewhurst 35 and Dewhurst 43. Apart from Dewhurst 35 and 43, these are either new water bores located on existing well pads, or recompletion / re-purpose of existing wells into multi-level monitoring points.

More information on the locations of the proposed Phase 1 monitoring wells is provided in Appendix B of the Groundwater Monitoring Plan, as attached to the Groundwater Management Plan (**GMP**). Deep reservoir monitoring bores are addressed in section 5.4.

5.2 Gas and water flow lines

Approximately 14.2 km of underground high density polyethylene gas and water flow lines will be constructed between the individual wells and the larger gas and water gathering lines that link into field water balance tanks and facilities at Bibblewindi or Leewood. Gas and water gathering lines will be generally co-located with access tracks as far as is reasonably practicable.

Low-point drains and high-point vents will be installed along the gathering lines, with the number and specific location of these determined through detailed design.

Further construction-specific details are provided in the BMP, the RMP and the ESCP

5.3 Roads and tracks

In order to provide plant and equipment access to the proposed well pad locations and construction areas, the total combined length of existing tracks to be upgraded and new access tracks that will be constructed under the scope of this FDP is approximately 6.8 km.

The new access tracks will generally be co-located in the same corridor as any required gas and water gathering lines. The corridor will be on average 10 m wide, up to a maximum of 12 m. The corridor will be reduced to a 5 m access track for the operational phase following partial rehabilitation, slightly wider on intersections and bends as required for vehicle movement and safe negotiation. The rehabilitated

areas will be over the gathering lines so deep-rooting vegetation including overstorey tree species will need to be removed in order to prevent damage to the buried pipes.

Proposed upgrades to existing roads and tracks, including the Bohena Creek road, will be designed to ensure the road surface is suitable for being traversed by drilling rigs, as well as ensuring road drainage / erosion and sediment controls are in place and are functional.

Further construction-specific details are provided in the BMP, the RMP and the ESCP. Note that the following section of the FDP provide specific information regarding the location of the proposed new and to be upgraded tracks.

5.4 Non-linear infrastructures

The core holes and pilot wells (or appraisal wells) will be constructed on well pads of approximately one hectare in size, which will be partially rehabilitated once production has commenced. During partial rehabilitation, approximately three quarters of the well pad will be rehabilitated using a proportion of the original topsoil and seed bank from the site. The remaining area of approximately one quarter of a hectare, being around one quarter of the construction area, will remain cleared to allow for the operation of the well head infrastructure, associated production equipment, and day to day vehicle access.

Further construction-specific details are provided in the BMP, the RMP and the ESCP.

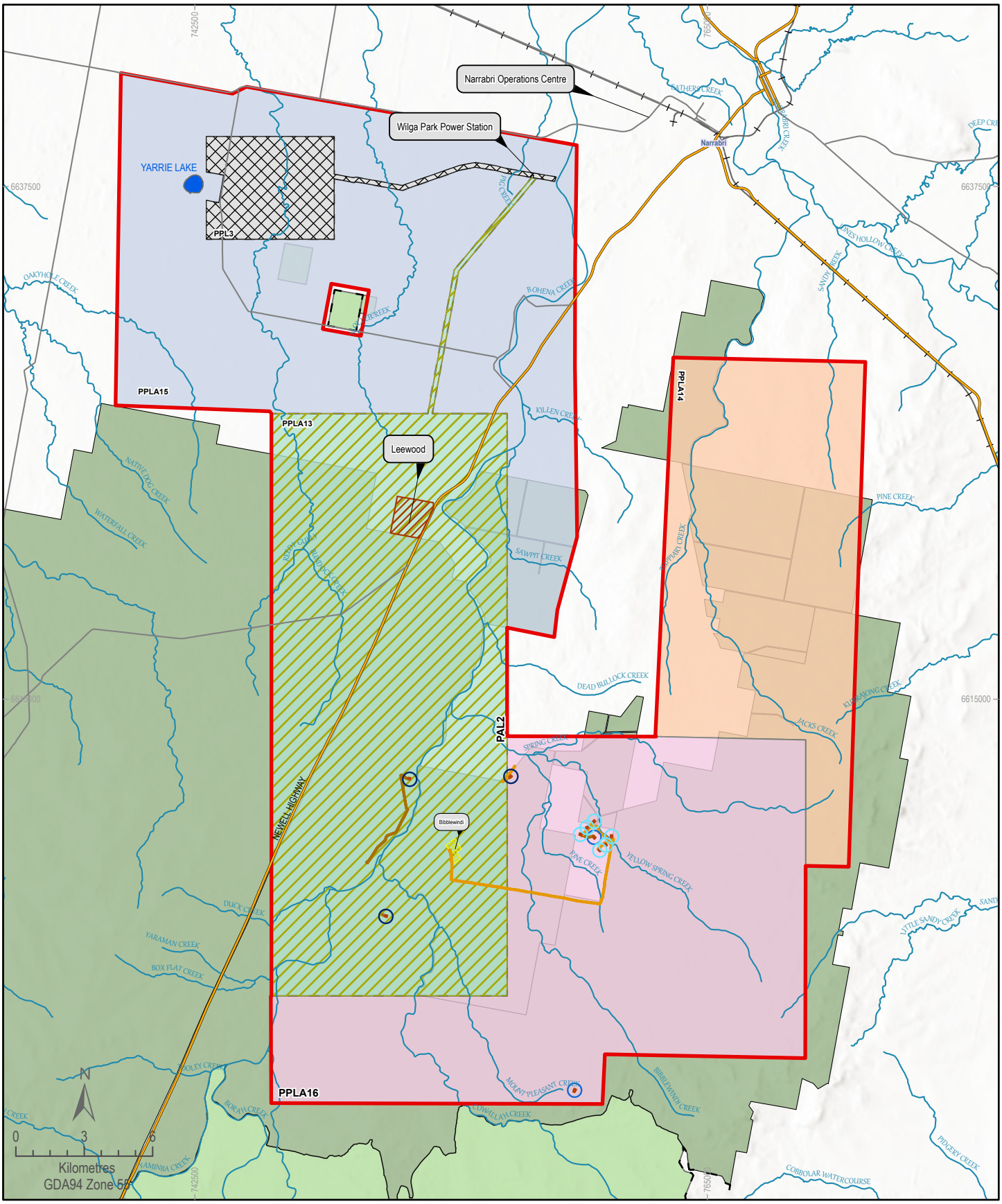
The locations of each of the proposed four core holes and six pilot wells is provided in Table 5.1, with corresponding locations shown in Figure 5.1 and Figure 5.2. Note that the following section of the FDP provides specific information regarding the location of each of the well pads.

Table 5.1 - Proposed non-linear gas field infrastructure for Phase 1

Type	Well name	Lot / DP	Landowner
Core hole	Bibblewindi 30	N/A	FCNSW
	Bibblewindi 31	N/A	FCNSW
	Dewhurst 34	N/A	FCNSW
	Dewhurst 35 [1]	Lot 1 DP 757126	Private property
Pilot well	Dewhurst 37 (horizontal)	Lot 2 DP 757126	Private property
	Dewhurst 38 (horizontal)	Lot 2 DP 757126	Private property
	Dewhurst 39 (horizontal)	Lot 2 DP 757126	Private property
	Dewhurst 40 (vertical)	Lot 3 DP 757126	FCNSW
	Dewhurst 41 (vertical)	Lot 1 DP 757126	Private property
	Dewhurst 42 (vertical)	Lot 1 DP 757126	Private property
Groundwater monitoring bore	Dewhurst 35 [1]	Lot 1 DP 757126	Private property
	Dewhurst 43 [2]	N/A	FCNSW

Notes:

1. Dewhurst 35 is a new well pad for a new corehole that will be converted to a deep reservoir groundwater monitoring bore.
2. Dewhurst 43 is an existing well pad and core hole that will be converted to a deep reservoir groundwater monitoring bore.



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LEGEND

- NGP boundary
- PEL238
- PAL2
- PPL3
- PPLA13
- PPLA14
- PPLA15
- PPLA16
- Leewood
- Bibblewindi
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

Proposed phase 1 wells

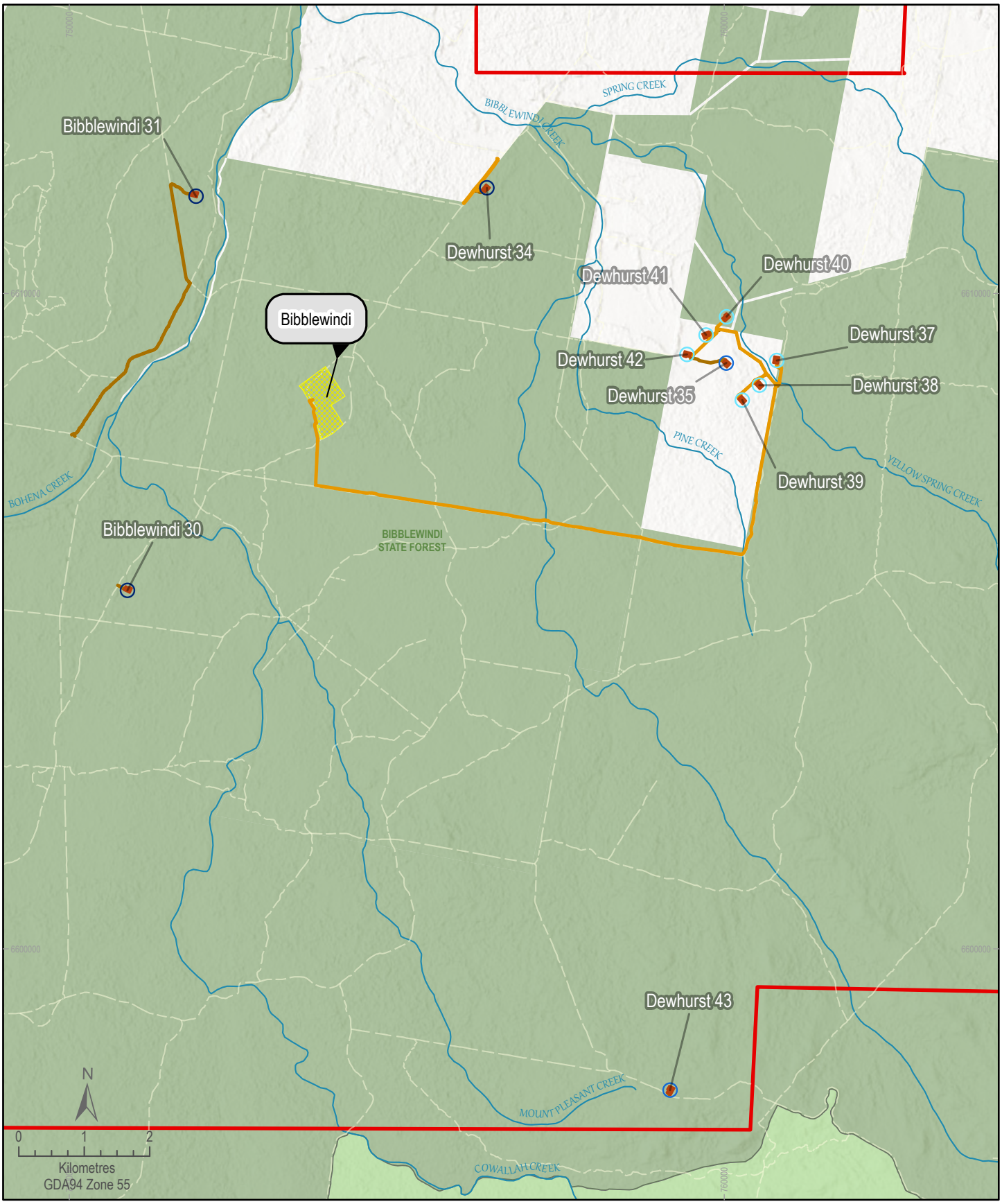
- Core hole
- Groundwater monitoring bore
- Pilot well

- Highway
- Major roads
- Watercourse
- Railway
- State Forest
- Parks and reserves
- Lakes and dams

NARRABRI GAS PROJECT

Figure 5.1

Phase 1 Development Project
Infrastructure Overview



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LEGEND

- NGP boundary
- Bibblewindi
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

- Roads and tracks
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 5.2

Phase 1 Development
Project Infrastructure

6. Locational criteria and constraints

The gas field development locational criteria as defined in Table 1 [of the CoC] has been reproduced in Table 6.1 below. The criteria are further considered below in sections 6.1 to 6.6. Further locational constraints regarding noise, odour and air quality are addressed in sections 6.7 and 6.8.

Table 6.1 - Gas field development locational criteria

Feature	Locational criteria
Conservation areas	• No surface infrastructure within 200 metres of Yarrie Lake property boundary • No surface infrastructure within 50 metres of Brigalow State Conservation Area • No sub-surface infrastructure below Brigalow State Conservation Area, from the ground surface to a depth of at least 110 metres • No surface infrastructure within 50 metres of Brigalow Nature Reserve
Sensitive receivers and amenity	• No Project-related infrastructure within 200 metres of any residence (occupied or otherwise), unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary • No well pads within 100 metres of any privately-owned land or other land not owned by the Applicant, unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary • Production well pads to be spaced at least 750 metres apart • Pilot well pads to be spaced at least 250 metres apart • No telecommunications towers within 500 metres of any residence (occupied or otherwise), unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary
Biodiversity	• No disturbance of more than 988.8 hectares of native vegetation (including derived native grassland) • No disturbance beyond the limits by vegetation type as identified in Table 8 [of the CoC]. • No disturbance beyond the limits by threatened flora species type as identified in Table 9 [of the CoC] • No disturbance beyond the limits by threatened fauna species type as identified in Table 10 [of the CoC]
Water resources	• No non-linear infrastructure within any watercourse or watercourse buffer zone as determined by Strahler stream order (and shown in Appendix 5 [of the CoC] including: ▪ 1st order stream – 20 metre corridor plus channel width ▪ 2nd order stream – 40 metre corridor plus channel width ▪ 3rd order stream – 60 metre corridor plus channel width ▪ 4th order and greater stream – 80 metre corridor plus channel width • No large ponds and dams, or any ponds and dams used for storage of produced water or brine, within the 1% AEP flood extent, as identified in Appendix 5 [of the CoC] (apart from approved ponds and dams in major facilities constructed above the 1% AEP flood extent)
Heritage	• No disturbance of identified Aboriginal cultural heritage items, as identified in Appendix 7 [of the CoC] • No disturbance of identified historic heritage items, as identified in Appendix 7 [of the CoC] • No disturbance of other Aboriginal cultural heritage items identified during the development, if assessed in a Field Development Plan to be of high significance • No disturbance of other Aboriginal cultural heritage items and historic heritage items identified during the development, unless otherwise approved in a Field Development Plan

6.1 Conservation areas

6.1.1 Constraints for nature reserves, national parks and Aboriginal areas

Petroleum activities are not permissible within the NP&W Act reserve categories of national parks, historic sites, nature reserves and Aboriginal areas. As per Section 62 of the Act, lands within an Aboriginal area shall be deemed to be reserved for the purpose of preserving, protecting and preventing damage to Aboriginal objects or Aboriginal places therein. There are no Aboriginal areas within the Project footprint.

The Brigalow Park Nature Reserve has been excluded from the Project area and no petroleum activities will occur in this area. No surface infrastructure will be located within 50 m from the Brigalow Park Nature Reserve boundary.

Figure 6.1 confirms that the proposed Phase 1 infrastructure locations fully comply with this requirement.

6.1.2 State conservation areas

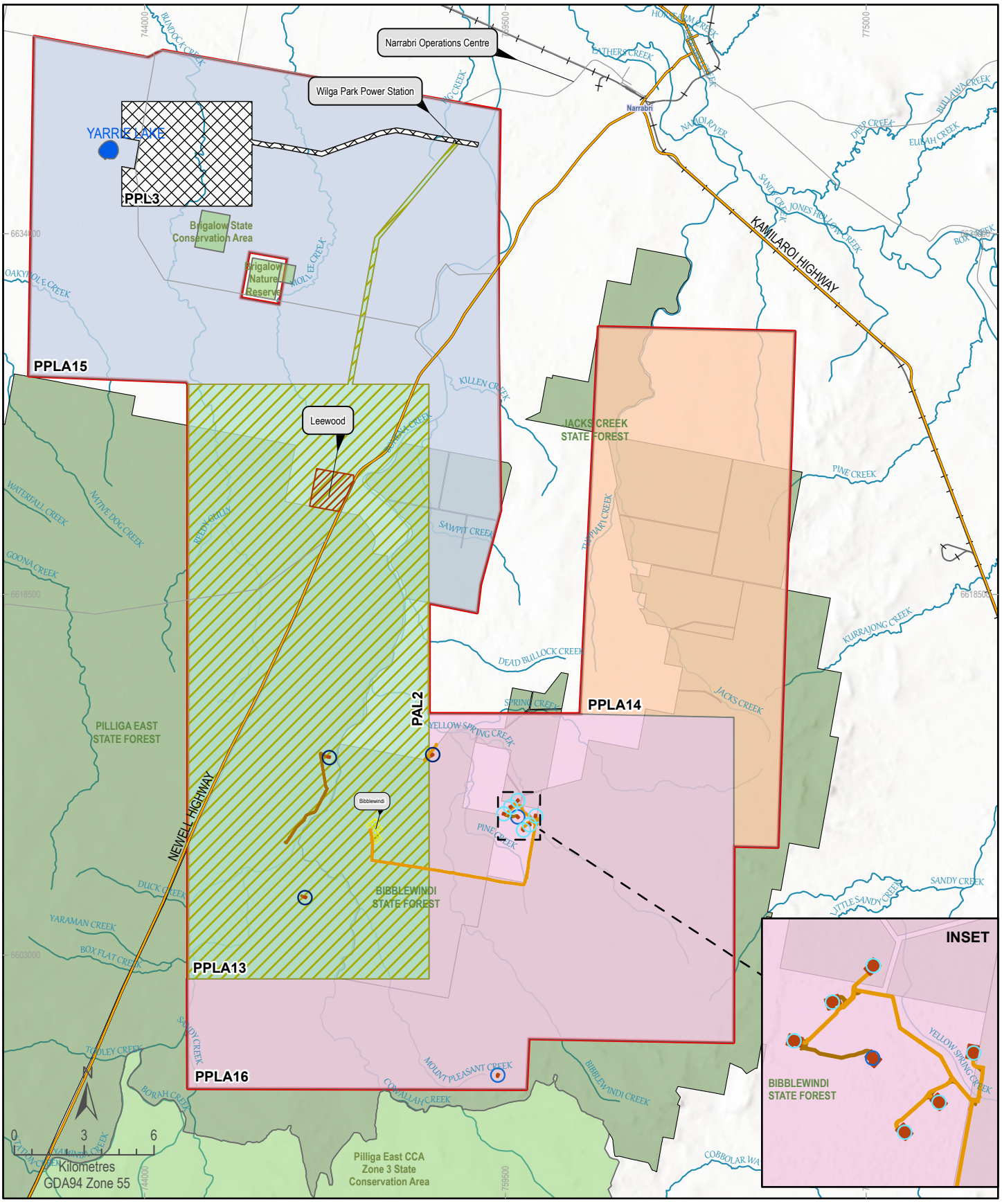
The Brigalow State Conservation Area is located within the Project area. The Brigalow State Conservation Area is gazetted to a depth of 100 m. It is a designated surface development exclusion zone for the Project, including a buffer of at least 50 m. No surface infrastructure will be located within the State Conservation Area and the buffer. Any wells drilled under the Brigalow State Conservation Area from outside of the buffer area will be at least 110 m deep under the State Conservation Area.

Figure 6.1 confirms that the proposed Phase 1 infrastructure locations fully comply with this requirement.

6.1.3 Yarrie Lake Reserve

Yarrie Lake Reserve is located within the Project area and is defined as the following land: Lots 51, 52 and 53 of DP 43308. It is a designated surface development exclusion zone (plus a buffer of at least 200 m) for the Project. No surface infrastructure will be located within the Yarrie Lake Reserve or within the 200 m buffer area.

Figure 6.1 confirms that the proposed Phase 1 infrastructure locations fully comply with this requirement.



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LEGEND

- NGP boundary
- PAL2
- PPL3
- PPLA13
- PPLA14
- PPLA15
- PPLA16
- Leewood
- Bibblewindi

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

- Highway
- Major roads
- Railway
- Watercourse
- State Forest
- Parks and reserves
- Lakes and dams

NARRABRI GAS PROJECT

Figure 6.1

Conservation Areas

6.2 Sensitive receivers and amenity

6.2.1 Residences

In accordance with CoC B1, no Project-related infrastructure will be located within 200 m of any residence (occupied or otherwise). Figure 6.2 shows a 200 m buffer around the nearest residences to the Phase 1 infrastructure. It confirms that the proposed Phase 1 infrastructure locations fully comply with this requirement.

6.2.2 Infrastructure siting and well pad spacing

No telecommunications towers are approved to be or will be constructed as part of the Phase 1 activities.

No production wells are approved to be constructed as part of Phase 1.

In accordance with CoC B1, all pilot well pads will be spaced at least 250 metres apart, as shown in Figure 6.3. Only the pilot well set of Dewhurst 37-42 are shown, since the other wells are located in isolation. The minimum distance between the well pads is 270 m.

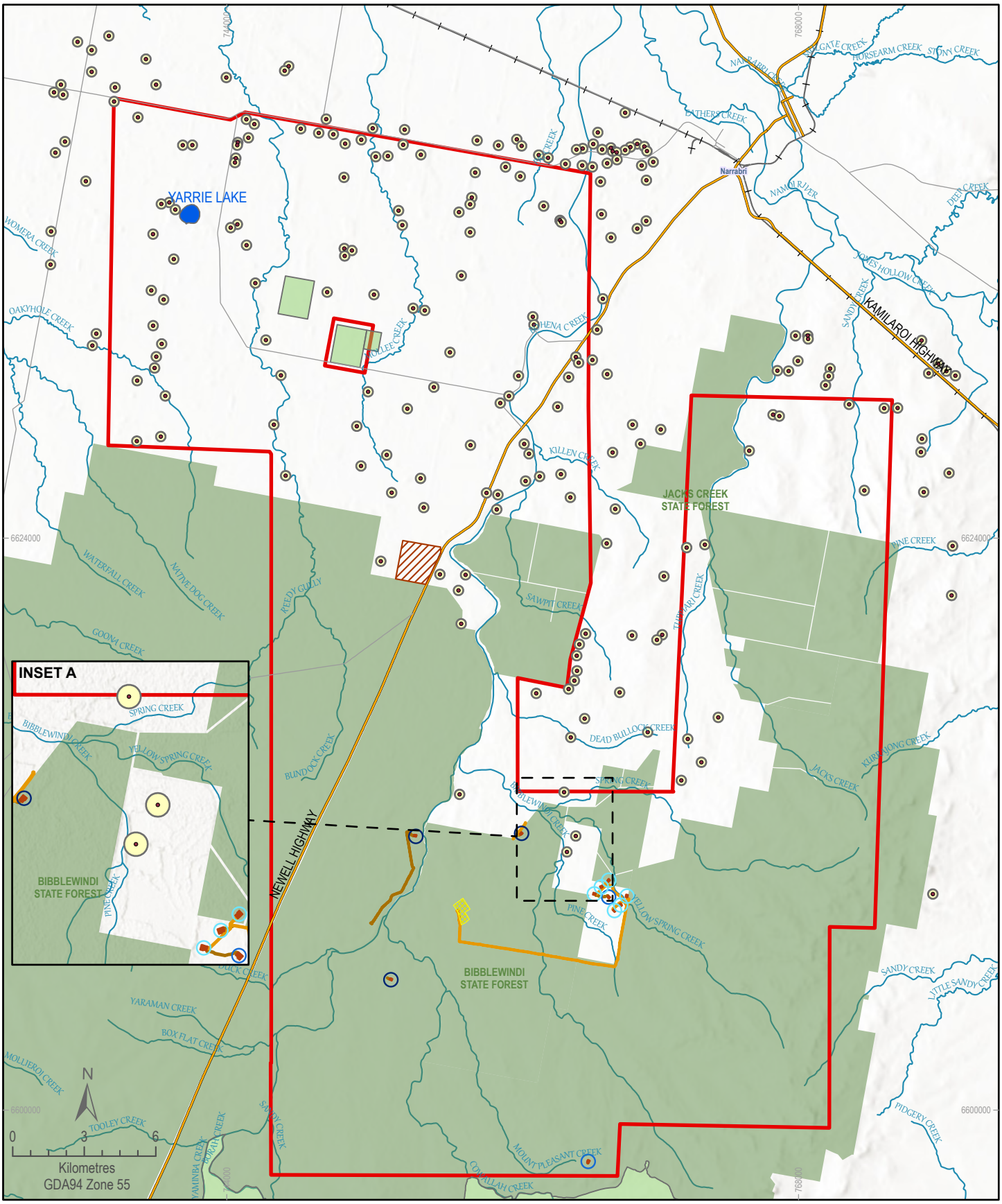
6.2.3 Production well pads and neighbouring properties

In accordance with CoC B1, no pilot or production well pads must be located within 100 m of any privately-owned land or other land not owned by Santos, unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary.

As detailed in Table 5.1, seven of the proposed well pads, core holes and monitoring bores are located on private property. Santos is finalising negotiated land access agreements with the respective owners, and a copy of the agreements will be provided to the Planning Secretary prior to the commencement of Phase 1.

6.3 Biophysical strategic agricultural land

As shown in Figure 6.4, no biophysical strategic agricultural land is located within the Project area. A site verification certificate acknowledging the absence of biophysical strategic agricultural land in the Project area was issued by the NSW Department of Planning and the Environment on 1 December 2015, a copy of which is included in Appendix I2 of the EIS. On this basis, no constraints are proposed.



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Sensitive receivers
- 200m buffer surrounding sensitive receiver site
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

Proposed phase 1 wells

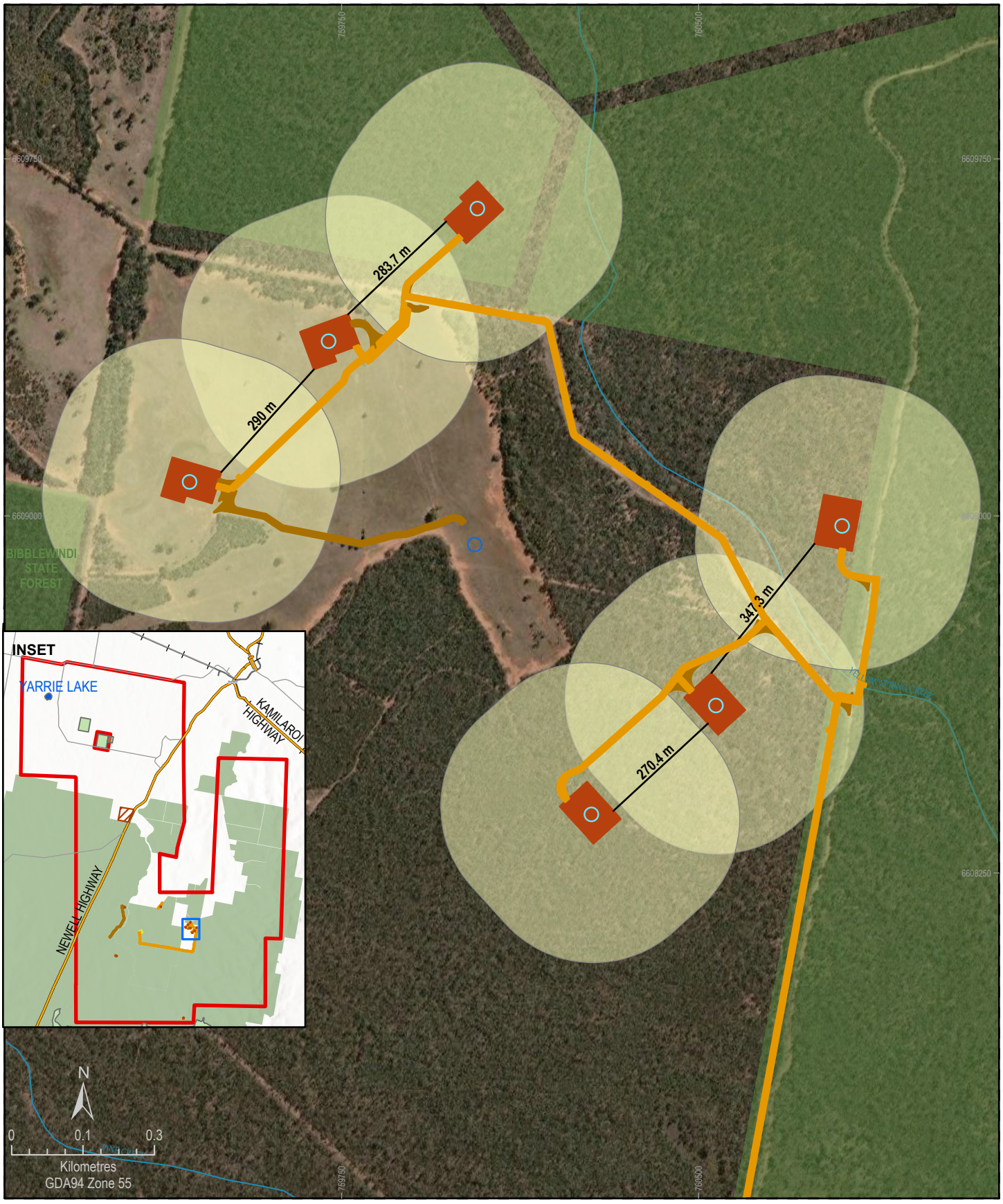
- Core hole
- Groundwater monitoring bore
- Pilot well

- Highway
- Major roads
- Railway
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 6.2

Sensitive Receivers Distance to Project-related Infrastructure



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Phase 1 flowlines
- Phase 1 access roads
- Phase 1 pilot well pads
- 250m buffer around pilot well pads
- distance between pilot well pads

Proposed phase 1 wells

- Groundwater monitoring bore
- Pilot well

- Highway
- Major roads
- Railway
- Watercourse
- State Forest
- Parks and reserves

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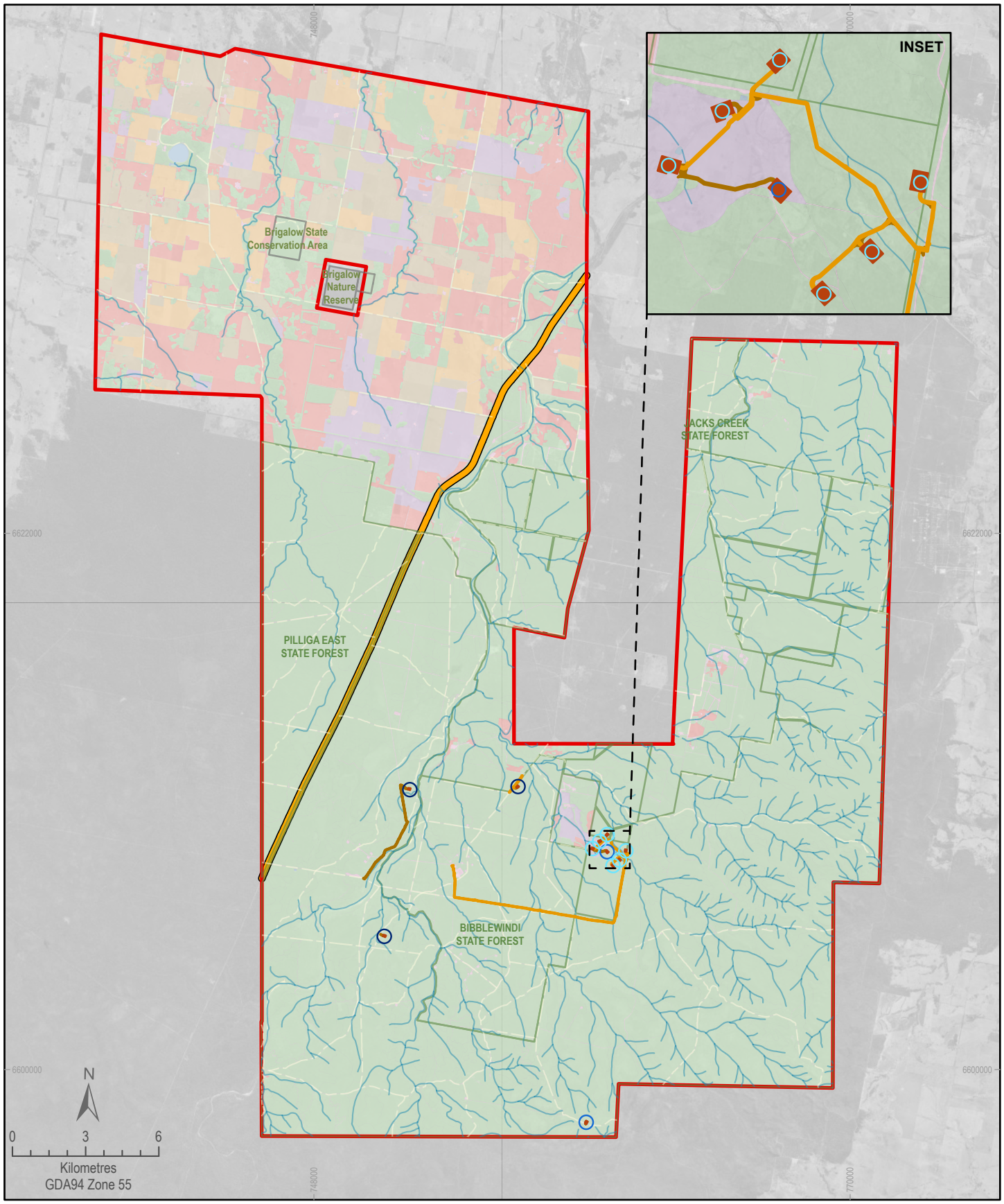
Figure 6.3

Pilot Well Distances



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads
- State Forest
- NPWS Estate
- Highway
- Roads
- Watercourses

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

Land use type

- Derived native grassland
- Native vegetation
- Other - cropping
- Other - improved Pasture
- Other - previous evidence of pasture improvement
- Other - creek bed
- Other - dam
- Other - cleared

NARRABRI GAS PROJECT

Figure 6.4

Land Use within Phase 1 Infrastructure Areas

6.4 Biodiversity constraints

6.4.1 Disturbance limits

The Project consent provides a total maximum disturbance on vegetation communities, and as estimated by modelling threatened flora and habitat. The development planning and execution maintains the Project under these defined limits, in accordance with the Protocol.

The disturbance limits are the maximum amount of direct impact to each native vegetation community or threatened flora approved to be cleared for the Project. Direct impacts considered for the assessment are vegetation removal, habitat removal and removal of threatened flora individuals.

Approval has been obtained for a maximum of 988.8 hectares of new disturbance of native vegetation, including derived native grassland. Appendix D of the Field Development Protocol provides an overview of the approved maximum disturbance of each vegetation community, and the disturbance limits for the threatened flora species and threatened fauna species. These are reproductions of CoC Table 8, Table 9, and Table 10 respectively. The disturbance limits are presented in section 6.4.2 against the estimated impact for the Phase 1 activities.

6.4.2 Ecological micro-siting

A micro-siting exercise was completed for the Phase 1 development footprint. The exercise followed the Ecological Scouting Framework (**ESF**) as detailed in Appendix C of the BMP, and a set of design principles for the Phase 1 infrastructure, including well pad locations and orientation, and maximum angles of curves in access tracks. The exercise was carried out in a Geographic Information System (**GIS**). This process enabled the identification of optimum locations for well pads and linear infrastructure to minimise impacts to sensitive biodiversity values based on a prioritisation framework.

The spatial process was as follows:

- perform an intersect between the original locations of the Phase 1 infrastructure, and spatial datasets relevant to biodiversity values including mapped primary Pilliga Mouse habitat, EECs, riparian corridors, high ecological sensitivity class areas, cultural heritage sites and slope classes;
- calculating areas (ha) for primary Pilliga Mouse Habitat, EECs, riparian corridor and high ecologically sensitive area class features within the disturbance footprint;
- where no biodiversity values are present, the well location is appropriate and does not require further checking;
- where sensitive biodiversity values are present, a rapid assessment of well and linear infrastructure location and ability to relocate was undertaken;
- perform a final intersect between amended well pad and linear infrastructure locations and biodiversity values to identify the impacts avoided and the impacts remaining.

The hierarchical structure as presented in Table 6.2 was applied to the relocation of infrastructure to avoid or minimise impacts on key features and attributes identified during micro-siting. Priority was also given to avoiding exacerbation of edge effects, fragmentation and habitat connectivity, wherever possible, by minimising width of clearing, co-location with existing roads or infrastructure and using short direct routes. No endangered ecological community was identified that was not mapped at that particular location (as part of the EIS). Where avoidance was not possible, the impact has been counted toward the upper disturbance limit for that endangered ecological community. For all other impacts, the upper clearing limits were assessed as per the mapped plant community type (**PCT**).

Table 6.2 - Ecological avoidance hierarchy in order of priority

Priority	Ecological feature of attribute	
1	**Endangered Ecological Communities by listing status**	
	Ranking (highest to lowest)	**Status**
	1	EPBC Act Endangered
	2	BC Act Endangered
2	**Threatened flora species prioritised by listing status**	
	Ranking (highest to lowest)	**Status**
	1	EPBC Act Critically Endangered
	2	BC Act Critically Endangered
	3	EPBC Act Endangered
	4	BC Act Endangered
	5	EPBC Act Vulnerable
	6	BC Act Vulnerable
3	**Hollow-bearing trees prioritised by size class**	
	Ranking (highest to lowest)	**Size class (hollow)**
	1	> 300 millimetres (**mm**)
	2	> 200 mm < 300 mm
	3	< 200 mm
4	**Significant fauna habitat (e.g. Pilliga Mouse habitat, nests including stick nests for raptors, mistletoe, termite mounds, hollow logs and rock piles)**	

Due to the specific positioning requirements for the well pads for optimum appraisal, there was generally limited scope for significant adjustments to the footprint. However, small opportunities to avoid, where present, sensitive biodiversity values were provided to satisfy the Field Development Protocol, and to facilitate increased avoidance of these values. These adjustments to the original well pad, flow line, access tracks and road locations are presented in Appendix C.

The adjusted infrastructure locations were evaluated by the Santos design and construction teams and assessed against plant and equipment accessibility requirements, and constructability limitations and restrictions. In a number of instances, the adjusted footprints were amended to ensure compliance with the locational criteria in CoC B1 Table 1. In other instances, the access track into the well pad required to be widened to allow access for drilling equipment, turning radius, or the well pad footprint was enlarged to allow for cut/fill batters.

The modifications to the locations of the original and adjusted well pad, flow line and access track locations are presented in Appendix D.

The summary of impact to the biodiversity values of the original, adjusted and modified infrastructure locations is presented in Table 6.3. The total impacts avoided consisted of three high, five medium and eight low priority biodiversity values detected during the micro-siting surveys. The notes in the table provide a summary of the reasoning behind either accepting the original location, the adjusted footprint or the modified final position.

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Table 6.3 - Summary of impacts to biodiversity values

Infrastructure name	Feature	Original footprint Priority level			Adjusted footprint Priority level			Impacts avoided (original to adjusted)	Notes (original to adjusted)	Modified footprint Priority level			Impacts avoided (adjusted to modified)	Final impacts avoided (original to modified)	Notes (adjusted to modified)
		High	Med	Low	High	Med	Low			High	Med	Low			
Bibblewindi 30	HBT		1	1		1		**1**	Well pad, track and access road moved 20 m north-east to avoid impacts to seven biodiversity values: 2 HBT 4 logs 1 fauna habitat		1		**0**	**1**	Adopt the ecological micro-siting adjustments. Impacts avoided: 2 HBT 4 logs 1 fauna habitat
	Logs	1	1	3		1	1	**3**			1	1	**0**	**3**	
	Fauna habitat			4			3	**1**				3	**0**	**1**	
Bibblewindi 30 flowlines and access	HBT	1						**1**					**0**	**1**	
	Logs			3			2	**1**				2	**0**	**1**	
Bibblewindi 31	HBT	1					2	**-1**	Well pad rotated and moved to the north- west to avoid a high priority HBT. Two HBTs impacted following adjustment are lower priority than the one avoided. Upgrade to existing road shortened and new access road extended to meet existing road.			2	**0**	**-1**	Adopt the ecological micro-siting adjustments.
Bibblewindi 31 access (maintenance grade)	HBT	1	3		1	3		**0**	This section occurs off Bohena Creek Road towards Dewhurst 31. The data supplied indicates a maintenance grade is required, however it appears as though this will be unlikely for this route.	1	3		**0**	**0**	
Dewhurst 34	HBT			2			2	**0**	Well pad and access track moved 25 m northeast to avoid impact to one threatened species and two HBTs. Two HBTs on the well pad cannot be avoided.			2	**0**	**0**	Retain the adjusted footprint due to already optimised location.
	Logs			6			8	**-2**				8	**0**	**-2**	
	Th species [1]			1			0	**1**				0	**0**	**1**	
Dewhurst 34 – access	HBT			2			0	**2**				0	**0**	**2**	
	Logs			2			0	**2**				0	**0**	**2**	
Dewhurst 35	Th species		2			1		**1**	Rotating and moving this well pad 40 m south will avoid impacts to one threatened species record.		2		**-1**	**0**	Retain the original footprint. The Dewhurst pilot is a set of 6 surface locations with 3 laterals per deviated well (DWH 37, 38, 39) intersecting the vertical wells (DWH 40, 41, 42). These are a complicated well designs and any potential collision risk (Dewhurst 35) will need to be avoided. The current well locations are ideal for the pilot setup with Dewhurst 35 located as centrally as possible, whilst being offset from the planned deviated well path. There is the possibility of complications in drilling the horizontal well paths that may require side track drilling and as such there is the requirement for maintaining the proposed buffer.
Flowline from pilot well set Dewhurst 37-42 to Bibblewindi	HBT	6	12	42	6	12	42	**0**	No adjustments to original footprint as co-location to existing tracks is more favourable than creating isolated fragments of vegetation between tracks and linear infrastructure.	6	12	42	**0**	**0**	No adjustments to original footprint as co-location to existing tracks is more favourable than creating isolated fragments of vegetation between tracks and linear infrastructure.
	Logs	1	4	16	1	4	16	**0**		1	4	16	**0**	**0**	
	Th species	9			9			**0**		9			**0**	**0**	

Infrastructure name	Feature	Original footprint			Adjusted footprint			Impacts avoided (original to adjusted)	Notes (original to adjusted)	Modified footprint			Impacts avoided (adjusted to modified)	Final impacts avoided (original to modified)	Notes (adjusted to modified)
		Priority level			Priority level					Priority level					
		High	Med	Low	High	Med	Low			High	Med	Low			
Dewhurst 37	HBT			7			6	**1**	Rotating this well pad on its vertical axis and moving the flowline connection approximately 15 m west will avoid impacts to three HBTs (one within the well pad area and, two in the flowline and access footprint) and one log.			6	**1**	**0**	Minor modification to the adjusted well pad locations. Minor modification to the adjusted access track location.
Dewhurst 37 - flowlines and access	HBT		2					**2**						**2**	
	Logs			1				**1**						**1**	
Dewhurst 38	HBT	1	2	7		2	2	**6**	Well pad, flowline connection and access road rotated and shifted to the south-west to avoid eight HBTs and three logs. Note: 1 low priority HBT, Fauna Habitat and Log are located in a section identified as existing but mapped in remnant vegetation. Calculations include these but it is believed they can be avoided through colocation of infrastructure in adjacent clearing.	1	2	7	**-1**	**0**	Retain the original footprint. Adopt the ecological micro-siting adjustment on the access road. To be compliant with 250 m well pad spacing as dictated by CoC B1. Access road adjusted to avoid HBT priority 1
	Logs	1	2					**3**		1	2		**-3**	**0**	
Dewhurst 38 - flowlines and access	HBT	1		5			4	**2**		1		4	**-2**	**1**	
	Logs			1			1	**0**							
	Fauna habitat			1			1	**0**							
Dewhurst 39	Logs			3				**3**	Well pad shifted approximately 20 m in a north-east direction to avoid impacts to two logs.			3	**-3**	**0**	Retain the original footprint. To be compliant with 250m well pad spacing as dictated by CoC B1
	Th species			1				**1**				1	**-1**	**0**	
Dewhurst 39 - flowlines and access track	HBT			1				**1**				1	**-1**	**0**	
Dewhurst 40	HBT			2			2	**0**	Well pad shifted approximately 10 m in a south-west direction to avoid impacts to one HBT. Note: Impacts to one medium priority and two low priority HBTs occur adjacent to cleared areas, intended for location of infrastructure. These trees should be avoided through colocation of infrastructure.			2	**0**	**0**	Adopt the ecological micro-siting adjustments.
Dewhurst 40 - flowlines and access	HBT			1			1	**0**				1	**0**	**0**	
Dewhurst 41									No features identified within disturbance footprint.						Retain the original footprint. No features identified within disturbance footprint.
Dewhurst 42									No features identified within disturbance footprint.						Retain the original footprint. No features identified within disturbance footprint.
Dewhurst 43	HBT	2	3	2	1	2	2	**2**	Shifted well pad, access road and site access 13 m to the north-west to avoid impacts to two HBTs.	3	4	2	**-3**	**-2**	Retain the original footprint, however area increased to account for cut/fill batters. This has resulted in additional clearance of priority 1 and 2 HBTs. Access road adjusted to avoid HBT priority 1
Dewhurst 43 - access	HBT	1	1		1			**1**		1	1		**-1**	**0**	
Bohena Creek Road - upgrade	HBT	4	10	1	3	6		**6**	One priority 2 and one priority 1 tree only require branch trimming to facilitate upgrade. Total impact is one priority 1 HBT.	3	6		**0**	**6**	Adopt the ecological micro-siting adjustments. Total impact is one priority 1 HBT.
Summary of impacts		**Original footprint**			**Adjusted footprint**					**Modified footprint**					**Original total: 188**
		30	**43**	**115**	**22**	**32**	**99**	**39**		**27**	**38**	**107**	**-15**	**17**	**Modified total: 172**

Notes:

1. Th species – threatened species

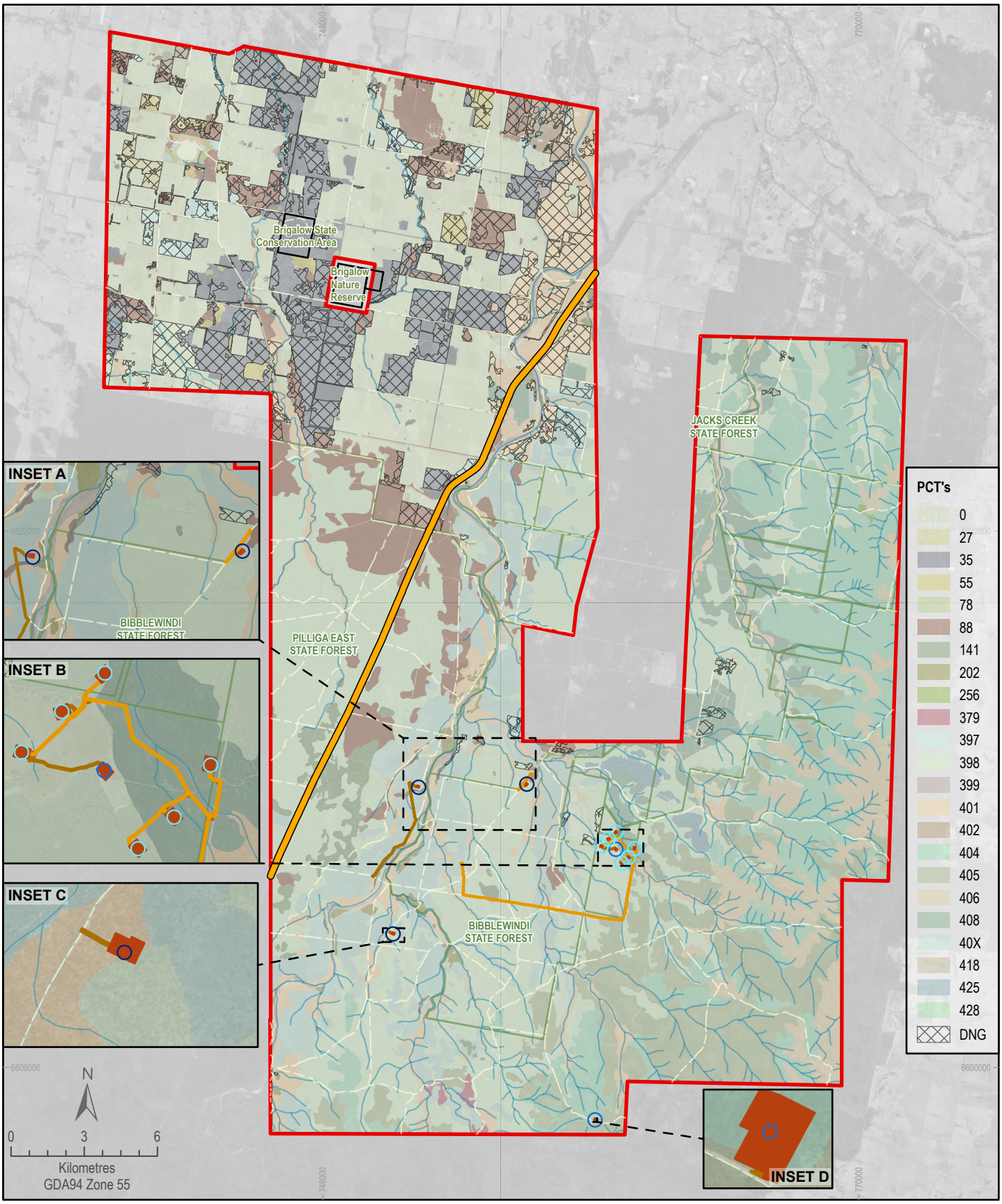
The final Phase 1 impacts have been calculated by intersecting the development footprint with the approved Project EIS vegetation mapping, where clearing of native vegetation is required.

Based on the impact calculations, the largest area of impact will occur in Narrow-leaved Ironbark - White Cypress Pine-Buloke tall open forest, as presented in Table 6.4. Approximately 0.5 ha of Fuzzy Box Woodland on alluvial soils of the south-western slopes, Darling Riverine Plains and Brigalow Belt South bioregions EEC along Bohena Creek Road will be impacted during the Phase 1 development.

Table 6.4 - Direct impacts to native vegetation per Plant Community Type

Plant Community Type	Direct impacts (ha)		
	CoC limit	Original Phase 1 footprint	Modified Phase 1 footprint
141 - Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	19.5	0.60	0.51
404 - Red Ironbark - White Bloodwood -/+ Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	86.6	1.20	1.34
405 - White Bloodwood - Red Ironbark - cypress pine shrubby sandstone woodland of the Pilliga Scrub and surrounding regions	247.1	4.52	1.21
408 - Dirty Gum (Baradine Gum) - Black Cypress Pine - White Bloodwood shrubby woodland of the Pilliga forests and surrounding region	33.3	3.52	2.8
202 - Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South-western Slopes Bioregion	4.1	0.47	0.47
88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	6.2	0.05	0.05
399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, BBS Bioregion	0.14	0.03	0.03
401 - Rough-barked Apple - red gum - cypress pine woodland on sandy flats, mainly in the Pilliga Scrub region	12.7	1.98	2.17
398 - Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north BBS Bioregion	226.4	12.32	10.51
Total (ha)	-	24.69	22.68

Figure 6.5 presents the vegetation communities relative to the proposed well pads in linear infrastructure, and Figure 6.6 presents the EECs within the Phase 1 infrastructure area. Note that locational details for each well pad in relation to any impact on the various PCTs is provided in in Appendix F.



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LEGEND

- NGP boundary
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

- State Forest
- NPWS Estate
- Highway
- Roads
- Watercourses

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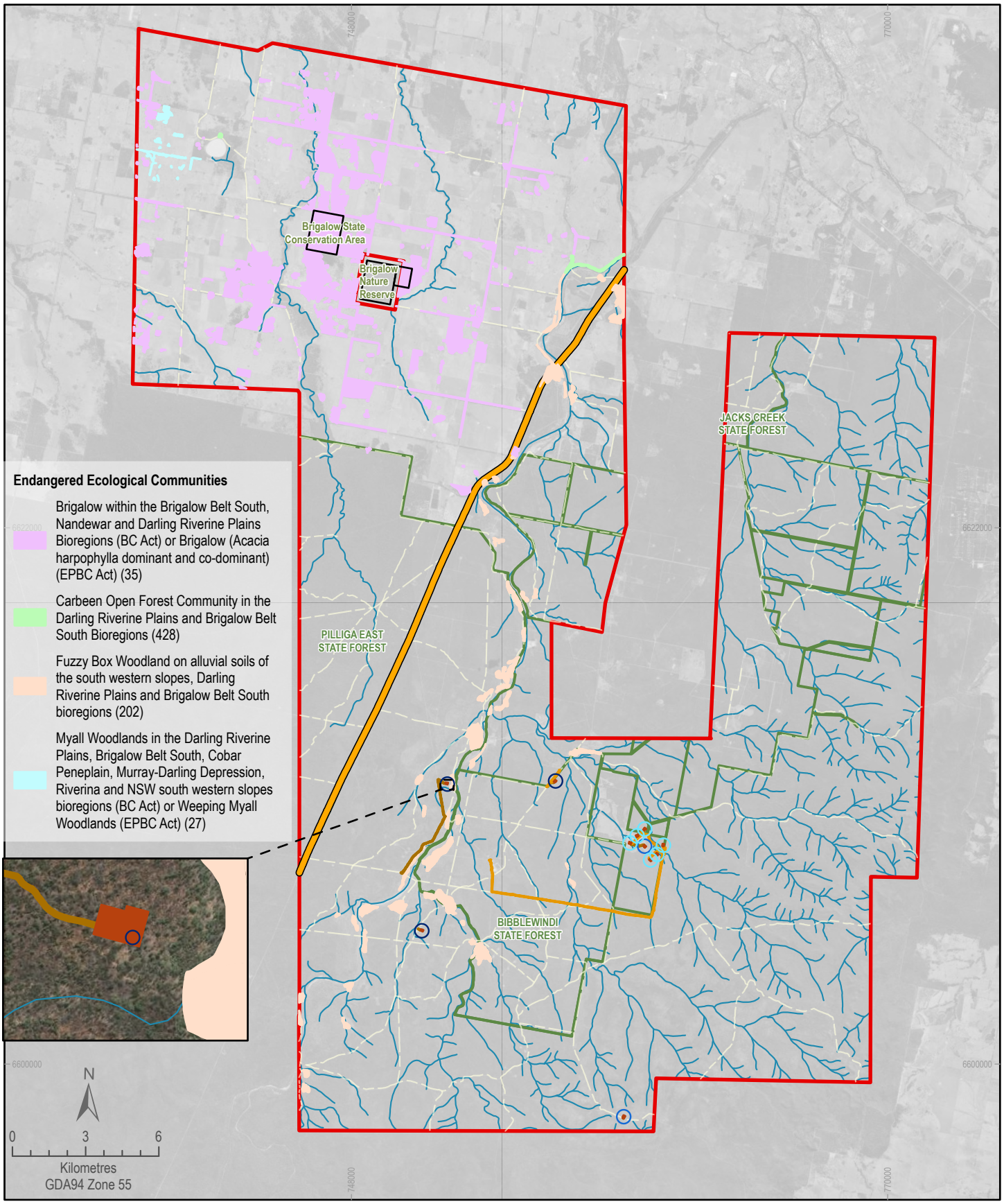
Figure 6.5

Vegetation Communities within Phase 1 Infrastructure



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LEGEND

- NGP boundary
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

- Highway
- Roads
- Watercourses
- State Forest
- NPWS Estate

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Figure 6.6
Endangered Ecological Communities within Phase 1 Infrastructure

Impacts to threatened flora and fauna species for Phase 1, as presented in Table 6.5 and Table 6.6 respectively, have been calculated using modelling and impact area predictions from the Project EIS.

Note, indirect and cumulative impacts to threatened fauna habitat have been calculated as proportions of direct impacts to remnant native vegetation. Conversely, indirect impacts to PCTs and threatened flora have been calculated as a proportion of the upper limit of the modelled impacts to PCTs. Impact calculations for offsetting purposes of indirect and also cumulative impacts will be addressed in the Phase 2 development plan in accordance with the CoC.

Table 6.5 - Estimated direct impacts to flora species

Scientific name	Direct impacts (individuals)		
	CoC limit	Original Phase 1 footprint	Modified Phase 1 footprint
Bertya opponens (Coolabah Bertya)	10,309	0	
Diuris tricolor (Painted Diuris)	52	2	2
Lepidium aschersonii (Spiny Peppercress)	77,691	0	0
Lepidium monoplocoides (Winged Peppercress)	1,116	0	
Polygala linariifolia (Native Milkwort)	252	6	6
Pomaderris queenslandica (Scant Pomaderris)	467	0	
Pterostylis cobarensis (Cobar Greenhood Orchid)	6,658	178	158
Commersonia procumbens	3,716	86	77
Tylophora linearis	513	14	13

Table 6.6 - Estimated impacts to fauna species habitat

Scientific name	Direct impacts (ha)		
	CoC limit	Original Phase 1 footprint	Modified Phase 1 footprint
Cercartetus nanus) (Eastern Pygmy-possum)	775	23.50	21.40
Hoplocephalus bitorquatus (Pale-headed Snake)	885	24.10	22.20
Petaurus norfolcensis (Squirrel Glider)	862	24.10	22.20
Phascolarctos cinereus (Koala)	989	24.70	22.70

As shown in Table 6.7, for area-based sensitive biodiversity values the location adjustments resulted in:

- a small decrease in the area of impact to Fuzzy Box EEC and no net change to the area of riparian corridor affected for linear infrastructure; and
- no increase to riparian corridor impacts for any well pads.

Table 6.7 - Change in area of impact to area-based ecological features

Infrastructure	Original Phase 1 footprint (ha)				Adjusted Phase 1 footprint (ha)			
	Primary Pilliga Mouse habitat	Fuzzy Box EEC	High ecological sensitivity area	Riparian corridor	Primary Pilliga Mouse habitat	Fuzzy Box EEC	High ecological sensitivity area	Riparian corridor
Access Road - Existing - Upgrade Required (Bohena Creek Road)	0.27	0.07	0.04	0.24	0.21	0.05	0.03	0.18
Access Road - New	0.13	-	-	0.07	0.42	0.01	0.06	0.12
Well pad - Bibblewindi 31	0.58	-	-	-	0.76	-	-	-
Gas flowline – Pilot well set Dewhurst 37-42	-	-	-	0.28	-	-	-	0.28
Gas flowline – Dewhurst 37	-	-	-	0.13	-	-	-	0.13
Gas flowline - Dewhurst 38	-	-	-	0.22	-	-	-	0.22
Gas flowline – Dewhurst 40	-	-	-	0.30	-	-	-	0.30
Water flowline – Dewhurst 37	-	-	-	0.02	-	-	-	0.02
Total	**0.98**	**0.07**	**0.04**	**1.25**	**1.39**	**0.06**	**0.09**	**1.25**
Difference if all changes are accepted					**-0.41**	**0.01**	**-0.05**	**0.00**

6.5 Water resources

6.5.1 Watercourses

As required by CoC B1, no non-linear infrastructure will be located within any watercourse or watercourse buffer zone as determined by Strahler stream order. The Phase 1 non-linear infrastructure as presented in Figure 6.7 confirms that all well pads are located outside of the buffer zones as determined in Table 6.8. The constraints mapping for each well pad in Appendix F provides further detail on the avoidance of the watercourses.

Non-linear infrastructure and large ponds and dams will be excluded from these buffers.

Table 6.8 - Riparian corridor widths

Strahler Order	Riparian buffer zones
1st order	20 m plus channel width
2nd order	40 m plus channel width
3rd order	60 m plus channel width
4th order and greater	80 m plus channel width

In accordance with commitment 4.3 in EIS Chapter 31 (as updated in Appendix B of the Response to Submissions), Santos will, where practical, select watercourse crossing points after consideration of the following:

- use existing vehicular crossings;
- locate the crossing points on straight sections of channel; and
- maximise avoidance of steep, unstable banks, permanent pools and waterholes for crossing points.

6.5.2 Flooding and geomorphology

Flood analysis over the Project area has been carried out for a 1 % AEP and is presented in the Surface Water Management Plan. The existing Leewood produced water ponds are located outside of the 1 % AEP flood extent as shown in the Dam Safety Emergency Plan.

There are no large ponds or dams approved to be constructed as part of Phase 1.

INSET - Dewhurst 34

INSET - Bibblewindi 31

INSET - Bibblewindi 30

INSET - Dewhurst 43

INSET - Dewhurst 37

INSET

Dewhurst 40

Dewhurst 41

Dewhurst 42

Dewhurst 35

Dewhurst 37

Dewhurst 38

Dewhurst 39

INSET - Dewhurst 38

N

0 1.5 3

Kilometres

GDA94 Zone 55

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LEGEND

- NGP boundary
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads
- State Forest
- Parks and reserves
- Highway
- Roads
- Riparian corridors (to scale)
- 20 m buffer around 1st stream order riparian corridor
- 40 m buffer around 2nd stream order riparian corridor
- 60 m buffer around 3rd stream order riparian corridor
- 80m buffer around 4th order and greater riparian corridors

Strahler Stream Order

- 1
- 2
- 3
- 4
- 5
- 6

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

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Figure 6.7

Phase 1 Non-linear Infrastructure and Watercourse Resources

6.6 Heritage constraints

6.6.1 Aboriginal cultural heritage

In accordance with CoC B1, Santos will avoid all currently known Aboriginal sites and objects, presented in Figure 11 in Appendix 7 of the consent. Santos will also implement avoidance strategies by site type, as detailed in Schedule 3 and Schedule 4 of the ACHMP.

For all currently known sites, and for the most sensitive site types identified during the pre-clearance survey, complete avoidance will be applied, and no infrastructure will be located in that area. For other sites, avoidance will be maximised and where the site cannot be avoided, artefacts may be relocated.

Assessment of the Cultural Heritage Assessment Request areas took place with the assistance of representatives from the Aboriginal community arranged by Santos through the Aboriginal Cultural Heritage Working Group and the Cultural Heritage Coordinator (refer to section 5.4 of the ACHMP).

Figure 6.8 and Table 6.9 provide an overview of the Aboriginal cultural sites identified during the Project pre-clearance survey. Two Aboriginal sites were recorded ([redacted] including one [redacted] and one [redacted]. Of these sites, only [redacted] is located within the request area. Three [redacted] and two [redacted] were also identified during the fieldwork.

The undertaking of the impact assessment concluded that all recorded [redacted] and [redacted] will not be harmed by the Project. The Cultural Heritage Compliance Report is presented in Appendix E.

Table 6.9 - Aboriginal cultural heritage sites

Site type	Phase 1 infrastructure	Planning outcome
[redacted]	[redacted]	Avoidance
[redacted]	[redacted]	Not applicable
[redacted]	[redacted]	Avoidance
[redacted]	[redacted]	Avoidance
[redacted]	[redacted]	Avoidance
[redacted]	[redacted]	Avoidance

Redacted for confidentiality reasons

Figure 6.8 - Aboriginal Heritage Pre-clearance Survey Findings

6.6.2 Historic heritage

There have been 53 potential historic heritage sites identified within the Project area, primarily associated with past logging activities. The majority of sites were found to be of local significance as part of a collection, referred to as the Pilliga East Logging Cultural Landscape, that can demonstrate the pattern and course of the development of logging in the forests. In addition, a number of other sites of heritage significance were identified. These sites have been classified as surface development exclusion areas in order to preserve their heritage significance and are listed in Table 6.10. Note that there are multiple heritage sites in the majority of the identified areas.

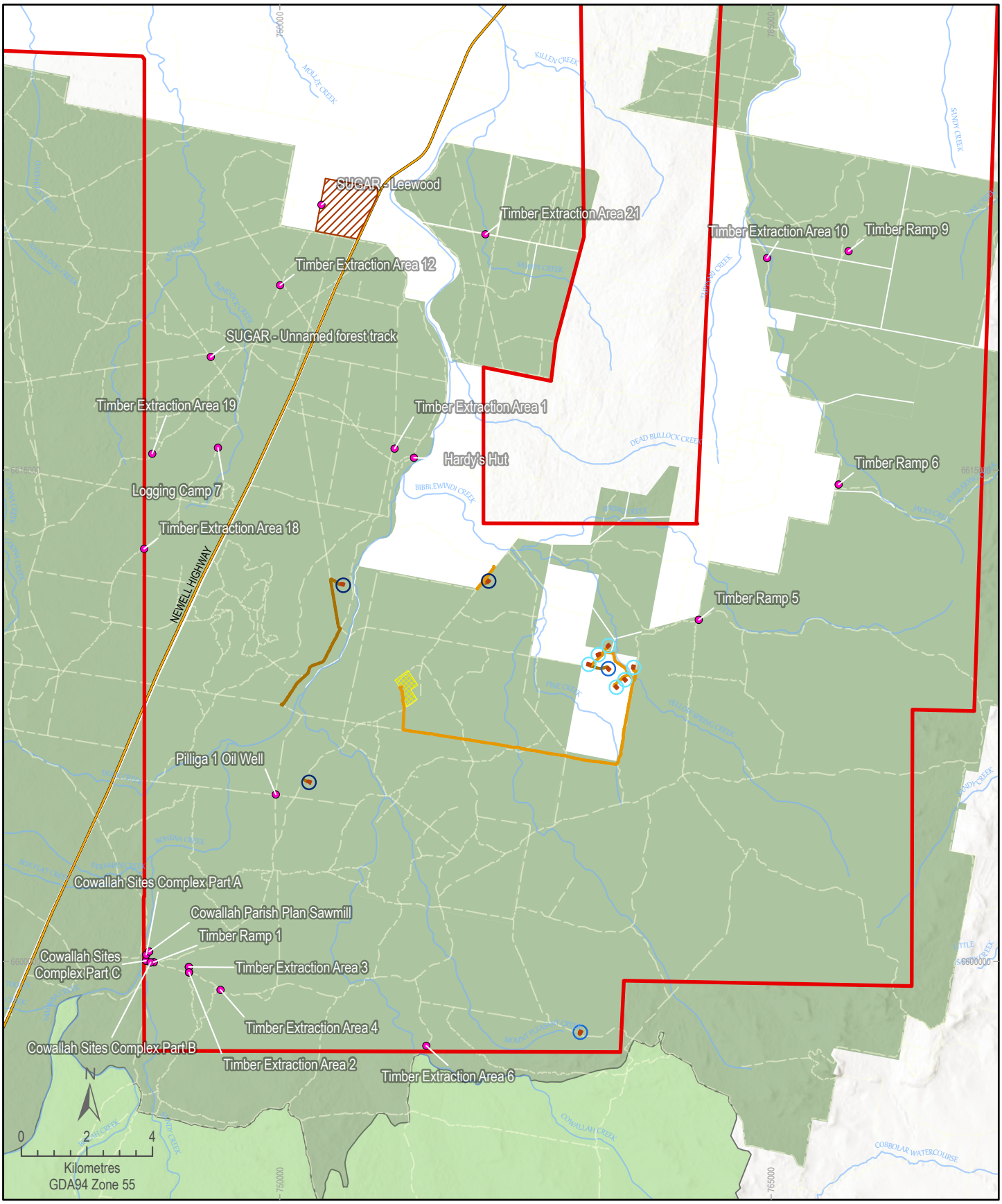
In accordance with CoC B1, Santos will avoid all identified historic heritage items during the Phase 1 appraisal activities. The locations of the proposed Phase 1 infrastructure relative to the historic heritage sites are shown in Figure 6.9. Further information on each of the previously identified sites is provided in the Historic Heritage Management Plan.

Table 6.10 - Historical heritage sites

Area No.	Heritage sites	Non-linear infrastructure	Linear infrastructure	Large ponds and dams	Support for planning
1	Cowallah Parish Plan Sawmill	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
2	Logging Camp 7	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
3	Cowallah Sites Complex	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
4	Hardy's Hut	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
5	Pilliga 1 Oil Well	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
6	SUGAR pits (2) – (Leewood and Plumb Rd/No Name Road intersection	Surface: prohibited Sub-surface: permitted	Prohibited	Prohibited	Permitted
7	Timber extraction areas 1, 2, 3, 4, 6, 10, 12, 18, 19 and 21	Surface: prohibited. Same site type may be substituted if unavoidable [a] Subsurface: permitted	Prohibited. Same site type may be substituted if unavoidable [a]	Prohibited. Same site type may be substituted if unavoidable [a]	Permitted
8	Timber loading ramp 1, 5, 6, 9 and ramp associated with timber extraction area 19	Surface: prohibited. Same site type may be substituted if unavoidable [a] Subsurface: permitted	Prohibited. Same site type may be substituted if unavoidable [a]	Prohibited. Same site type may be substituted if unavoidable [a]	Permitted

Notes:

a - The timber extraction areas and timber loading ramps are nominally listed as suggested sites to avoid surface disturbance. However, due to the similarity of the sites across the Project area, if impacts are unavoidable at a listed timber extraction area or listed timber loading ramp, another site of the same type may be substituted without impacting the heritage significance of the collection of sites.



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads
- Historic heritage sites (exclusion zones)

Proposed phase 1 wells

- Core hole
- Groundwater monitoring bore
- Pilot well

- Highway
- Roads and tracks
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 6.9

Historic Heritage Surface Exclusion Zones within Phase 1 Infrastructure Areas

6.7 Noise constraints

Consent condition B7, B8 and B9 provides noise criteria, as summarised in Table 6.11, with the following considerations:

- for standard hours construction phase works, where these criteria are not achieved, all reasonable and feasible mitigation measures are to be implemented during these construction activities. Reasonable is defined in the consent as *"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".* Feasible is defined in the consent as, *"what is possible and practical in the circumstances"*;
- for operational phase and non-standard hours construction phase works, which cannot be exceeded; and
- for non-routine safety flaring, where these criteria are not achieved, all reasonable and feasible mitigation measures are to be implemented during these construction activities. The mitigation requirements for non-routine safety flaring at Leewood as described in consent conditions C1 to C3 do not apply to Phase 1 since there is no flare located at Leewood.

Standard construction hours are defined in the consent as 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday.

Subject to private negotiated agreements with the owner/s of the relevant residence or land to exceed the noise criteria, as required by EPL 20350 condition L5.2 and CoC B11, construction activities will generally occur between 7 am and 6 pm Monday to Sunday. Under the same agreements, the drilling and completions activities are the only scheduled construction to occur for 24 hours a day.

Table 6.11 - Noise criteria summary

Time period		All privately owned residences	Yarrie Lake, Brigalow Conservation Area, Brigalow Nature Reserve
Day	**Duration of day**	**Noise criteria dB(A)**	
Monday to Friday	7am to 6pm	40 $L_{Aeq\ (15mins)}$	50 $L_{Aeq\ (period)}$
Monday to Friday	6pm to 7am	35 $L_{Aeq\ (15mins)}$	
Saturday	8am to 1pm	40 $L_{Aeq\ (15mins)}$	
Saturday	1pm to 8am	35 $L_{Aeq\ (15mins)}$	
Sunday and public holidays	All hours	35 $L_{Aeq\ (15mins)}$	
All days of week	Night (10pm-7am)	45 $L_{A1\ (1min)}$	
Non-routine safety flaring [1]	All hours of everyday	35 $L_{Aeq\ (15mins)}$ Refer to section 5.2 of the NMP for exemptions	

Note 1: No routine safety flaring is approved at pilot wells or production wells.

The maximum buffer distance to achieve the noise management levels during standard construction hours are estimated to be approximately 1,440 m during vegetation clearing for access tracks and gathering line corridors; and approximately 2,021 m during trenching activities for gathering line installation. By their nature, noise level exceedances of the construction noise management levels at sensitive receivers associated with the installation of access tracks or gathering lines are very short term as the installation work front proceeds along the corridor.

As per CoC A11, other than for non-routine safety flaring, consent has not been granted for flaring infrastructure at pilot wells.

A buffer screening test has been completed for the proposed Phase 1 activities to identify potentially affected privately-owned residences for which further detailed assessment is required. The buffer distances for construction and well operational phase activities have been obtained from the EIS and are summarised in Table 6.12 and Table 6.13 respectively.

Table 6.12 - Screening criteria buffer distance (construction activities)

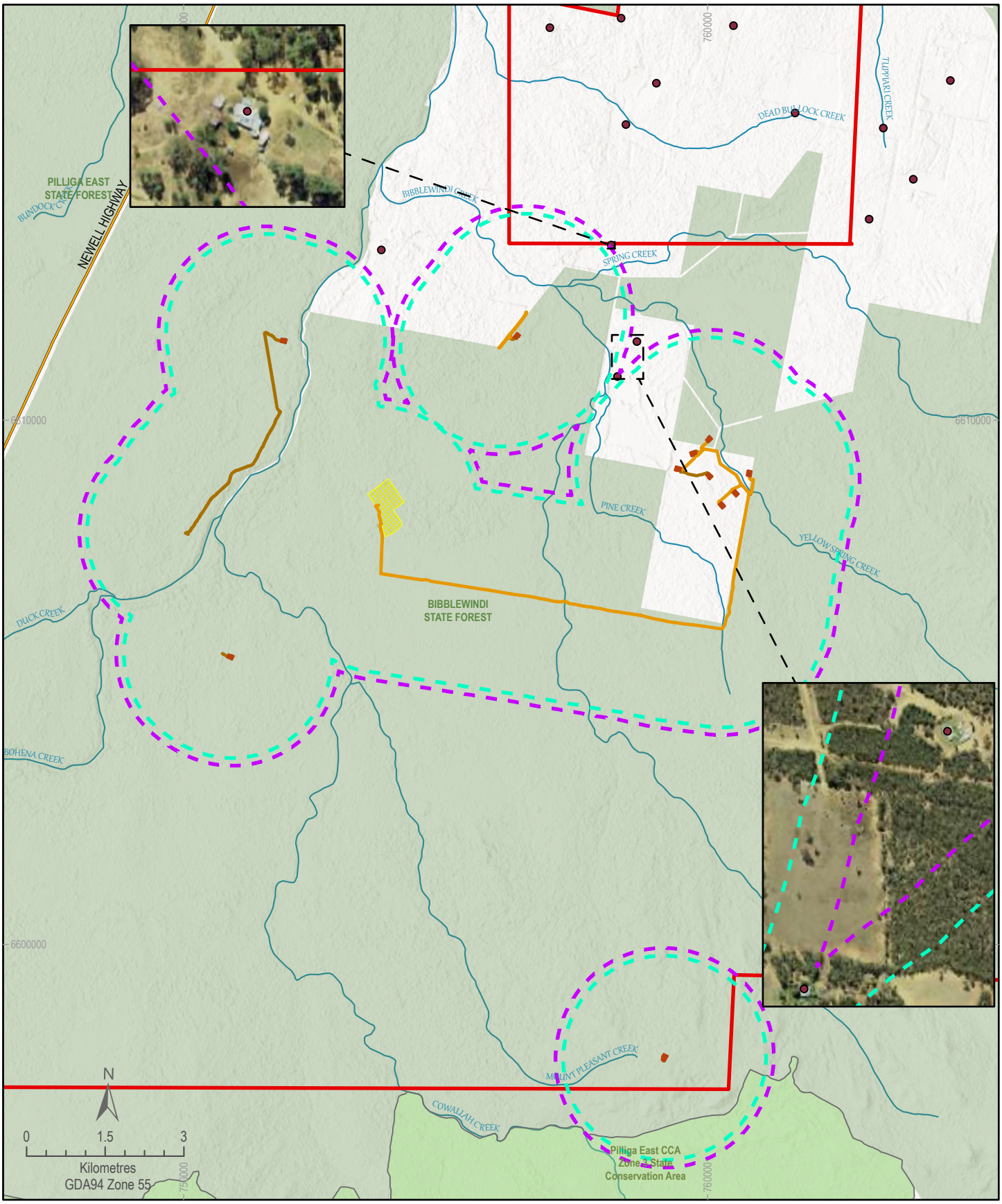
Phase	Activity / equipment		Screening criteria buffer distance (m)	
Time Period			Standard hours	Outside standard hours
Construction activities – Phase 1	Well drilling activities		844	1875
	Gas and water gathering system installation	Gathering line installation trenching	2021	-
		Vegetation clearing	1440	-

Table 6.13 - Screening criteria buffer distances (operational activities)

Phase	Activity / equipment	Screening criteria buffer distance (m)
Operational activities – Phase 1	Well operation	218

The previously presented Figure 6.2 shows the sensitive receivers relative to the Phase 1 construction activities. The buffer screening tests for gathering line installation trenching (during standard hours) and well drilling activities (outside standard working hours) is presented in Figure 6.10. As per Table 6.12 above, these buffer distances as shown are 2021 m and 1875 m respectively.

Based on the buffer screening test presented in Figure 6.10, up to three residences may experience potential noise impacts from the Phase 1 construction activities associated with well drilling and completions. In accordance with CoC B11, Santos is finalising negotiated agreements with the owner/s of the relevant residence to exceed the noise criteria, and will provide a copy of this agreement to the Planning Secretary prior to commencement of Phase 1.



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Bibblewindi
- Sensitive receivers
- Phase 1 well pads
- Phase 1 flowlines
- Phase 1 access roads
- Indicative inside standard hours buffer
- Indicative outside standard hours buffer (well drilling only)
- Highway
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 6.10
Phase 1 Development Infrastructure
Buffer Screening Test

6.8 Odour and air quality constraints

6.8.1 Odour

In accordance with CoC B15, Santos will ensure that no offensive odours are emitted from the Project, as defined under Section 129 of the POEO Act which states that the occupier of a premises must not cause or permit the emission of any offensive odour.

Algae and bacteria in brine storage ponds can potentially lead to off-site odour impacts. Specifically, this occurs in anaerobic areas of the ponds due to no circulation or agitation below the water surface. Control measures implemented to reduce potential for off-site odour impacts include the introduction of algaecide to the brine cell and mechanical aeration of the brine ponds.

Santos has not reported any issues with any algae or bacteria in the existing brine storage cells leading to off-site odour impacts.

6.8.2 Air quality

Air quality impacts during construction and operation are considered a constraint for the Project. Santos will ensure that all reasonable and feasible avoidance and mitigation measures are employed so that air emissions generated by the Project do not cause exceedances of the criteria listed in Table 6.14 at any residence on privately-owned land. These levels will be measured with the relevant requirements and exemptions of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2007) during the construction phase.

Table 6.14 - Air quality criteria

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM_{10})	Annual	[a, c] 25 µg/m^3
	24 hour	[b] 50 µg/m^3
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual	[a, c] 8 µg/m^3
	24 hour	[b] 25 µg/m^3
Total suspended particulate (TSP) matter	Annual	[a, c] 90 µg/m^3
Nitrogen dioxide (NO_2)	1 hour	[a] 246 µg/m^3
	Annual	[a] 62 µg/m^3
Ozone (O_3)	1 hour	[a] 214 µg/m^3
	4 hour	[a] 171 µg/m^3

Notes:
[a] *Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).*
[b] *Incremental impact (i.e. incremental increase in concentrations due to the development on its own).*
[c] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.*

In accordance with CoC B18, Santos is finalising negotiated agreements with the owner/s of the relevant residence or land to exceed the air quality criteria, and will provide a copy of this agreement to the Planning Secretary prior to commencement of Phase 1.

Santos will implement all reasonable and feasible measures during the Phase 1 construction and operational activities to:

- minimise odour, fume and particulate matter (including PM_{10} and crustal and combustion $PM_{2.5}$) emissions of the Project;
- minimise point source and fugitive emissions of methane, carbon dioxide and other pollutants from all Project-related infrastructure;
- minimise any visible off-site air pollution generated by the Project; and
- minimise the extent of potential dust generating surfaces exposed in the Project area at any given point in time;

The detailed management and monitoring of air quality through a range of avoidance, mitigation and management methods will be outlined in the Air Quality and Greenhouse Gas Management Plan for Phase 2.

6.9 Cumulative constraints

As required by CoC B4(d), cumulative analysis of compliance with the locational criteria is provided in Figure F1 to Figure F11 in Appendix F for each individual well pad. The constraints mapping combines the location criteria and constraints from section 6.1 to section 6.6, and includes the requirement regarding sensitive receivers and amenity; conservation areas; water resources; biodiversity and heritage.

7. 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.

A number of TARPs have been developed to address the management and consent conditions associated with the construction, operation and management of the infrastructure proposed as part of Phase 1. These are included in the various management plans listed in Table 3.1 in section 3.1.3, and have been reproduced in Appendix G.

In addition to the trigger points and associated actions to be undertaken, where relevant these documents also detail the delegation of responsibility at each trigger point and contact details for both internal and external notification requirements.

8. 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 of the Water Management Plan, 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 Plan. These include Sharepoint for management plans, procedures and laboratory reports; Santos' EHS Toolbox for capturing inspections and field assessments; and EquIS[4], an advanced environmental data management and decision support system, for capturing all data and any laboratory results.

Key records associated with this FDP that are stored and managed include:

- inspection and monitoring records for facilities and dams (including leak detection monitoring);
- records of construction quality assurance program, including details of person(s) who prepared the program and records to demonstrate their certification by Engineers Australia;
- records of pond design (including location) and installation;
- records of standards and quality control testing used for seam joining of geomembrane liners;
- records of groundwater levels or underdrainage measures;
- name of standard or code that is utilised for construction of pipeline and records of field pressure testing;
- record of pipeline leak detection testing;
- records of any review of this FDP;
- operational monitoring and performance data for treatment systems;
- water sampling and laboratory analytical reports;
- calibration records for field instruments and continuous water quality monitoring systems;
- waste transportation and disposal certificates; and
- annual inspection reports and/or certifications of storages.

Monitoring data is subject to quality assurance and quality control protocols and procedures that ensure that data is accurate and usable. Data is subjected to consistent validation and verification procedures.

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 (sections 97D and 97E of the PO Act).

[4] EQuIS (Environmental Quality Information System) is a proprietary software application.

9. Incidents, non-compliances and complaints

9.1 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 FDP 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).

9.2 Contingency plan

It is considered unlikely that the activities during Phase 1 will result in any unpredicted or unforeseen impacts in relation to the gas field infrastructure against the provisions of the Field Development Protocol. However, in accordance with CoC D3(f), the following strategy outlined in Table 9.1 below will be adopted in the event where the infrastructure is not sited in accordance with the Field Development Protocol, and the locational criteria.

Table 9.1 - Unpredicted impact or event

Step	Strategy
1	Stop any ground disturbance works and implement immediate corrective actions to minimise the unpredicted impact
2	Review the unpredicted impact and consider the following: • activities that may have triggered this event; and • micro-siting surveys; • relevant locational criteria.
3	Notify the relevant agencies and departments
4	If appropriate, commission an investigation by an appropriate specialist
5	Based on the results of the investigation, develop the appropriate amendment and amelioration methods

Step	Strategy
6	Implement the information from the investigation to review, and if necessary, update this Field Development Protocol which will include any or all of the following: • a review and where required, revision of the field development steps in section 5; • a review and where required, revision of the management controls in section 6 and the constraints mapping in sections 7, 8, 9 and 10; • a review the actions that may have been taken prior to event; and • implement any relevant training based on the findings of the investigation to avoid any recurrence of the unpredicted impact.

9.3 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 (at https://narrabrigasproject.com.au) 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.

10. Reporting, evaluation and review

10.1 Annual Review

In accordance with CoC D8 and as further described in section 8 of the EMS, Santos will review the performance of its field development process 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 framework for siting gas field infrastructure measures to prevent, and if prevention is not reasonable and feasible, to minimise and manage any impact associated with the Project;
- any incidents, non-compliances and complaints;
- monitoring relevant 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.

Note that since the FDP is predominantly a 'summary' of the other management plans required under the CoC, any findings in the Annual Review against the FDP will automatically prompt similar findings in the associated management plan or protocol.

The Annual Review may also make recommendations for any additions, changes or improvements to the strategies and processes outlined in the FDP and the strongly-linked Field Development Protocol.

10.2 Independent environmental audits

In accordance with CoC D9 and D10, within one year of commencement of Phase 1 and every three years thereafter, Santos will facilitate an independent environmental audit (**IEA**) to ensure compliance with the following:

- implementation consistent with the FDP and Field Development Protocol;
- conditions of all relevant approvals, permits, licences and plans;
- relevant State and Commonwealth legislation;
- management plans; and
- any annual compliance review obligations for the period.

The IEA will be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary, and be carried out in consultation with the relevant agencies, the CCC and the various advisory groups required by the CoC.

Within 3 months of commencing an IEA, unless the Planning Secretary agrees otherwise, Santos will submit a copy of the IEA report to DPE (and any other NSW agency that requests it) together with its response to any recommendations contained in the IEA report, and a timetable for the implementation of the recommendations.

10.3 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 this consent.

This is to ensure this Plan 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, it is recommended that this Plan 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;
- due to any significant change to the design of infrastructure or operation of the field development plan;
- if there is ambiguity in relation to whether there is a significant change, Santos will consult with the Planning Secretary to determine whether the FDP must be reviewed; and
- otherwise at intervals of no longer than one year.

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 FDP 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 FDP to the Planning Secretary for approval within 6 weeks of the review.

10.4 Improvement measures

Santos will conduct a program to investigate and implement ways to improve the environmental performance regarding the siting of gas field infrastructure, and implement a protocol for the periodic review of the FDP, 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 design and micro siting processes as detailed in the Field Development Protocol;
- reviewing the implementation of the management controls;
- assess ongoing consistency with the underlying and supporting management plans (including Aboriginal cultural heritage and historical heritage; biodiversity management; water; rehabilitation, fire; noise and vibration; and air quality (post Phase 1); and
- review of monitoring and inspections data, and any assessment of trends.

The results of the review of the individual management plans will be used to report back to the Plan (through the Field Development Protocol) for periodic fine-tuning to ensure that leading practice environmental management is maintained for the Project.

The protocol for review is set out by consent conditions D8, D4 and D5, which have been addressed in sections 10.1 and 10.3 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.

11. References

DECC (2009). *Interim Construction Noise Guideline*. NSW Department of Environment and Climate Change.

DECCW (2011). *NSW Road Noise Policy*. NSW Department of Environment, Climate Change and Water.

EPA (2017). *Noise Policy for Industry*. NSW Environment Protection Authority.

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

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

12. Glossary

Term	Definition[5]
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[6], construction and dust suppression
Approved disturbance area	The disturbance areas shown in the EIS as modified by any approved Field Development Plan
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
Department	NSW Department of Planning and 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.
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
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
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
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.
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
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 (not part of Phase 1)
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

[5] The majority of the definitions are as provided in the Development Consent for SSD 6456.

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

Term	Definition[5]
Mitigation	Activities associated with reducing the impacts of the development
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: • Santos QNT Pty Ltd; • 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
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
Treated water	Produced water that has undergone treatment to enable it to be used for beneficial reuse purposes including irrigation, stock watering, drilling[7],

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

Term	Definition[5]
	construction and dust suppression, and/or for managed release to Bohena Creek[8]
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[9], or other area as may be approved in the Field Development Plan

[8] Note that there will be no discharge to Bohena Creek during Phase 1.

[9] 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

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Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Field Development Plan - Phase 1**
STAKEHOLDER:	**Biodiversity Conservation and Science Directorate (BCS)**
CONSULTATION RELEASE DATE:	**14 October 2022**
COMMENTS DUE DATE:	**28 October 2022**

General Feedback	
Key Issues	Given the high-level nature of the field development plan, BCS has no general feedback to provide outside of one specific issue related to the outcomes of the unexpected finds protocol. This should be referenced clearly within the field development plan to provide clarity on what surveys have taken place to determine the presence/absence of unexpected finds i.e., a TEC or threatened species unaccounted for in the EIS. This point of feedback has been captured in the specific feedback table below

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Management Plan Consultation Feedback Form

Section	Type of feedback (e.g. readability, usability,)	Specific Feedback *Detail specific issues with certain sections in the document*
8.1	Usability	The Field Development Plan does not reference the results of the unexpected finds surveys. Section 8.1 of the Field Development Protocol states: *"Given the extensive ecological survey effort conducted to support the assessment of the Project (prior to submission of the EIS), it is considered highly unlikely that a previously undetected threatened ecological community or species, listed at the time of the development consent, will be identified in micro-siting areas. In the unlikely event that this does occur, these entities will be avoided. Micro-siting activities allow for flexibility in project design, through exploration of alternative routes or placement options to provide opportunities for avoidance of impact to threatened species. If it is not possible to avoid previously undetected threatened ecological communities or species, the development consent will need to be modified prior to impacting these entities. This does not apply to species listed after the date of consent.* *The reporting framework to manage and document upper disturbance limits includes the Annual Review and the regular independent environmental audits, as detailed in sections 12.1 and 12.3 respectively. The process of monitoring direct impact on flora and fauna is described in the BMP, and the Field Development Plan."* Section 6.2.1.1 and Section 6.2.1.2 of the Biodiversity Management Plan states: *"In the event a previously undetected threatened ecological community or species is identified within the micro-siting footprint, every effort will be made to avoid the entities. Micro-siting activities allow for flexibility in project design, through exploration of alternative route or placement options to provide opportunities for avoidance of impact to threatened species.* *In cases where this is not possible, a modification to the Project approval may be required. This does not apply to species listed after the date of approval.* *Micro-siting surveys will target all threatened entities regardless of listing date. While no obligation exists to avoid entities listed after the approval date, all reasonable and feasible efforts will be made to avoid or minimise the impacts to these entities. In cases where a prioritisation conflict arises between an entity with an upper disturbance limit under SSD 6456 and an entity listed after the approval priority will be given to the entity with the higher listing status, i.e. Critically endangered > Endangered > Vulnerable, except where doing so will result in exceedance of the approved upper disturbance limits over the lifetime of the project. In cases where the listing status is the same, priority will be given to the entity listed in SSD 6456. Exceptions to this guidance may occur on a case by case case-by-case basis and will be justified in the relevant Field Development Plan."* From review of the Field Development Plan, it is unclear what surveys have taken place to determine the presence/absence of unexpected finds i.e., a TEC or threatened species unaccounted for in the EIS. For example, it is unclear if pre-clearance surveys of micro-sighting works have been undertaken a suitably qualified and experienced ecologist. The Field Development Plan should detail the results of the unexpected finds surveys including detailing the methods utilized to detect unexpected finds.

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Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Field Development Plan - Phase 1**
STAKEHOLDER:	**DPE Water**
CONSULTATION RELEASE DATE:	**14 October 2022**
COMMENTS DUE DATE:	**28 October 2022**

General Feedback	
Key Issues	
Suggestions for improvement	

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*
		Our agency will not comment on the field development plan, our focus is on the groundwater management plan and modelling plan.

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Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Field Development Plan - Phase 1**
STAKEHOLDER:	**NSW EPA**
CONSULTATION RELEASE DATE:	**14 October 2022**
COMMENTS DUE DATE:	**28 October 2022**

General Feedback	
Key Issues	No key issues
Suggestions for improvement	Improve references to documents that make up the Field Development Plan.
	Consider including a diagram showing relationship of Field Development Plan with these reference documents, plans and protocols

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*
11.0	References to Field Development Protocol	Improve references and links in document to the Field Development protocol to be read in conjunction.
3.2	Not clear	The Field Development Plan states "There are no specific codes, standards …. applicable to the FDP". The Field Development Plan could identify and collate these codes and standards of the sub plans relevant to the regulatory requirements of Phase 1.
Table 6.3	Abbreviation	"HBT" Hollow Bearing Tree, "TH Species" missing from glossary

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Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Field Development Plan - Phase 1**
STAKEHOLDER:	**Resources Regulator**
CONSULTATION RELEASE DATE:	**14 October 2022**
COMMENTS DUE DATE:	**28 October 2022**

General Feedback	
Key Issues	
Suggestions for improvement	

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*
5.1	Readability	In section 5.1 of the FDP, it states: *New shallow water monitoring bores will be installed at Bohena South 1C, Bibblwindi 6, Dewhurst 9, Dewhurst 35 and Dewhurst 43. With the exception of Dewhurst 43, the remainder are either new water bores located on existing well pads, or recompletion / re-purpose of existing wells into multi-level monitoring points. As such, Dewhurst 43 is the only new site that will require establishment.* Based on this one would assume that Dewhurst 43 is a new site. However, in Table 5.1 Proposed non-linear gas field infrastructure for Phase 1 under section 5.4, Dewhurst 43 is listed as a groundwater monitoring bore site but there is a footnote that says: *2. Dewhurst 43 is an existing core hole that will be converted into a groundwater monitoring bore.* This statement would imply that Dewhurst43 is an existing site. This needs to be clarified so that it is clear which sites are new sites and which are changes to an existing site.

Our Reference: DLA:MH:2019473
Your Reference: 0041-150-PLA-0023
Contact Name: [redacted]

[redacted]
Environmental Approvals Lead – HGP/NGP
Santos Ltd
32 Turbot Street
BRISBANE QLD 4000

Via Email: [redacted]

Thursday, 28 October 2022

Re: Narrabri Gas - Post Approval (SSD-6456-PA-22) – Field Development Plan (Phase 1)- Council Feedback

Dear [redacted]

I refer to your correspondence dated 14 October 2022 seeking Council's feedback in relation to the abovementioned draft Field Development Plan (FDP) for phase 1. Council acknowledges that the Phase 1 scope is comparatively minor works in the context of the ultimate development and is planned to include the construction and operation of:

- 4 coreholes;
- 6 pilot wells;
- 2 deep reservoir monitoring bores (converted coreholes);
- New shallow water monitoring bores;
- Associated linear infrastructure;
- Seismic surveys (nb: outside of scope of the submitted reviewed FDP);
- Continued operation of Santos' existing exploration and appraisal activities, including workover activities.

Please find below a summary of Council's consolidated feedback in relation to the draft FDP, as presented:

- Table 1.2 notes "Fit for the intended post-mining land use/s". Consider inclusion of wording to the effect of "Fit for the intended post-extraction land use(s)" instead.

- Page 17 minor administrative amendments – insert close brackets after acronyms BMP and NMP.

- Table 6.3 – within the Notes column, consider inclusion of additional detail for ease of reading/cross referencing. For example, Bibblewindi 30 references that the well pad, track and access road moved 20m north-east to avoid impacts to

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7 biodiversity values. Consider inclusion of a short summary of said values for contextual purposes.

- Page 46 minor administrative amendment – insert full stop to last paragraph.
- Page 50 Table 5.9 – reference in final column to "Support for Planning" is unclear. Insert additional explanatory information or a notation to confirm applicable context.
- Page 124 Appendix G Biodiversity TARP – consider inclusion of reporting mechanisms for identified wildlife roadkill within the section reference 'Traffic causes a decline in ecosystem function'.
- Public Safety Management Plan – document unavailable at time of review.
- Property Management Plan - document unavailable at time of review.

Council trusts that the above advice provides the necessary assistance. Should you require any additional information in relation to this matter you are invited to contact the undersigned or Council's Manager of Planning and Development, [redacted] on [redacted] or by emailing [redacted]

Yours faithfully,

[redacted]
Director Planning & Sustainability

Santos

Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Field Development Plan - Phase 1**
STAKEHOLDER:	**Forestry Corporation NSW** [redacted]
CONSULTATION RELEASE DATE:	**14 October 2022**
COMMENTS DUE DATE:	**28 October 2022**

General Feedback	
Key Issues	
Suggestions for improvement	

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*
Table 1.2	comment	Surface infrastructure – directions are not limited to Resource Regulator. FCNSW/Santos access agreement states that infrastructure must be removed from State forest unless agreed with FCNSW.
3.1.3	typo	Replace Forestry Commission of NSW with Forestry Corporation of NSW
5.1	Clarification sought	States that Dewhurst 43 will be a new shallow water monitoring bore
Table 5.1	Clarification sought	States that Dewhurst 43 is an existing core hole site.
Table 6.3	Details sought	What is planned for the upgrade of Bohena Creek Road? New drainage structures/crossings etc?

Field Development Plan – ACHAG comments received on Revision B (draft)

Comments received from [redacted]

Item	Section #	Section heading	Existing text	Comment	Final response
1	N/A	Key Issues	No specific text reference	[redacted]] No key issues. FDP reads well and is structured to enable easy review of the approach, context and results.	NIL
2	N/A	Suggestions for Improvement	No specific text reference	Only very minor issues as mentioned below. Overall I think the document is excellent. It precisely follows the requirements of the Field Development Protocol, and more overarchingly, goes above and beyond when it comes to CH avoidance, considering the newly recorded sites, under the ACHMP provisions, may have been able to be relocated if needed.	NIL
3	6.6.1	Aboriginal Cultural Heritage	No specific text reference	This section mentions that some sites were recorded, but doesn't mention in relation to which elements of proposed Phase 1 infrastructure they were located, nor does it map them. It does refer to the CH report however, which does have that data in it, as well as figures. It just does seem a bit of a contrast to the very detailed maps showing the ecological constraints in relation to every footprint, within the body of the FDP, but again maybe this is because the ecological report is not an appendix?	A new table (Table 6.9) has been added to section 6.6.1. This table summarises the Aboriginal cultural heritage sites found during the survey relative to the Phase 1 infrastructure location. A new figure has also been included to show these recorded locations (refer new Figure 6.8). The table and the figure will be redacted from the approved FDP to be made public on Santos and Government websites.
4	Appendix F	Cumulative Constraints Map	No specific text reference	In the same vein, the Appendix F figures are called Cumulative constraint maps, and in Section 6.9 it is said that these figures will combine the results of the field work / constraints from all disciplines as reported in Sections 6.1-6.6. Section 6.6 contains the heritage field assessment results, however on no figures are the results of the Aboriginal heritage assessment mapped. To my mind, the Appendix F figures should include the Aboriginal heritage sites in relation to the infrastructure as clear evidence of CH avoidance in relation to what is the final impact footprint. I guess it can be considered that the mapping in the CH report in Appendix E definitely includes the final footprint, but as the process was so iterative, it is in Appendix F that this can be made crystal clear.	The location of the artefact within the investigation area is shown on a new Figure 6.8. This figure will be redacted in the approved FDP to be made public on Santos and Government websites. Other sites have not been included as it will affect the scale and readability of the maps. Further, if the Aboriginal heritage sites are included on the cumulative constraint figures, redaction would not be possible.

Field Development Plan – BAG comments received on Revision B (draft)

Comments received from [redacted]

Item	Section #	Section heading	Existing text	Comment	Final response
1	8.1 6.2.1.1	No specific section reference	*"Given the extensive ecological survey effort conducted to support the assessment of the Project (prior to submission of the EIS), it is considered highly unlikely that a previously undetected threatened ecological community or species, listed at the time of the development consent, will be identified in micro-siting areas. In the unlikely event that this does occur, these entities will be avoided. Micro-siting activities allow for flexibility in project design, through exploration of alternative routes or placement options to provide opportunities for avoidance of impact to threatened species. If it is not possible to avoid previously undetected threatened ecological communities or species, the development consent will need to be modified prior to impacting these entities. This does not apply to species listed after the date of consent.* *The reporting framework to manage and document upper disturbance limits includes the Annual Review and the regular independent environmental audits, as detailed in sections 12.1 and 12.3 respectively. The process of monitoring direct impact on flora and fauna is described in the BMP, and the Field Development Plan."*	**[BCS]** The Field Development Plan does not reference the results of the unexpected finds surveys. Section 8.1 of the Field Development Protocol states: *"Given the extensive ecological survey effort conducted to support the assessment of the Project (prior to submission of the EIS), it is considered highly unlikely that a* previously *undetected threatened ecological community or species, listed at the time of the development consent, will be identified in micro-siting areas. In the unlikely event that this does occur, these entities will be avoided. Micro-siting activities allow for flexibility in project design, through exploration of alternative routes or placement options to provide opportunities for avoidance of impact to threatened species. If it is not possible to avoid previously undetected threatened ecological communities or species, the development consent will need to be modified prior to impacting these entities. This does not apply to species listed after the date of consent.* *The reporting framework to manage and document upper disturbance limits includes the Annual Review and the regular independent environmental audits, as detailed in* sections *12.1 and 12.3 respectively. The process of monitoring direct impact on flora and fauna is described in the BMP, and the Field Development Plan."* Section 6.2.1.1 and Section 6.2.1.2 of the Biodiversity Management Plan states: *"In the event a previously undetected threatened ecological community or species is identified* within *the micro-siting footprint, every effort will be made to avoid the entities. Micro-*siting *activities allow for flexibility in project design, through exploration of alternative route or placement options to provide opportunities for avoidance of impact to threatened species.* *In cases where this is not possible, a modification to the Project approval may be required. This* does *not apply to species listed after the date of approval.* *Micro-siting surveys will target all threatened entities regardless of listing date. While no obligation exists to avoid entities listed after the approval date, all reasonable and feasible efforts will be made to avoid or minimise the impacts to these entities. In cases where a prioritisation conflict arises between an entity with an upper disturbance limit under SSD 6456 and an entity listed after the approval priority will be given to the entity with the higher listing status, i.e. Critically endangered > Endangered > Vulnerable, except where doing so will result in exceedance of the approved upper disturbance limits over the lifetime of the project. In cases where the listing status is the same, priority will be given to the entity listed in SSD 6456. Exceptions to this guidance may occur on a case by case case-by-case basis and will be justified in the relevant Field Development Plan."* From review of the Field Development Plan, it is unclear what surveys have taken place to determine the presence/absence of unexpected finds i.e., a TEC or threatened species unaccounted for in the EIS. For example, it is unclear if pre-clearance surveys of micro- sighting works have been undertaken by a suitably qualified and experienced ecologist.	The micro-siting surveys to support the final positioning of the gas field infrastructure were undertaken in the spring of 2020, by suitably qualified ecologists. The surveys followed the Ecological Scouting Framework as detailed in the Biodiversity Management Plan. There were no unexpected finds during this survey. Threatened species located included: • Diuris tricolor • Polygala linarifolia • Pterostylis cobarensis • Tylophora linearis The intent of the micro-siting process is to apply an ecological avoidance hierarchy, with different ecological features or attributes, rather than go into the detail of particular species. This hierarchy is provided in Table 6.2.

Item	Section #	Section heading	Existing text	Comment	Final response
				The Field Development Plan should detail the results of the unexpected finds surveys including detailing the methods utilised to detect unexpected finds.	
2	N/A	No specific section reference	No specific text reference	[redacted] No comments thank you.	NIL
3	N/A	No specific section reference	No specific text reference	[redacted] Just confirming that I have read the document “Field Development Plan – Rev B.pdf” (as per the weblink provided) in my capacity as a member of the Narrabri Gas Project (NGP) Biodiversity Advisory Group (BAG). I have no additional comment to make on the document.	NIL
4	Table 6.5 and 6.6 pg. 44	No specific section reference	No specific text reference	[redacted] Estimated direct impacts to threatened flora and fauna. There is just a single sentence on how numbers were derived in EIS. The FDP would benefit from further detail on how these numbers were actually derived and how the micro siting process attempted to avoid them. The EIS was prepared several years ago now so it may be worthwhile for the FDP to revisit this and update predicted impacts based on more recent data. Are threatened species shown in micro siting figures actual records or modelled predictions? 23 ha of koala habitat to be cleared? This assumes koala occurs in all veg types to be impacted. Is this the case? After all these decades of gas extraction, native forest logging and coal mining in the Pilliga, do we not have data on preferred koala habitat?	The Field Development Plan is not the vehicle to review / challenge fauna habitat mapping assumptions. This Plan just provides the results of methods / processes used to derive the conditions of consent and/or management plans required by the conditions of consent. The EIS-derived limits are those prescribed in the Conditions of Consent (i.e. column 2 of Table 6.5 and 6.6). Our way of describing habitat / calculating habitat impacts needs to be consistent with the way the limits were derived to ensure Santos can comply with them. The assumptions used to calculate impacts to threatened flora and fauna is conservative as it always assumes presence in agreed vegetation types. The mapping of koala habitat is a demonstration of this – whereby large areas of vegetation are considered to be habitat – despite limited species records.
5	Appendix C	No specific section reference	No specific text reference	The micro siting figures may benefit from detailing the specific Threatened flora and fauna species being impacted or avoided, not just listing priority numbers.	The detail of the micro-siting process is provided in the Biodiversity Management Plan. The intent of the micro-siting process is to apply an ecological avoidance hierarchy, with different ecological features or attributes, rather than go into the detail of particular species. This hierarchy is provided in Table 6.2. For information, threatened species located during micro-siting included: • Diuris tricolor • Polygala linarifolia • Pterostylis cobarensis • Tylophora linearis
6		Key issues	No specific text reference	[redacted] Management Strategies & approaches 5.3 Roads and Tracks over storey trees	See below responses to Kath Hamilton’s queries.
7		Suggestions for improvement	No specific text reference	Fire Management Plan should specify how it will cope with native fauna after a bushfire – eg perhaps rescue procedures, who would be involved, Rehabilitation Action Plan after. This could also apply to natural disasters such as storm/flood.	The Fire Management Plan for Phase 1 of the NGP has already been approved by the DPE, and is out-of-scope for the Field Development Plan. However, at any time during Santos activities, including after a natural disaster, should Santos become aware of injured or distressed fauna, personnel will contact one of the following organisations and follow their advice: a. Veterinary clinic: • Practice: Western Namoi Veterinary Clinic • Principal Vet: Dr Michael Reed • Contact: 02 6792 4388 • Address: 24 Francis Street, Narrabri. b. WIRES: 13 000 WIRES or 13 000 94737 c. WIRES (central northern branch): 1300 131 554 This is consistent with information provided in the Biodiversity Management Plan.

Item	Section #	Section heading	Existing text	Comment	Final response
8		Suggestions for improvement	No specific text reference	What provision has been made for high storey fauna such as birds, koalas disturbed by removal of these trees? Query – placing gunyahs there for shelter, nesting boxes for displaced Squirrel Gliders Under storey provision for the Eastern Pygmy Possum ensuring good banksia grass trees and the Gymea Lily	For large tree hollows removed as part of construction activities will be replaced 1:1 with nest boxes. These will be located within 100m of the originally disturbed hollow. Partial rehabilitation over a portion of the linear infrastructure corridors will be completed which will provide some provision for cover / understorey when traversing through the area. Rehabilitation using nest boxes is described in detail in the Biodiversity Management Plan, and will be agreed in consultation with FCNSW.
9	N/A	No specific section reference	No specific text reference	Maps – Appropriate for those using that area of information Tables Tables – Good concise information clearly presented Key to Abbreviations – Very helpful in understanding concepts	NIL
10	N/A	No specific section reference	No specific text reference	[redacted] Confirming I have reviewed the above document, paying particular attention to biodiversity aspects of the FDP, including Appendices C & D. In general terms I found the FDP to be well written and generally easy to follow. The only paragraph I had to read a few times to get it figured out was the 2nd par under 6.4.1 *Disturbance limits*, the first sentence of which reads '*Disturbance limits, direct impacts, are…*' causing me to wonder if the first sentence might read better as '*Direct impacts informing disturbance limits are…*'	This sentence in Section 6.4.1 has been updated to read as: The disturbance limits are the maximum amount of direct impact to each native vegetation community or threatened flora approved to be cleared for the Project.
11	N/A	No specific section reference	No specific text reference	I also found myself wondering why The Brigalow State Conservation Area was only being afforded 'at least' a 50-meter buffer. I am uncomfortable with provisions such as this (used elsewhere in the FMP); if all we will see at the end is the 50 m buffer, then say it. I note from Figure 5.1 that the western boundary of PPL3 has been adjusted to accommodate a larger buffer around Yarrie Lake, the presence of which I presume may have a hydrological basis. That said, why not take the same approach around the BSCA on ecological grounds given the potential presence of threatened fauna species such as Black-striped Wallaby that may be sensitive to noise. While such an adjustment may be window dressing in the end, at least it would demonstrate that matters such as that had been taken into account.	The 50-metre buffer around the Brigalow State Conservation Area is the prescribed set-back distance in the condition of consent B1, designed to protect the values of the area. The new proposed Phase 1 NGP activities are approximately 19 km away from the conservation area and will not impact upon the values present within it. The closest existing Phase 1 activities (i.e. existing infrastructure that will continue to be operated as part of Phase 1) is greater than 3 km from the area and again is unlikely to affect the conservation area or the values contained within it.
12	N/A	No specific section reference	No specific text reference	The small micro-siting adjustments and modifications (Appendices C & D) are informative. That said, I would rather see exactly what the threatened fauna species were in each case, rather than what Priority they had been afforded.	The detail of the micro-siting process is provided in the Biodiversity Management Plan. The intent of the micro-siting process is to apply an ecological avoidance hierarchy, with different ecological features or attributes, rather than go into the detail of particular species. This hierarchy is provided in Table 6.2. For information, threatened species located during micro-siting included: • Diuris tricolor • Polygala linarifolia • Pterostylis cobarensis • Tylophora linearis
13		Key Issues	No specific text reference	[redacted] Well written, clear document	NIL
14		Suggestions for Improvement	No specific text reference	An executive summary which gave a simple 4 paragraph coverage of: a) The impacting works b) The way they will be addressed; and c) View of overall net effect.	This is a management plan, not a report. Similar to all other management plans and protocols, no executive summaries are provided, or required under the consent.

Field Development Plan – CCC comments received on Revision B (draft)

Comments received from [redacted], [redacted], [redacted], [redacted], [redacted] ([redacted])

Item	Section #	Section heading	Existing text	Comment	Final response
1	N/A	No specific section reference	No specific text reference	[redacted] I have contacted the CWA's CEO & asked whether feedback to the FDP was going to be forthcoming. She has responded saying that the answer is no, the main reason being that the timeframe given for feedback to occur is too short, especially for such a large & detailed document.	NIL
2	N/A	No specific section reference	No specific text reference	[redacted] LLS North West has nothing further to add to the draft plan.	NIL
3	N/A	No specific section reference	No specific text reference	[redacted] 1. Consultation needs to occur We would like confirmation that the 7 private properties listed in Table 5.1 have been informed about the Draft Field Development Plan and have come to agreement with Santos on this plan. This has not been made clear in the FDP. As per our feedback on 22/11/2021 on the Noise Management Plan we would like to see Appendix A "Consultation Records" as it was blank at the time of giving feedback on the NMP. We still have received no response to this feedback process on the NMP. ***We request that the draft FDP not be finalised until there is confirmation from private properties of their consent.***	The conditions of consent require affected landholders to be consulted as part of preparation of the Field Development Plan, and any feedback incorporated as required. Additional to any management plan, Santos must secure a negotiated Land Access Agreement with each landowner before any works can be undertaken, or infrastructure can be located, on a landholder's property. The consultation records section of the management plans is only'populated after the consultation period is completed – it was during this period that members of the CCC had an opportunity to provide feedback, so there was obviously no consultation feedback available yet. The Noise Management Plan is currently undergoing assessment by the DPE. Consultation records and responses to issues are incorporated into the approved plan.
4	N/A	No specific section reference	No specific text reference	**2. Noise Management Plan Cross Over** The draft Noise Management Plan provided for feedback in November 2021 outlined a total of 217 sensitive receivers to Phase One activities. At the time, we questioned how the NMP could be thorough if the FDP had not been completed and therefore siting of coreholes, pilot well and monitoring bores were not known. Now that these sightings are known, the NMP needs to be edited. Of the 7 private landholdings Lot/DP numbers listed in the FDP, only one correlates with the list of 217 sensitive receivers listed in the NMP. Should the other 7 private landholdings be added to the NMP? As per our feedback to the NMP, we also believe that sensitive receivers should include dwellings that are currently unoccupied (as well as the occupied ones) as Santos is not in a position to know the future of these dwellings and their occupancy could change at any time. These dwellings should be given the same protections. ***We request a review of the Noise Management Plan, now knowing the locations of coreholes and pilot wells and that all dwellings are included.***	The Noise Management Plan is currently undergoing assessment by the DPE. The Noise Management Plan outlines a process that Santos will follow in the application of a development Phase. This process remains applicable irrespective of the final sighting of infrastructure. The mapping of sensitive receptors within the Plan is largely indicative. Sensitive receptor assessments will always be undertaken during the planning phases of development stages to ensure no new receptors have appeared between development stages and in proximity to the proposed development. Through the Field Development Plan and the final siting of the Phase 1 infrastructure, the potentially affected sensitive receivers have now been identified. Santos is finalising negotiated agreements with these affected sensitive receptors – with a copy of the agreement to be provided to DPE. All potentially affected dwellings have been included in the Phase 1 noise assessment.

Item	Section #	Section heading	Existing text	Comment	Final response
5	N/A	No specific section reference	No specific text reference	**3. Threatened Species Recorded** The maps outlining threatened species do not show the actual threatened species recorded, instead of just what 'priority' they are. In order to effectively manage the impacts and undertake a proper assessment of the plan, the community needs to see the actual threatened species in each location. We would like to see the actual threatened species list. In particular, we would like to see the location of new infrastructure compared to the Pilliga Mouse habitat as this species has high community interest and it is highly vulnerable to the building of access tracks, cleared corridors, underground electricity lines etc. ***We request the FDP threatened species maps be edited to include the actual threatened species in each location, particularly the Pilliga Mouse, and that the full list of all threatened species impacted by Phase One to be provided to us.***	The detail of the micro-siting process is provided in the Biodiversity Management Plan. The intent of the micro-siting process is to apply an ecological avoidance hierarchy, with different ecological features or attributes, rather than go into the detail of particular species. This hierarchy is provided in Table 6.2. Threatened species lists are provided in the Biodiversity Management Plan. For information, threatened species located during micro-siting included: • Diuris tricolor • Polygala linarifolia • Pterostylis cobarensis • Tylophora linearis Pilliga Mouse habitat is included in section 6.4.2.
6	N/A	No specific section reference	No specific text reference	**4. Water and Gas Gathering Pipelines** There does not appear to be a micro-siting map of the new water and gas gathering pipelines from the new northern wells to Bibblewindi. Whilst there is a corridor mapped, the FDP should have the level of detail that shows where new infrastructure will actually be and where the highpoint vents and low point drains will be. Furthermore we question the route used to get to Bibblewindi as it is not taking the most direct path and therefore the path with least impact. These flowlines require clearing up to 12 m wide which will continue to prevent overstory trees on it into the future. It is important for biodiversity protection to make sure there is as few of these impacts as possible and it would appear that approach is not being taken. ***We request reconsideration and provision of better micro-siting maps of the pipelines from Wilga Park to Bibblewindi.***	It is not clear which 'northern wells' are being referred to. All micro-siting figures of all surveys for all proposed infrastructure are provided in the FDP. Note the difference between coreholes and pilot well sites. Proposed wells 'north' of Bibblewindi are coreholes only and therefore will not have any pipeline gathering infrastructure associated with them.. The high point vents and low point drains are within the corridor and have no bearing on micro-siting. They will be located within the linear infrastructure disturbance footprint. The most direct route is not always the path with least impact – this depends on the landform and the species encountered between a point A and a point B. The gathering system to be installed has utilised existing disturbed areas and existing Santos gathering corridors to reduce overall impact.
7	N/A	No specific section reference	No specific text reference	**5. Significant impacts to Bohena Creek** We raise concerns about siting a new >12m wide access track/road right along Bohena Ck as shown in Figure C12. Bohena Ck is the single most important habitat in the area. Extra consideration should be given to avoid putting a road all the way along it. Furthermore, roadworks parallel to a waterway such as Bohena Creek is sure to increase erosion risks during high flow times. ***We request that the access track along Bohena Creek be re-sited to reduce impacts to biodiversity and floodways.***	The Bohena Creek Road is an existing Forestry road which Santos will utilise and maintain. The maximum allowable width for clearing is 12 m wide. This existing road is being used to minimise overall impacts.
8	N/A	No specific section reference	No specific text reference	Thank you for the opportunity to provide feedback on the draft Field Development Plan and we look forward to this feedback being incorporated into the plan. This will be a clear and obvious indication of the importance of the role of the Community Consultative Committee. We would also appreciate some recognition of receipt of this feedback, along with that to the Noise Management Plan from November last year.	All consultation comments received from any stakeholder and advisory group are incorporated in the applicable management plan or protocol, together with a response to the comment. These consultation comments are then all available on line as part of the approved management plans.
9	N/A	No specific section reference	No specific text reference	**1. Lack of information re the monitoring Bores purposes and strata areas targeted, what they are monitoring, and why they are located where they are.** Location maps provided are poor to non-existent. Many of the "figures" have too much information on them for their size, many do not have any roads or other features marked or existing major Santos infrastructure (to assist in gaining a proper location perspective). In some the background colour and cross hatchings makes it difficult for the reader to determine the location and names. In others the lack of Legend information and easily discernible colours used it is hard to determine 'things' in relation to other "figures". Examples of this is fig 4.4, 4,5, 6.7. Maps and Plans should be easily read.	The figures show all relevant details as required by the consent conditions. The number of figures has been kept to a minimum to provide all relevant details while at the same time avoiding 'overcrowding'. Information regarding monitoring bores are provided in the suite of water management plans. Figure 5.2 provide all the relevant detail regarding the proposed infrastructure for Phase 1. All forest roads are shown. All features on all figures are clearly identified and named in the respective legends.

Item	Section #	Section heading	Existing text	Comment	Final response
10	N/A	No specific section reference	No specific text reference	The same remarks as above apply to the shallow aquifer monitoring bores in the plan. Words are one thing, good maps/figures are quite another.	The shallow bores are not shown on any figure, since these will be located on existing well pads. Dewhurst 43 is the only new site (refer to section 5.1).
11	N/A	No specific section reference	No specific text reference	The legend on figure 6.2 does not explain what the large number small circles with yellow with dots in them are, and this is a problem on a number of figures.	The legend clearly states the black dots are sensitive receivers, and the small yellow circles around each of the small black dots are the 200m buffers. There are no yellow dots on the figure. All features on all figures are identified and named in the respective legends.
12	N/A	No specific section reference	No specific text reference	Again, on the “figures” the Aboriginal heritage sites and sensitivity zoning figure 6.8 in the FDP, should be of a size so as to easily determine the locations of the existing and proposed CSG infrastructure within the various listed zones.	This figure is reproduced from the EIS and as such is an existing figure. There is no existing or proposed infrastructure on the figure – it only shows Aboriginal heritage sites and sensitivity zoning, as per the title. Refer to the Cultural Heritage Compliance Report in Appendix E for details of any heritage sites in relation to the proposed Phase 1 infrastructure.
13	N/A	No specific section reference	No specific text reference	The figures on the micro-siting are very good so why not do the same elsewhere.	It is not clear what the comment is. All figures use the same definition and data set.
14	N/A	No specific section reference	No specific text reference	I note the proposed distances between well heads of the Dewhurst 37 to 42 Pilot wells that are in this FDP. However, the proposed distance between the well heads does not meet the current requirement for production well spacing. There are more well sets currently in the NGP that do not meet the Phase 2 distance criteria. Santos needs to acknowledge this and reaffirm that they will comply with the CoC conditions for Production (Phase 2) well head spacing’s (see p73 of FDP) in this FDP.	This is the FDP for Phase 1, as clearly identified on the front page and in section 1.2 (Purpose and scope of the FDP – Phase 1). The proposed Phase 1 wells are pilot wells. The pilot well pads are to be spaced no closer than 250 m apart, as required by CoC B1. The locational criteria regarding production wells are not relevant or applicable to Phase 1. The SSD 6456 consent conditions are not applicable to existing infrastructure which has been constructed and is operating under different planning approvals.
15	N/A	No specific section reference	No specific text reference	There is no mention of ‘road dust’ generated by the proposed phase in the relevant section of the FDP. Road dust can and is very dense and hard to see through, lasts for long periods of time, carries for long distances when the roads are dry and if there is a slight breeze. Road Dust also hangs in the air on still days. The Pilliga has high silicon based soils’ so any dust generated contains unknown quantities of Silicon; this presents a health hazard to both workers and the public. Maybe something can be included about this: e.g.- minimization methods/ mitigation/trigger, maybe. Remember that the roads in the Pilliga Forest and on Narrabri Council controlled areas are all open for public use unless Santos intends to close the areas off either temporally or permanently.	The aspect of road dust is addressed in the Dust Suppression Protocol. As identified, all roads within the Project area are accessible by the general public.
16	N/A	No specific section reference	No specific text reference	There is no contact number or email address provided in the Complaint management section just a reference to another document. If a section is important to list so should a few extra lines with the contact details. One extra dot point should be added to the existing dot point list Receipt of registering of complaint provided to complainer. The reason for this is that people can have confidence in the system as this information may be hard to find in the Annual Review document.	All management plans, including the FDP, refer back to the Environmental Management Strategy and the Project website for full details regarding complaints and complaint management. The complaints register will be published on the Project website and updated monthly. This will provide evidence of receipt back to the complainant.
17	N/A	No specific section reference	No specific text reference	There should be working link (webpage addresses) provided in the FDP as to where to find any information and changes to the FDP noted within Annual Review Section, not just a reference to another document somewhere else which may or may not be operational.	As stated in section 1.4, the FDOP is largely a summary of the other management plans required under the consent. All approved management plans and protocols are published on the Project website. There will not be any changes to this FDP – it will be a revised approved FDP, which will also be available on the Project website.

Item	Section #	Section heading	Existing text	Comment	Final response
18	N/A	No specific section reference	No specific text reference	Concerns around the use of the word “Revision” as found in this FDP and how this process might be used. Concerns centre around, by not mentioning any concerns and requesting information now on exactly what type of Revision might be done in the future, we are effectively allowing, by defacto, more than the listed Infrastructure, gas wells, deep and shallow monitoring bores (new), along with the recommissioning and developing of existing and non-existing already approved infrastructure such as parts, but not limited to, of the northern gas and water flow line, the Dewhurst North Fields, recommissioning of existing but not used Flares such as on Dewhurst North Fields gas wells in and around X line Road, just to mention a few. This FDP needs to be more explicit in regards to what the proponent plans to Revise under the heading “Revision”	As required by consent condition B4, the construction of all proposed gas field infrastructure must be approved by the DPE. This FDP will be revised when additional gas field infrastructure is proposed, and that revised FDP will be applicable to that portion of infrastructure. That revised FDP then needs to be approved by the DPE. This process will continue until all required infrastructure has been constructed. The process is detailed in section 1.2.
19	N/A	No specific section reference	No specific text reference	**Summary of** the **FDP** I do believe, and have outlined some failings (above), that indicate that this FDP does not meet the stated “Objectives” as written in Section 1.3. Phase 1 is defined as being Exploration and Assessing; as such some of the basic rules of exploration should apply, even though the NGP has had Development Consent. There could be wider ramifications if the basic rules around new location Exploration are ignored. There are no “detailed plans” for both existing and especially proposed Phase 1 Infrastructure and no reference to or the prevision of the approved Exploration and REF for the Dewhurst 37 to 42 and certainly no REF Mod document for Core/monitoring bore Dewhurst 35. The same applies to Dewhurst 34. ***This information and documentation should be included as an attachment at the very least.***	The definition for Phase 1 as provided in the consent is *the phase in the development comprising ongoing exploration and appraisal activities*. There are detailed plans in the FDP regarding existing infrastructure (Figures 4.1 to 4.5) and proposed infrastructure (Figures 5.1, 5.2 and 6.1 to 6.4). There is no REF or MOD required for any of the proposed infrastructure – it is as approved in the SSD 6456.
20	N/A	No specific section reference	No specific text reference	Shallow Aquifer monitoring bores are a ‘grey’ area with regard to who gives approval, but at the very least an approval should be sought from the Federal/State bodies that control ground water aquifer interference no matter the level of interference or purpose, ***and this noted in the FDP.***	The installation of the shallow monitoring bores is a requirement by DPE Water.
21	N/A	No specific section reference	No specific text reference	Many Figures and Maps leave a lot to be desired when it comes to cross referencing information, clarity of reading, location siting’s. There is not enough of either to make points of clarification by the reader, easier. Remember a “good image is worth a thousand words”, this also to simple but accurate sketches. ***More of both are needed in this FDP.***	As stated in section 1.4, the FDP is largely a summary of the other management plans required under the consent. All approved management plans and protocols will be published on the Project website. The majority of the detail is in the other management plans – the FDP is simply a summary.
22	N/A	No specific section reference	No specific text reference	Giving Approval of this FDP without requesting or limiting the type and nature of “Revision” of the FDP is a like giving an open ended approval for the proponent to pretty well do as they wish during the entire Phase 1 period. ***This should be looked at and seriously considered and corrective rewrite measures taken.***	As required by consent condition B4, the construction of all proposed gas field infrastructure must be approved by the DPE. This FDP will be revised when additional gas field infrastructure is proposed, and that revised FDP will be applicable to that portion of infrastructure. That revised FDP then needs to be approved by the DPE. This process will continue until all required infrastructure has been constructed. The process is detailed in section 1.2 of the FDP
23	N/A	No specific section reference	No specific text reference	The way some of the information has been presented and the References to other Plans for even basic information such as a simple readable map, is very disappointing and could be considered poor form, especially if Santos wanted to encourage the public to learn more and accept the NGP.	Only the information as required by the consent conditions is included in the FDP. One reason for this is to minimise the repeat and overlap with the other plans. As stated in section 1.4, the FDP is largely a summary of the other management plans required under the consent. All approved management plans will be available on the Project website, and each plan has numerous figures and maps providing all the details about Phase 1 and the Project.
24	N/A	No specific section reference	No specific text reference	Many basic housekeeping/health effecting items have not been listed in this FDP. ***This area needs to be looked at and noted in the FDP.***	It is not clear what basic housekeeping / health effecting items are being referred to. The FDP has been written to address the conditions of consent. The consent conditions relevant to the FDP do not list any basic housekeeping / health effecting items that needed to be included.

Item	Section #	Section heading	Existing text	Comment	Final response
25	N/A	No specific section reference	No specific text reference	***This entire FDP and provided attachment, falls well short of what is required of it***	The FDP will be assessed against the applicable consent requirements, and placed on the Project website once it has been approved by the DPE.
26	N/A	No specific section reference	No specific text reference	**2. Aboriginal Cultural Heritage – Attachment** I am sure, any reader would be curious as to why Santos Commissioned another Company to do the Study and the reason/reasons, and timings as to why the artefact's and other findings alone with the Figures showing Zones of Sensitivity, as listed in the FDP Attachment and alluded to in an earlier Cultural Heritage Document, are now being found and documented as opposed to the "previous" studies, and their "findings", of the area as noted in this document.	All approved management plans will be available on the Project website, including the Aboriginal Cultural Heritage Management Plan.
27	N/A	No specific section reference	No specific text reference	There seems to be no cultural significant Flora species listed even though the subject is mentioned. Some existing species are widely known, one can only assume that the Authors were loath to do so, did not know the actual number and types from this Survey+ or is this information sensitive?	All approved management plans will be available on the Project website, including the Biodiversity Management Plan.
28	N/A	No specific section reference	No specific text reference	From a non-indigenous person perspective, enough has been said above. This whole area of Cultural Heritage does need big improvements and involvement, not the ad -hock process that in the past and at present is occurring, although I find this Survey to be better than the others, maybe less 'desktop' and more 'field work' will reveal more Cultural Significant items, places and artefacts' 'missed' and yet to be found.	All approved management plans will be available on the Project website, including the Aboriginal Cultural Heritage Management Plan. The consent conditions relevant to the FDP require detailed surveys to be conducted for each FDP, including micro-siting and cultural heritage clearance surveys. These are follow-up surveys to those conducted as part of the EIS.
29	N/A	No specific section reference	No specific text reference	This topic is for the Aboriginal people to discuss and give comment upon. ***As a suggestion, why not ask for comment from the entire local first nations people***	The consent conditions relevant to the FDP do not require the entire local first nations people to be consulted. The Aboriginal Cultural Heritage Advisory Group has been consulted as part of the FDP development.
30	N/A	No specific section reference	No specific text reference	***As a comment, I am disappointed in the Studies done before now by the CSG Industry. Any study needs to be all inclusive not piecemeal as is the case now.***	The consent conditions relevant to the FDP require detailed surveys to be conducted for each FDP, including micro-siting and cultural heritage clearance surveys. These are follow-up surveys to those conducted as part of the EIS.

Field Development Plan – EPA comments received on Revision B (draft)

Comments received from the NSW Environment Protection Authority

Item	Section #	Section heading	Existing text	Comment	Final response
1		Suggestions for improvement	No specific text reference	Improve references to documents that make up the Field Development Plan. Consider including a diagram showing relationship of Field Development Plan with these reference documents, plans and protocols	As stated in section 1.2, the FDP is prepared against the provisions of the approved Field Development Protocol, which provides the background detail and framework for the FDP. The FDP is to be read in conjunction with the Field Development Protocol. Table 3.1 provides a full list of the management plans that are summarised into the FDP.
2	11	References	No specific text reference	Improve references and links in document to the Field Development Protocol to be read in conjunction.	A link has been added to the Project website where approved plans will be published. A link has also been provided to the Project website where approved management plans will be published in section 1.4.

Item	Section #	Section heading	Existing text	Comment	Final response
3	3.2	Relevant codes, standards, policies and guidelines	There are no specific codes, standards, policies and guidelines applicable to the FDP. Refer to the individual management plans for these details.	The Field Development Plan states “There are no specific codes, standards …. Applicable to the FDP”. The Field Development Plan could identify and collate these codes and standards of the sub plans relevant to the regulatory requirements of Phase 1.	To include this table would add unnecessary bulk to the plan. The codes, standards etc are applicable to the frameworks developed in the other management plans, not the FDP directly. This plan is the application of those frameworks for siting the Phase 1 footprint. As such, Santos has chosen not to include this table. However, the codes, standards etc for all management plans has been collated as part of the Environment Management Strategy. Therefore section 3.2 of the FDP now makes reference to section 3.4 of the EMS where this information exists.
4	3.0	Ecological micro-siting Table 6.3	No specific text reference	“HBT” Hollow Bearing Tree, “TH Species” missing from glossary	HBT and TH species have been added to the ‘Acronyms and Abbreviations’ list, not the glossary.

Field Development Plan – GGEAG comments received on Revision B (draft)

Comments received from [redacted]

Item	Section #	Section heading	Existing text	Comment	Final response
1	N/A	General Feedback	No specific text reference	[redacted] The FDP applies only to Phase 1 of the project; the Air Quality and Greenhouse Gas management plan for the project will be developed prior to the commencement of Phase 2. Hence, at present there is little in the document to assess in relation to greenhouse emissions. Since the FDP does not apply to existing infrastructure, most of the greenhouse and air quality issues in Phase 1 will be associated with the construction of new wells, pads, roads, etc. which will be low compared to the overall emissions from the completed project.	NIL

Field Development Plan – Resources Regulator comments received on Revision B (draft)

Item	Section #	Section heading	Existing text	Comment	Final response
1	5.1	N/A	No specific text reference	In section 5.1 of the FDP, it states: New shallow water monitoring bores will be installed at Bohena South 1C, Bibblwindi 6, Dewhurst 9, Dewhurst 35 and Dewhurst 43. With the exception of Dewhurst 43, the remainder are either new water bores located on existing well pads, or recompletion / re-purpose of existing wells into multi-level monitoring points. As such, Dewhurst 43 is the only new site that will require establishment. Based on this one would assume that Dewhurst 43 is a new site. However, in Table 5.1 Proposed non-linear gas field infrastructure for Phase 1 under section 5.4, Dewhurst 43 is listed as a groundwater monitoring bore site but there is a footnote that says: (a) Dewhurst 43 is an existing core hole that will be converted into a groundwater monitoring bore. This statement would imply that Dewhurst43 is an existing site. This needs to be clarified so that it is clear which sites are new sites and which are changes to an existing site.	As stated in section 1.1.2, the Phase 1 scope includes the construction and operation of 2 deep reservoir monitoring bores (converted coreholes). Dewhurst 35 is a new well pad for a new core hole that will be converted to a deep reservoir monitoring bore. Dewhurst 43 is an existing well pad and core hole that will be converted to a deep reservoir monitoring bore. Section 5.1 has been reworded to specifically address shallow monitoring bores. Note that shallow bores will also be installed at Dewhurst 35 and Dewhurst 43.

Field Development Plan – Narrabri Shire Council comments received on Revision B (draft)

Comments received from Narrabri Shire Council

Item	Section #	Section heading	Existing text	Comment	Final response
1	1.5	Table 1.2 – Rehabilitation Objectives	‘Fit for the intended post-mining land use/s’	Table 1.2 notes “Fit for the intended post-mining land use/s”. Consider inclusion of wording to the effect of “Fit for the intended post-extraction land use(s)” instead.	As stated in section 1.4, Table 1.2 is a reproduction of Table 11 of the CoC. This Table 11 lists ‘fit for post-mining land use’ as one of the objectives. Under the Rehabilitation Code of Practice, gas extraction is regarded as mining.
2	3.1.3	Table 3.1 – Management Plan Summary	Biodiversity Management Plan (BMP Noise Management Plan NMP)	Page 17 minor administrative amendments – insert close brackets after acronyms BMP and NMP.	Closed brackets inserted.
3	6.4.2	Table 6.3 – Summary of impacts to biodiversity values	No specific text reference	Table 6.3 – within the Notes column, consider inclusion of additional detail for ease of reading/cross referencing. For example, Bibblewindi 30 references that the well pad, track and access road moved 20m north-east to avoid impacts to 7 biodiversity values. Consider inclusion of a short summary of said values for contextual purposes.	Some cosmetic changes to table 6.3 have been made to improve readability. A summary of the values impacted has also been added to the notes column where applicable.
4	6.5.2	Flooding and geomorphology	There are no large ponds or dams approved to be constructed as part of Phase 1	Page 46 minor administrative amendment – insert full stop to last paragraph.	Full stop inserted.
5	6.6.2	Table 6.9 – Historic heritage surface development exclusion areas	No specific text reference	Page 50 Table 5.9 – reference in final column to “Support for Planning” is unclear. Insert additional explanatory information or a notation to confirm applicable context.	Support for planning is generally any non-invasive activity. It is defined in section 7.1 of the Field Development Protocol, as follows: *Monitoring including air quality, noise, ecological surveys, cultural heritage surveys.*
6	Appendix G	Biodiversity TARP	No specific text reference	Page 124 Appendix G Biodiversity TARP – consider inclusion of reporting mechanisms for identified wildlife roadkill within the section reference ‘Traffic causes a decline in ecosystem function’.	The TARP is a direct reproduction of that in the Biodiversity Management Plan. Note that the traffic impact here is related to noise from traffic rather than direct impact from traffic. It is difficult to assess direct impact from project-related traffic since the State forest is publicly accessible.
7	Attachment 1	Public Safety Management Plan	No specific text reference	Public Safety Management Plan – document unavailable at time of review.	Noted. Consultation for this attachment has been undertaken with RFS, FCNSW and NSW Health as per the conditions of consent and in agreement with DPE.

Item	Section #	Section heading	Existing text	Comment	Final response
8	Attachment 2	Property Management Plans	No specific text reference	Property Management Plan – document unavailable at time of review.	Noted. Consultation for this attachment has been undertaken with the landowners as per the conditions of consent and in agreement with DPE.

Field Development Plan – Landholder comments received on Revision B (draft)

Comments received from NSW Forestry Corporation, [redacted]

Item	Section #	Section heading	Existing text	Comment	Final response
1	1.5	Table 1.2 – Rehabilitation objectives	To be decommissioned and removed, unless the Resources Regulator agrees otherwise	**[FCNSW]** Surface infrastructure – directions are not limited to Resource Regulator. FCNSW/Santos access agreement states that infrastructure must be removed from State forest unless agreed with FCNSW.	Wording updated to the following: • To be decommissioned and removed, unless the Resources Regulator agrees otherwise; and • FCNSW agrees otherwise; or • the landholder agrees otherwise.
2	3.1.3	Development consent SSD 6456	Public Safety Management Plan, prepared in consultation with Rural Fire Service, the Forestry Commission of NSW and NSW Health, to ensure public safety and manage access in the Project area, including verification of minimum safe separation distances between all potentially hazardous facilities; and …	Replace *Forestry Commission of NSW* with *Forestry Corporation of NSW*	Reference to FCNSW has been updated to correctly reflect the name of the Forestry Corporation.
3	5.1	Shallow monitoring bores	New shallow water monitoring bores will be installed at Bohena South 1C, Bibblwindi 6, Dewhurst 9, Dewhurst 35 and Dewhurst 43. With the exception of Dewhurst 43, the remainder are either new water bores located on existing well pads, or recompletion / re-purpose of existing wells into multi-level monitoring points. As such, Dewhurst 43 is the only new site that will require establishment.	States that Dewhurst 43 will be a new shallow water monitoring bore.	Dewhurst 43 will be a newly established site to house a deep reservoir monitoring bore and a shallow groundwater bore. The footnote in Table 5.1 is incorrect and has been deleted.
	Table 5.1	Proposed non-linear gas field infrastructure for Phase 1	Footnote Dewhurst 43 is an existing core hole that will be converted into a groundwater monitoring bore	States that Dewhurst 43 is an existing core hole site.	

Item	Section #	Section heading	Existing text	Comment	Final response
4	Table 6.3	Summary of impacts to biodiversity values	Last row of table Bohena Creek Road – upgrade	What is planned for the upgrade of Bohena Creek Road? New drainage structures/crossings etc?	The proposed works on Bohena Creek Road will be a mix of maintenance grading and road upgrades from the X-line road intersection up to the intersection leading to the Bibblewindi 31 well pad. The upgrades are designed to ensure the road surface is appropriate for drilling rigs and to restore existing drainage / ESC controls and/or where absent upgrade the road to install these. There are no new drainage crossings within the scope. A new paragraph has been added to section 5.3 to address road upgrades more generally. *Proposed* upgrades *to existing roads and tracks, including the Bohena Creek road, will be designed to ensure the road surface is suitable for being traversed by drilling rigs, as well as ensuring road drainage / erosion and sediment controls are in place and are functional.*
5		General Feedback	N/A	[redacted] We have no issues with the document, but we must impress upon you the inherent dangers in this forest of the uncontainable bushfires, that is, bushfires which are in fact FIRESTORMS and are recognisable by the actual burning clouds of smoke on the leading side of the fire, coloured from pink to red. They are extremely dangerous when they swirl down to the ground and can kill or destroy all they touch. They only occur during very dry periods.	This is understood and taken seriously by Santos. Santos will implement all protocols and measures as committed to in the Fire Management Plan to minimise the likelihood of fires starting from, or being exacerbated by. Our activities.

Field Development Plan – WTAG comments received on Revision B (draft)

Comments received from DPE Water, [redacted]

Item	Section #	Section heading	Existing text	Comment	Final response
1	N/A	General Feedback	No specific text reference	**[DPE Water]** The Department of Planning and Environment- Water has no comments on this plan. DPE Water will continue to work with Santos on other plans where key matters have been identified. This includes the Groundwater Management Plan.	NIL
2	N/A	Suggestions for Improvement	No specific text reference	[redacted]**]** Table 1.1 which is the hub for all water management performance measures should be reviewed to better reflect all Plans and Sections referenced.	Table 1.1 is a direct copy of Table 3.1 in the Water Management Plan ,as required by consent condition B4. The table has been reviewed and changes made where applicable as noted in the further comments received below. Note that copies of some of the existing approved management plans currently available on the Santos and EPA websites (Pollution Incident Response Plan, Produced Water Management Plan, Soil and Water Management Plan, and Irrigation Management Plan) are not those currently going through assessment and approval with DPE. This may explain some of the discrepancies noted by the reviewer.

Item	Section #	Section heading	Existing text	Comment	Final response
3	1.4	Performance Measures	The FDP is largely a summary of the requirements and obligations outlined in the management plans developed for the Project as stipulated by the various consent conditions. The key management plans (and relevant subplans) that determine the final locations of the infrastructure and associated construction activities under this FDP are the following: • Biodiversity Management Plan (**BMP**); • Aboriginal Cultural Heritage Management Plan (**ACHMP**); • Water Management Plan (**WMP**), including the Groundwater Management Plan (GMP) and the Produced Water Management Plan (**PWMP**); • Noise management Plan (**NMP**) • Historic Heritage Management Plan (**HHMP**); and the • Rehabilitation Management Plan (**RMP**).	Several of the Plans referenced in Table 1.1 are NOT referenced in this Section SWMP – Surface Water Management Plan ESCP – Erosion and Sediment Control Plan IMP – Irrigation Management Plan	The 3 plans not referenced in section 1.4 currently do not contain criteria / a process that directly informs or influences the siting of infrastructure. However, for completeness, these plans have been added to section 1.4, but under paragraph 2 which references the water performance measures discussed in Table 1.1. *In accordance with CoC B4(g)(i), the performance criteria to be implemented to ensure compliance with the water performance measures in Table 7 [of the CoC] are listed in Table 1.1, reproduced from Table 3.1 in section 3.3.4 of the WMP. Note that Table 1.1 generally refers to the WMP and subplans which fully address the relevant performance measures. The list of relevant subplans to the WMP are:* • Groundwater Management Plan (**GMP**); • Produced Water Management Plan (**PWMP**); • Erosion and Sediment Control Plan (**ESCP**); • Site Water Balance (**SWB**) • Salt Management Plan; • Irrigation Management Plan (**IMP**); and the • Surface Water Management Plan (**SWMP**).
4	1.5	Table 1.1 – water management performance measures	No specific text reference	This Table has numerous issues with regard to Referencing the Performance measure. To assist page 5 has Lines 1 to 12, page 6 Lines13 to 22 and page 7 Lines 23 to 34	See responses below. The table is a direct reproduction of Table 7 of the CoC. It can be placed on an A4 or an A3 size, either way it will be split.
5	Table 1.1	Line 5	Section 8.1	Section 8 is Groundwater Performance Criteria whereas Section 8.1 is Project Phasing	Updated to Section 8.2
6	Table 1.1	Line 6	Section 7	Section 7 is about Subsidence and Seismic Monitoring NOT Aquifer Interference	Updated to be Section 3.2.1 and 8.2
7	Table 1.1	Line 7	Section 8.1	Section 8.1 is Project Phasing	Updated to Section 4.4.4 and 8.2
8	Table 1.1	Line 9	Section 6 and 9.2	Section 6 is Groundwater Monitoring Strategy NOT Water Quality Section 9.2 is Monitoring and Reporting (perhaps this should be Section 8.4)	Updated to section 5.2, 8.2, 8.4, 8.5.1,
9	Table 1.1	Line 13	Section 5.1	Section 5.1 these are management strategies rather than performance measures	Updated to reference Section 5.4, 5.5 and 5.6
10	Table 1.1	Line 20	Section 6.1	There is no Section 6.1 in either of the PWMP versions	Updated to section 8.0 and 9.0
11	Table 1.1	Line 21	Section 5.3	Section 5.3 points to Table 5.1 However this is a description of Facilities NOT performance Measures	Updated to Section 8.0
12	Table 1.1	Line 22	Appendix C	Appendix C covers Water Quality Targets NOT Quantity performance measures	Updated to Section 8.0
13	Table 1.1	Line 23	Appendix D	Non Web Site PWMP Appendix D is Water Management assets on Water Quality (which rather appears to be Appendix C in this report)	Updated section 5.4 and Appendix D – Treated Water Quality
14	Table 1.1	Lines 25 to 27	Section 5.3 Section 5.2 Section 5.4	IMP describe these as protocols NOT performance measures	Line 25 – a new reference to section 1.4 has been added. Line 26 – a new reference to section 1.4 has been added. Line 27 – the performance measure in this instance is clear – no irrigation is allowed inside forest areas. This is stated in Section 5.4 of the IMP as listed in the FDP. A new reference to section 1.4 has also been added.

Item	Section #	Section heading	Existing text	Comment	Final response
15	Table 1.1	Lines 30 to 33	No specific text reference	Salt Management Plan (Web Site version) includes performance measures in the unreferenced addendum letter in the pages after Page 21. A more appropriate reference would assist	The Salt Management Plan is provided in section 7 of the PWMP. It is very basic in that no salt is proposed to be produced as part of Phase 1. Reference in the FDP has been updated to reference section 7 of the PWMP.
16	Section 5.1	Shallow monitoring bores	More information on the locations of the above well pads and the type of monitoring wells is provided in Appendix B of the Groundwater Monitoring Plan as attached to the Groundwater Management Plan (**GMP**).	Para 2. Appendix B is about InSAR subsidence	Appendix B of the Groundwater Monitoring Plan is the correct reference – that is Phase 1 Groundwater monitoring points. The reference in Table 1 has been updated to reference the Groundwater Monitoring Plan as an Attachment to the GMP. *More information on the locations of the above well pads and the type of monitoring wells is provided in Appendix B of the Groundwater Monitoring Plan as attached to the Groundwater Management Plan (**GMP**) as Attachment 1.*
17	Section 7	No specific section reference	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. A number of TARPs have been developed to address the management and consent conditions associated with the construction, operation and management of the infrastructure proposed as part of Phase 1. These are included in the various management plans listed in Table 3.1 in section 3.1.3, and have been reproduced in Table E1 in Appendix G. In addition to the trigger points and associated actions to be undertaken, where relevant these documents also detail the delegation of responsibility at each trigger point and contact details for both internal and external notification requirements.	Section refers to TARPs in various management plans that are summarised in Table 3.1 One would expect that the summary in Table 1.1 should provide direction to these. Appendix G TARPs has the Site Water Balance Plan and the Rehabilitation Plan that includes the Surface Water Quality Triggers.	Table 1.1 provides the water management performance measures. Table 3.1 provides a list of the management plans that are summarised and support the FDP. Consent condition B4 requires the FDP to include trigger action response plans related to the water performance measures and the rehabilitation objectives. This is the reason for including the WMP TARPs and the RMP TARPs in the FDP.
18	Key Issues	No specific section reference	No specific text reference	[redacted] No Issues. Very complex assessment. Spot checks show that the reasons given for changing or not changing location of infrastructure seem logical	NIL
19	Table 6.3	No specific section reference	No specific text reference	First line of the notes column on page 39 (Dewhurst 37) Perhaps ‘rotating’ rather than ‘flipping’	Wording has been updated as recommended.
20	Table 6.4	No specific section reference	No specific text reference	The notes say the original is retained. But the original impact is (2,3,2) while the final impact is (3,3,2) Why are they different if there has been no change to the footprint	The notes have been reworded. The original location was used, however the footprint has expanded to account for cut/fill batters. This is why the matters impacted have changed from the original.
21	Section 6.4.2	No specific section reference	No specific text reference	What is ‘PCT’ – Acronyms and abbreviations	PCT – Plant Community type, now included in Acronyms and abbreviations table. Have also ensured first use in the document contains the acronym.
22	N/A	No specific section reference	No specific text reference	As ‘Fuzzy Box Woodland’ in Table 6.4 exceeds the CoC limit should the (sic) be some mention in the lead in paragraph. In the second para on page 43 there is mention of ‘offsetting arrangements’ – is this how the exceeding CoC limits are dealt with?	The proposed impacts to Fuzzy Box Woodland (0.47 ha) does not exceed the approved limit of 4.1 ha as per Table 8 of the development consent. The 0.47 ha of Fuzzy Box Woodland will be offset.
23	Table 2.1	Acronyms	No specific text reference	[redacted]] On page 8: I couldn’t find reference to HSER and HSER Manager.	HSER has been added to the list of acronyms and abbreviations. This stands for Health, Safety, Environment and Risk.
24	N/A	No specific section reference	No specific text reference	On page 9: Also HSE is not referenced in “Acronyms and abbreviations” at the front of the document	HSE stands for health, safety and environment and has been added to the list of acronyms and abbreviations.
25	N/A	No specific section reference	No specific text reference	On page 10 the CCC should be referred to as” Community Consultative Committee”	Correction made
26	N/A	No specific section reference	No specific text reference	On page 28, second paragraph amend “For all currently **know** sites, to **known** sites	Correction made

Item	Section #	Section heading	Existing text	Comment	Final response
27	N/A	No specific section reference	No specific text reference	Generally, I have no suggestions to make in regard to the Plan. I am comfortable with what is presented to me for review.	NIL

Appendix B - Consent conditions relevant to the FDP

Table B1 – SSD 6456 consent conditions directly relevant to this FDP

SSD 6456 consent conditions directly relevant to this FDP	Section reference
Consent condition A1 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.	Section 1.2
Consent condition A5 The Applicant may only undertake the development in the following stages:	Section 1.1.2 Section 1.2
(a) Phase 1, comprising ongoing exploration and appraisal activities;	
(b) Phase 2, comprising construction activities for production wells and related infrastructure;	
(c) Phase 3, comprising gas production operations; and	
(d) Phase 4, comprising gas well and infrastructure decommissioning, rehabilitation and mine closure.	
Consent condition A7 At least two weeks prior to commencement or completion of each Phase of the development, the Applicant must notify the Department of the relevant date via the Major Project Portal	Section 1.2
Consent condition A8 If petroleum mining operations are suspended during Phase 1 to Phase 3, the Applicant must notify the Department immediately via the Major Projects Portal of the suspension, and then again prior to the recommencement of operations	Section 1.2
Consent condition A9 The Applicant shall not commence:	
(a) Phase 2 until a planning approval is granted for a transmission pipeline to deliver gas from the development to the domestic gas network; and	Not relevant to Phase 1
(b) Phase 3 until a transmission pipeline to deliver gas from the development to the domestic gas network is commissioned,	
to the satisfaction of the Planning Secretary.	
Consent condition A10 Condition A9 does not prevent gas from the development being sent to the Wilga Park Power Station or any local industry.	Not relevant to Phase 1
Consent condition A12 Petroleum mining operations may be carried out in the project area until 31 December 2045. ***Note**: Under this consent, the Applicant is required to decommission and rehabilitate the project area and carry out other requirements in relation to petroleum mining operations. Consequently, this consent will continue to apply in all respects other than to permit the carrying out of petroleum mining operations until the rehabilitation of the project area and other requirements have been carried out to the required standard.*	Noted
Consent condition A23 With the approval of the Planning Secretary, the Applicant may:	
(c) 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	Section 1.2
(d) 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);	No combination proposed as part of this Plan

SSD 6456 consent conditions directly relevant to this FDP		Section reference
(e)	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	Section 1.2
(f)	combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by a consent	No combination proposed as part of this Plan
Consent condition A25 Unless the Applicant and the applicable authority agree otherwise, the Applicant must:		
(a)	repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by carrying out the development; and	No interface with public infrastructure as part of this Plan
(b)	relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development, to the satisfaction of the applicable authority.	
Consent condition A26 All demolition of applicable structures must be carried out in accordance with *Australian Standard AS 2601-2001 The Demolition of Structures* (Standards Australia, 2001).		No demolitions required under this Plan
Consent condition A27 All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the development, must be constructed in accordance with the relevant requirements of the BCA. *Notes:* • *Under Part 6 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.* • *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.*		
Consent condition A28 All plant and equipment used in the project area, or to monitor the performance of the development, must be:		
(a)	maintained in a proper and efficient condition; and	Refer to the NMP
(b)	operated in a proper and efficient manner.	Refer to the NMP
Consent condition B1 The Applicant must ensure that petroleum mining operations in the project area comply with the locational criteria in Table 1 [of the CoC].		
Feature	Locational Criteria	
Sensitive receivers and amenity	• No project related infrastructure within 200 metres of any residence (occupied or otherwise), unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary	Section 6.2
	• No well pads within 100 metres of any privately-owned land or other land not owned by the Applicant, unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary	
	• Production well pads to be spaced at least 750 metres apart	
	• Pilot well pads to be spaced at least 250 metres apart	

SSD 6456 consent conditions directly relevant to this FDP		Section reference
	• No telecommunications towers within 500 metres of any residence (occupied or otherwise), unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary	
Conservation areas	• No surface infrastructure within 200 metres of Yarrie Lake property boundary	Section 6.1
	• No surface infrastructure within 50 metres of Brigalow State Conservation Area	
	• No sub-surface infrastructure below Brigalow State Conservation Area, from the ground surface to a depth of at least 110 metres	
	• No surface infrastructure within 50 metres of Brigalow Nature Reserve	
Water resources	• No non-linear infrastructure within any watercourse or watercourse buffer zone as determined by Strahler stream order (and shown in Appendix 5 [of the CoC], including: ▪ 1st order stream – 20 metre corridor plus channel width ▪ 2nd order stream – 40 metre corridor plus channel width ▪ 3rd order stream – 60 metre corridor plus channel width ▪ 4th order and greater stream – 80 metre corridor plus channel width	Section 6.5
	• No large ponds and dams, or any ponds and dams used for storage of produced water or brine, within the 1% AEP flood extent, as identified in Appendix 5 [of the CoC] (apart from approved ponds and dams in major facilities constructed above the 1% AEP flood extent)	
Biodiversity	• No disturbance of more than 988.8 hectares of native vegetation (including derived native grassland)	Section 6.4
	• No disturbance beyond the limits by vegetation type as identified in Table 8.	
	• No disturbance beyond the limits by threatened flora species type as identified in Table 9	
	• No disturbance beyond the limits by threatened fauna species type as identified in Table 10	
Heritage	• No disturbance of identified Aboriginal cultural heritage items, as identified in Appendix 7 [of the CoC]	Section 6.6
	• No disturbance of identified historic heritage items, as identified in Appendix 7 [of the CoC]	
	• No disturbance of other Aboriginal cultural heritage items identified during the development, if assessed in a Field Development Plan to be of high significance	
	• No disturbance of other Aboriginal cultural heritage items and historic heritage items identified during the development, unless otherwise approved in a Field Development Plan	

SSD 6456 consent conditions directly relevant to this FDP	Section reference
Consent condition B4 Prior to the construction of any gas field infrastructure, the Applicant must prepare a Field Development Plan for the relevant gas field infrastructure to the satisfaction of the Planning Secretary. This plan must:	This Plan
(a) be prepared by a suitably qualified and experienced person/s;	Section 1.5
(b) be prepared in consultation with the:	Section 1.6
(i) EPA, DPE Water, BCD, Resources Regulator and Council;	
(ii) owners of land not owned by the Applicant, upon which gas field infrastructure is proposed to be located;	
(iii) Community Consultative Committee;	
(iv) Water Technical Advisory Group;	
(v) Greenhouse Gas Emissions Advisory Group;	
(vi) Aboriginal Cultural Heritage Advisory Group;	
(vii) Biodiversity Advisory Group;	
(c) include detailed plans of existing gas field infrastructure in the project area, and proposed gas field infrastructure to be developed under the Field Development Plan;	Section 4
(d) include incremental and cumulative analysis of compliance with the locational criteria;	Section 6.9 Appendix F
(e) provide detailed consideration of the proposed gas field infrastructure against the provisions of the Field Development Protocol.	Section 5
(f) provide the results of all surveys undertaken as part of in-field micro-siting;	Section 6.4.2 Appendix C Appendix E
(g) describe the performance criteria to be implemented to ensure compliance with the water performance measures in Table 7 [of the CoC], and to meet the rehabilitation objectives in Table 11 [of the CoC], including a:	Section 1.4
(i) trigger action response plan to identify risks and actions to avoid exceedances of the performance criteria, including tiered triggers to provide for early detection of impacts; and	Section 7 Appendix G
(ii) contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of the performance criteria, or where an exceedance appears likely; and	Section 9.2
(h) include a:	
(i) Public Safety Management Plan, prepared in consultation with RFS, FCNSW and NSW Health, to ensure public safety and manage access in the project area, including verification of minimum safe separation distances between all potentially hazardous facilities; and	Refer to Attachment 1
(ii) Property Management Plans, prepared in consultation with landowners upon which gas field infrastructure is proposed to be located, to manage impacts and access arrangements on the properties.	Refer to Attachment 2
Consent condition B5 The Applicant must not commence Phase 1 or any subsequent phase of the development until:	
(a) a Field Development Plan for the relevant gas field infrastructure; and	Section 1.2.2
(b) any associated management plan, program or strategy updates, are approved by the Planning Secretary.	
Note: *For the avoidance of doubt, no gas field infrastructure may be constructed or operated until the relevant infrastructure has been approved in a Field Development Plan.*	

SSD 6456 consent conditions directly relevant to this FDP	Section reference
Consent condition B6 The Applicant must implement the approved Field Development Plan.	Section 1.2.2
Consent condition B7 The Applicant must ensure that the noise generated by the development – including cumulative noise generated by the Wilga Park Power Station and ancillary activities in the project area, but excluding Phase 1 and 2 construction activities during standard construction hours, and non-routine safety flaring operations – does not exceed the criteria in Table 2.	Section 6.7

Noise Assessment Location	Day	Evening	Night	Night
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
All privately owned residences	35	35	35	45
Yarrie Lake, Brigalow State Conservation Area, Brigalow Nature Reserve	50 $L_{Aeq\ (period)}$			-

Notes:

- *Receiver locations are shown on the applicable figure in Appendix 3 [of the CoC]*
- *Condition B11 provides exemptions to complying with these criteria.*
- *Noise criteria for Phase 1 and 2 construction activities during standard construction hours are outlined in condition B8.*
- *For the avoidance of doubt, the criteria in Table 2 apply to Phase 1 and 2 construction activities outside standard construction hours.*

Noise criteria for non-routine safety flaring operations are outlined in condition B9.

Consent condition B8 The Applicant must implement all reasonable and feasible measures to ensure that the noise generated by Phase 1 and 2 construction activities during standard construction hours – including cumulative noise generated by the development and noise from the Wilga Park Power Station and ancillary activities in the project area – does not exceed the criteria in Table 3.	Section 6.7

Noise Assessment Location	During Standard Construction Hours
All privately owned residences	40 $L_{Aeq\ (15\ min)}$
Yarrie Lake, Brigalow State Conservation Area, Brigalow Nature Reserve	50 $L_{Aeq\ (period)}$

Notes:

- *Receiver locations are shown on the applicable figure in Appendix 3 [of the CoC].*
- *Operational noise criteria, including Phase 1 and 2 activities outside standard construction hours are outlined in condition B7. For the avoidance of doubt, the criteria in Table 3 do not apply to Phase 1 and 2 activities outside standard construction hours.*

Consent condition B9 The Applicant must implement all reasonable and feasible measures to ensure that the noise generated by non-routine safety flaring operations – including cumulative noise generated by the development and noise from the Wilga Park Power Station and ancillary activities in the project area – does not exceed the criteria in Table 2 at any residence on privately-owned land.	Section 6.7

SSD 6456 consent conditions directly relevant to this FDP		Section reference
Consent condition B10 Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017). Appendix 4 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.		Section 6.7
Consent condition B11 The noise criteria in Tables 2 and 3 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and the Applicant has advised the Planning Secretary in writing of the terms of this agreement.		Section 6.7
Consent condition B12 The Applicant must:		
(a)	implement all reasonable and feasible measures to:	
(i)	minimise the construction, operational, low frequency and road noise of the development;	Refer to the NMP
(ii)	attenuate all new plant and equipment that will operate in noise sensitive areas;	
(iii)	schedule non-routine safety flaring and other non-routine maintenance activities at the Leewood facility and Bibblewindi facility that have the potential to exceed the noise criteria in Table 2, during the day period, where practicable;	
(iv)	monitor and record major equipment noise levels and make this data readily available at the request of the Department or the EPA;	
(v)	minimise the noise impacts of the development during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see Appendix 4);	
(b)	operate a suitable system to enable the public to get up-to-date information on any construction or non-routine safety flaring operations that have the potential to exceed the noise criteria in this consent; and	
(c)	regularly assess meteorological and noise monitoring data and modify operations in the project area in response to this data to ensure compliance with the relevant conditions of this consent.	
Note: Noise sensitive areas are areas with the potential to generate increased noise at privately-owned residences, such as areas near the boundary of the major facilities or well pads near residences.		
Consent condition B15 The Applicant must ensure that no offensive odours, as defined under the POEO Act, are emitted from the development		Section 6.8.1
Consent condition B16 The Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that air emissions generated by the development do not cause exceedances of the criteria listed in Table 5 [of the CoC] at any residence on privately-owned land.		Section 6.8.2

SSD 6456 consent conditions directly relevant to this FDP	Section reference

Table 5: Air quality criteria

Pollutant	*Averaging period*	*Criterion*
Particulate matter < 10 µm (PM_{10})	Annual	[a, c] 25 µg/m³
	24 hour	[b] 50 µg/m³
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual	[a, c] 8 µg/m³
	24 hour	[b] 25 µg/m³
Total suspended particulate (TSP) matter	Annual	[a, c] 90 µg/m³
Nitrogen dioxide (NO_2)	1 hour	[a] 246 µg/m³
	Annual	[a] 62 µg/m³
Ozone (O_3)	1 hour	[a] 214 µg/m³
	4 hour	[a] 171 µg/m³

Notes:
[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
[b] Incremental impact (i.e. incremental increase in concentrations due to the development on its own).
[c] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.

Consent condition B17 Air emissions generated by the development must be measured in accordance with the relevant requirements and exemptions of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2007).	Section 6.8.2
Consent condition B18 The air quality criteria in Table 5 [of the CoC] do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the air quality criteria, and the Applicant has advised the Department in writing of the terms of this agreement.	Section 6.8.2
Consent condition D3 The Applicant must ensure that (where relevant) the management plans required under this consent include:	
(a) summary of relevant background or baseline data;	Section 4
(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	Section 6
(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 3.3
(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 suite of EMPs supporting this FDP
(e) a program to monitor and report on the:	
(i) impacts and environmental performance of the development; and	Section 10.1

SSD 6456 consent conditions directly relevant to this FDP	Section reference
(ii) effectiveness of the management measures set out pursuant to paragraph (d);	Section 13.2
(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;	Section 9.2
(g) a program to investigate and implement ways to improve the environmental performance of the development over time	Section 10.4
(h) a protocol for managing and reporting any:	
(i) incident, non-compliance or exceedance of any impact assessment criterion and performance criterion	Section 9.1
(ii) complaint; or	Section 9.2
(iii) failure to comply with other statutory requirements; and	Section 9.1
(i) a protocol for periodic review of the plan.	Section 10.3
Consent condition D4 Within 2 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 Pla€(e) the submission of a Groundwater Model Update; or (e) the approval of any modification of the conditions of this consent, the Applicant must review the suitability of existing strategies, plans and programs required under this consent.:	Section 10.3
Consent condition D5 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 dire–tion - then the Applicant must submit the revised document to the Secretary for approval within 6 weeks of the review. ***Note**: 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.*	Section 10.3
Consent condition D6 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.	Section 9.1
Consent condition D7 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. **Note**: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance	Section 9.1
Consent condition D8 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.	Section 10.1
Consent condition D9 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.	Section 10.2

SSD 6456 consent conditions directly relevant to this FDP	Section reference
Consent condition D13 From the commencement of Phase 1, until the completion of all rehabilitation required under this consent, the Applicant must:	
(a) make copies of the following information publicly available on its website: (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
(b) keep such information up to date.	Section 1.8

Appendix C - Ecological micro-siting survey adjustments

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

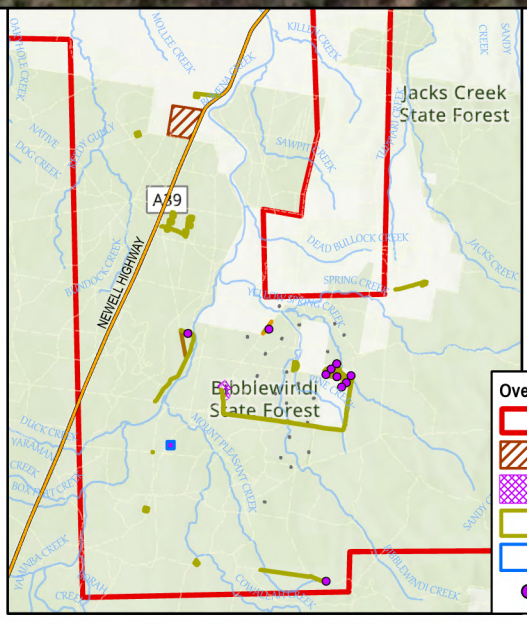
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 1
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C1

Bibblewindi 30 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT

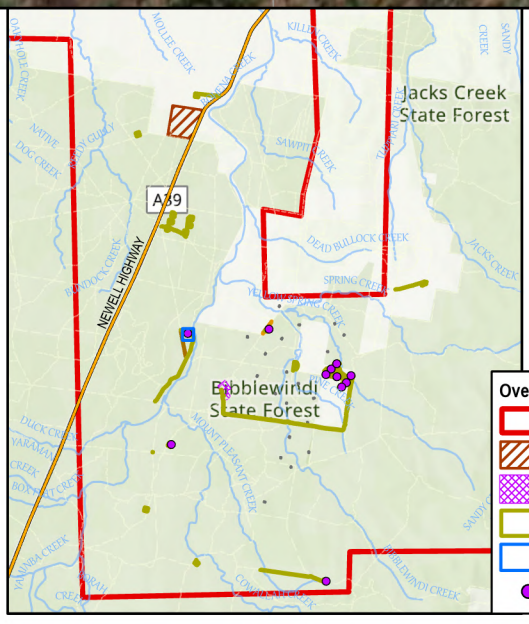
- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6

Logs

- Rank 1
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C2

Bibblewindi 31 Well Pad

Santos

LEGEND

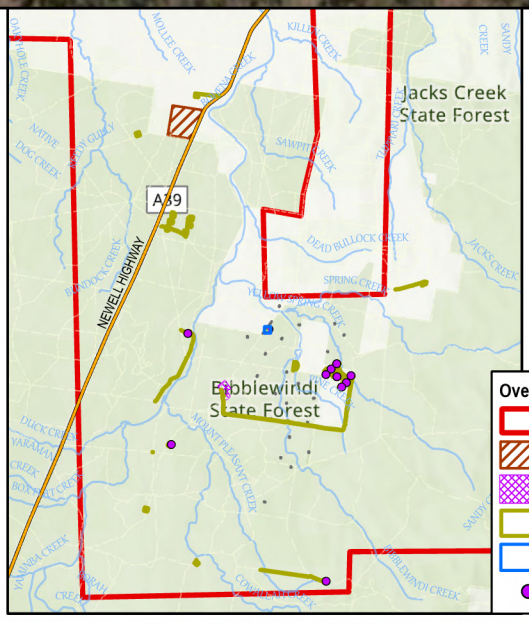
- Consolidated survey area
- Phase 1 access roads
- Phase 1 access rd - preliminary footprint
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells

ESF Ranked Features

HBT
- Rank 3

Threatened species
- Rank 6

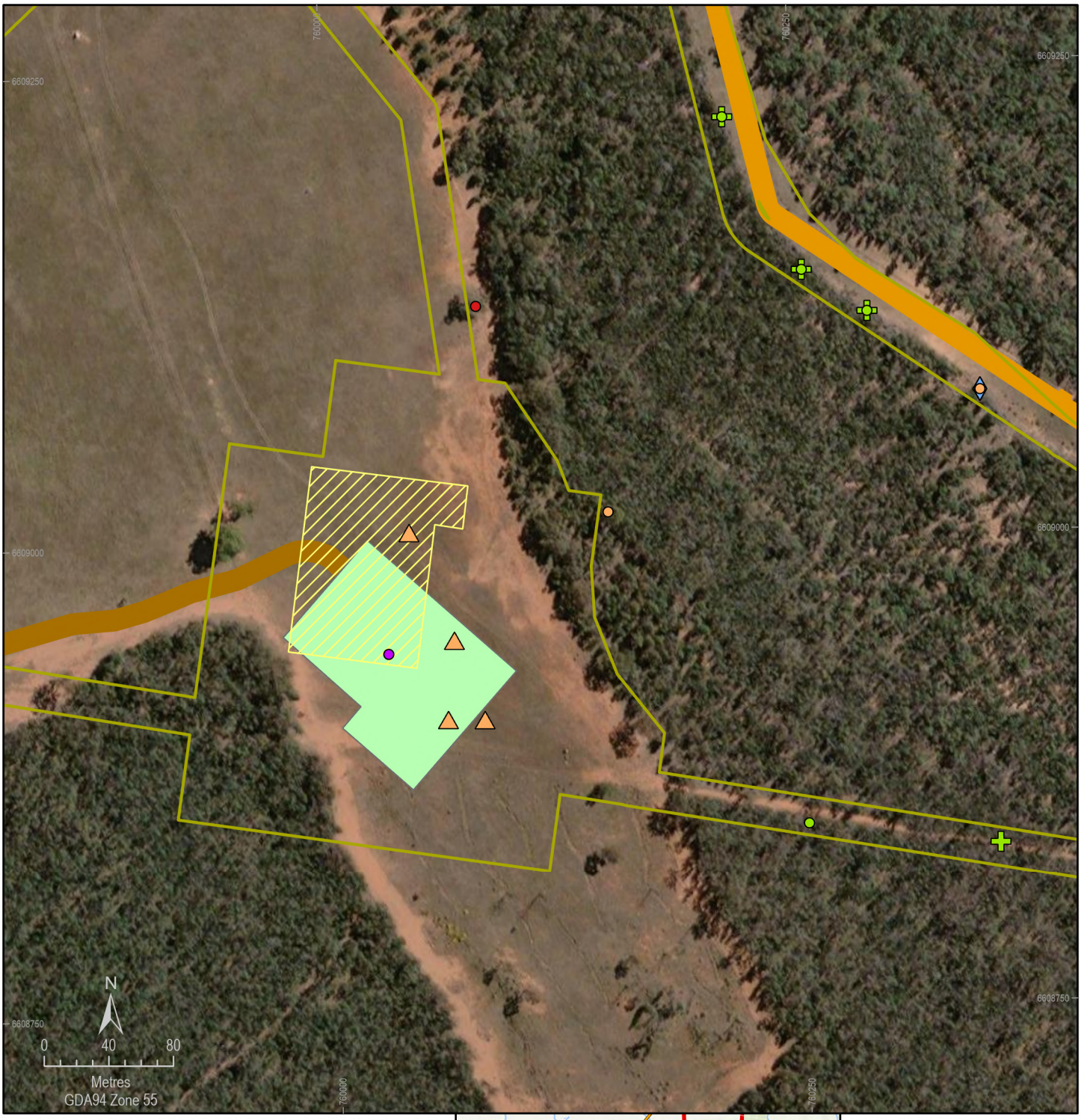
Logs
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C3
Dewhurst 34 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

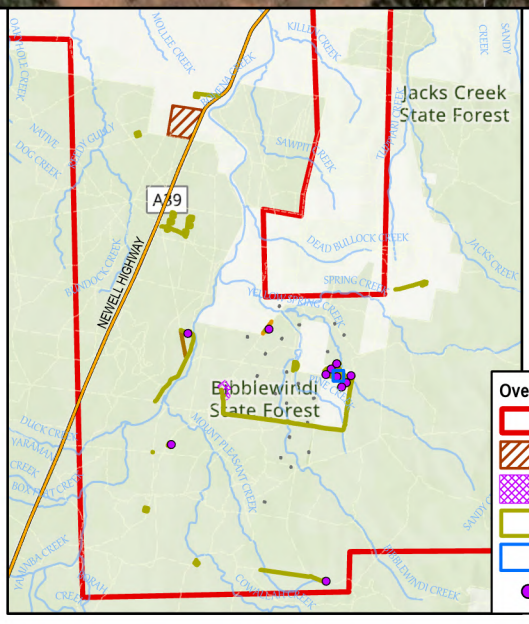
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 2



Overview Legend
- NGP boundary
- Leewood
- Bibblewindi
- Consolidated survey area
- Map extent
- Proposed phase 1 wells

ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C4
Dewhurst 35 Well Pad

Santos

LEGEND

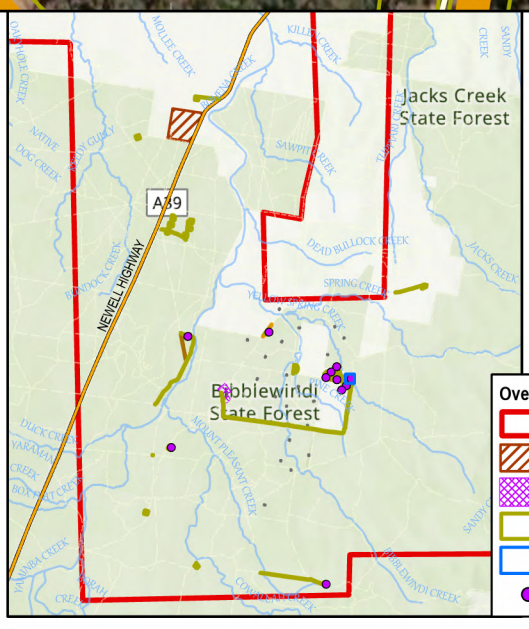
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 2
- Rank 3

Fauna habitat
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C5
Dewhurst 37 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

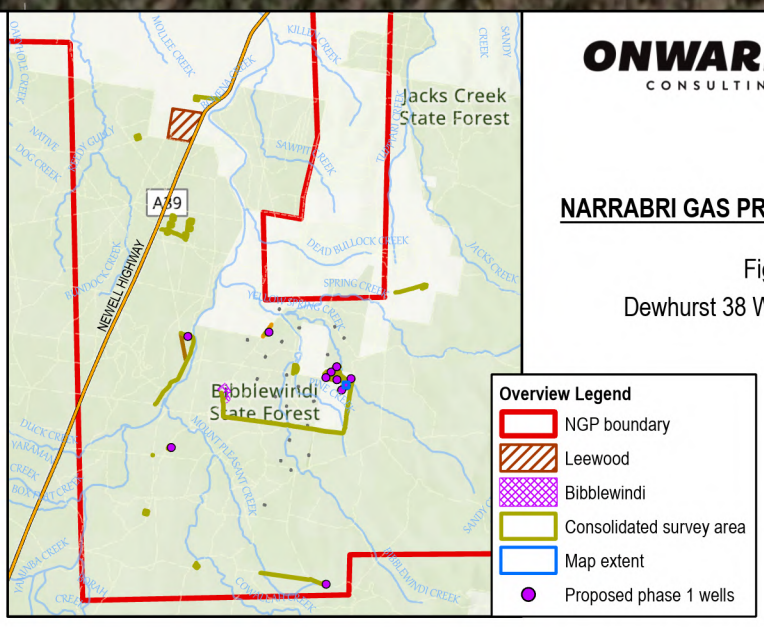
ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C6

Dewhurst 38 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

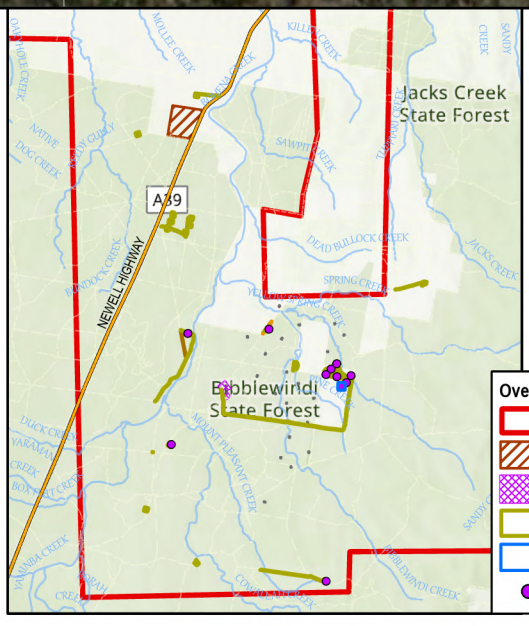
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C7
Dewhurst 39 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

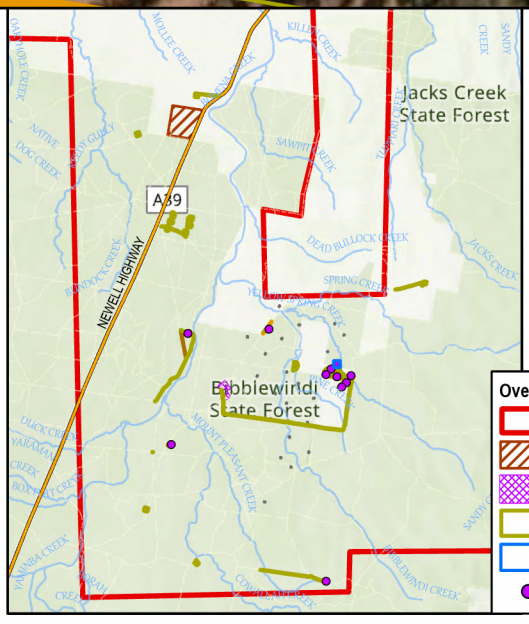
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C8
Dewhurst 40 Well Pad

Santos

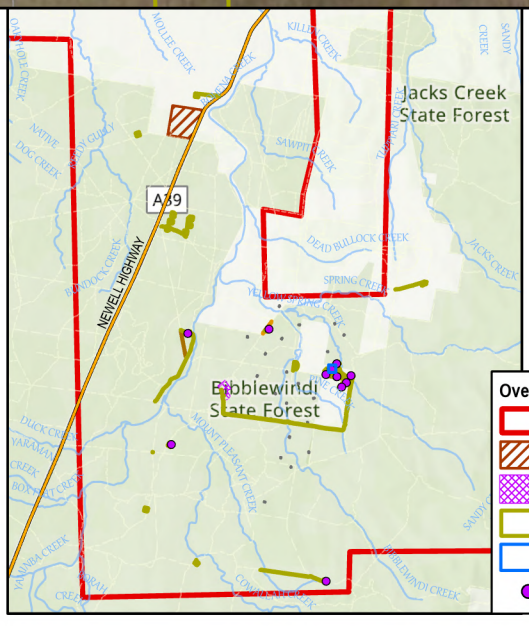
LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT

- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

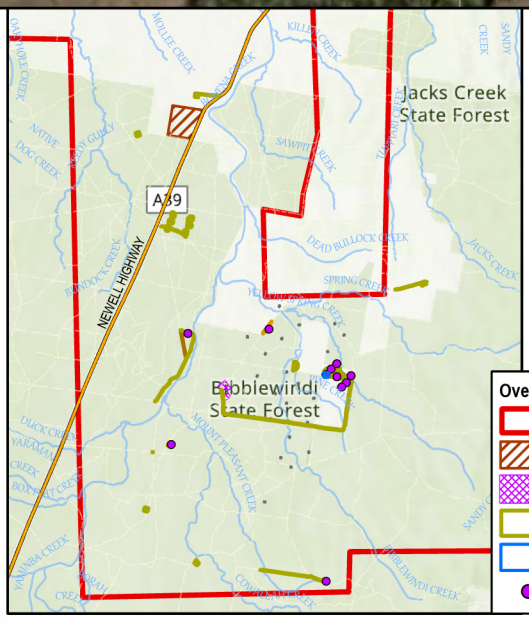
Figure C9

Dewhurst 41 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Roads and tracks



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C10
Dewhurst 42 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Proposed phase 1 wells
- Roads and tracks

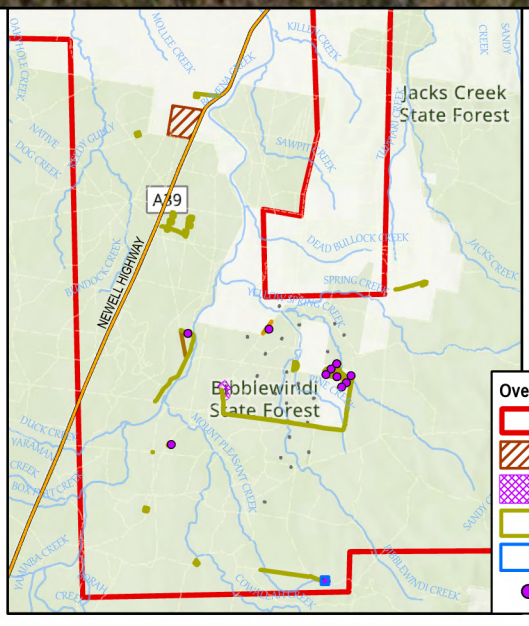
ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

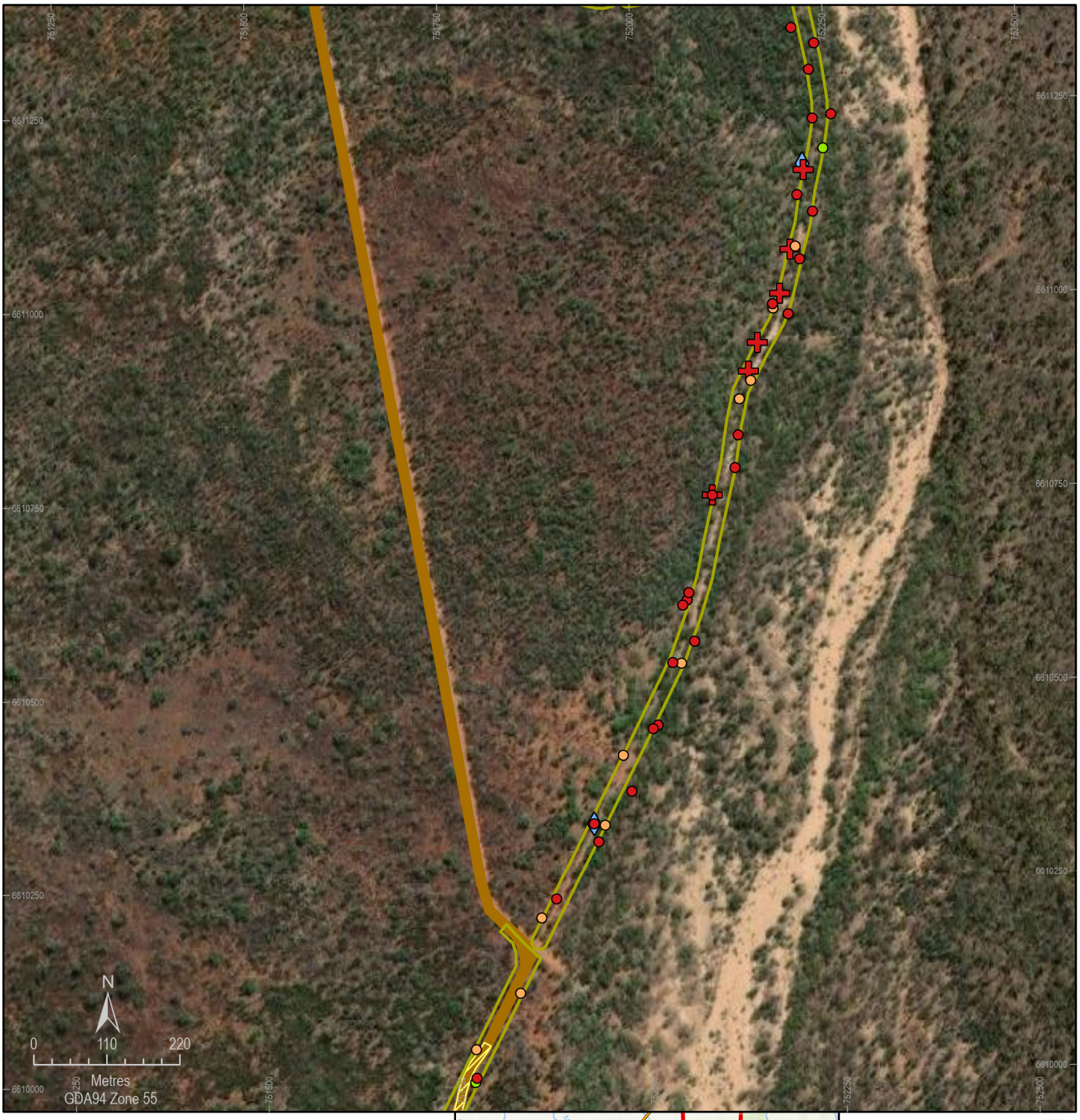
- Rank 2
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C11
Dewhurst 43 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - proposed infrastructure footprint adjustments

ESF Ranked Features

HBT

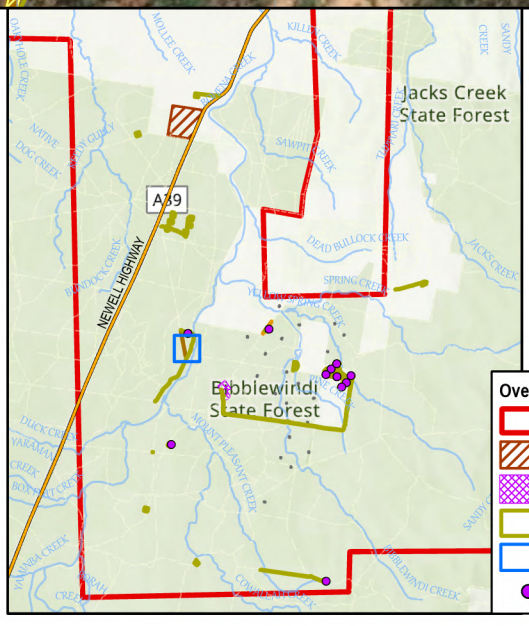
- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1

Fauna habitat

- Rank 6

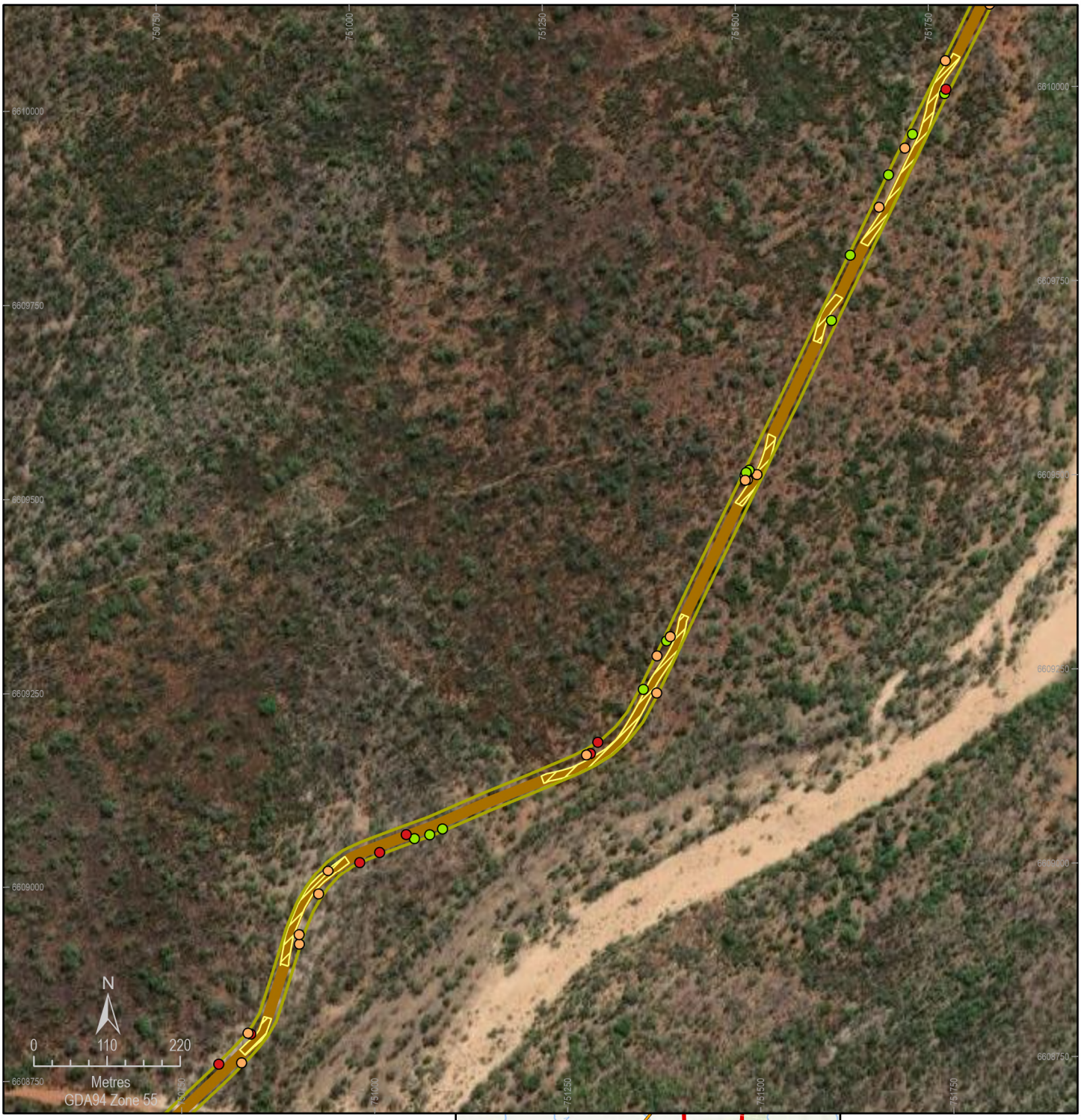


ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C12

Phase 1 Access Road to Bibblewindi 31 Well Pad - Northern Section



Santos

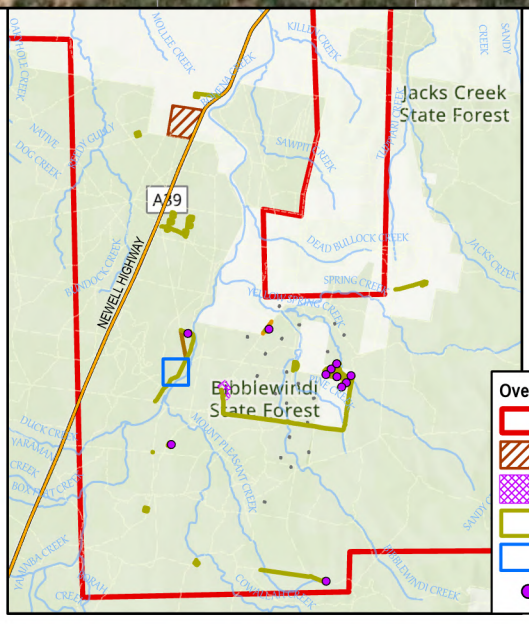
LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - proposed infrastructure footprint adjustments

ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

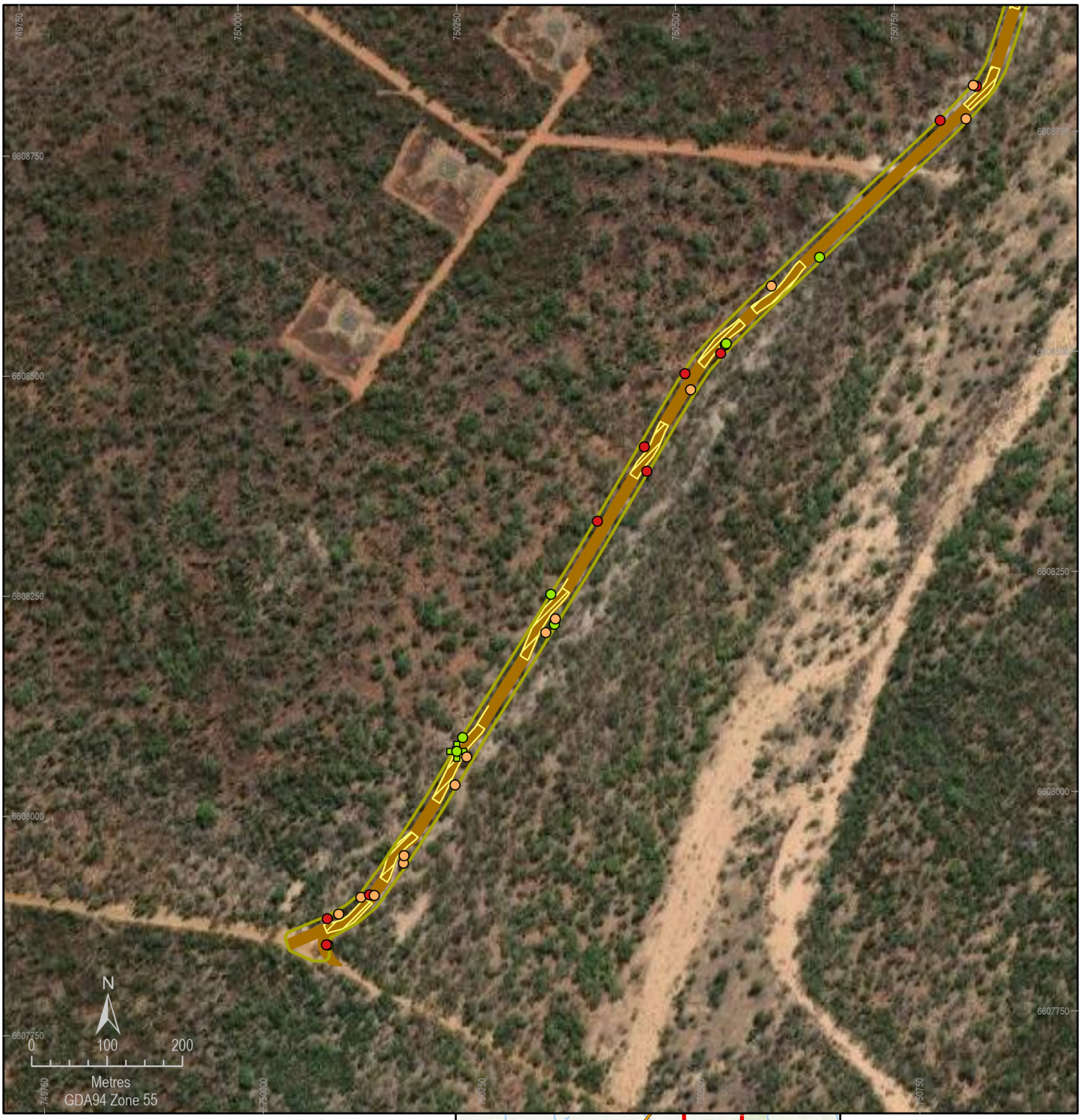


ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C13

Phase 1 Access Road to Bibblewindi 31 Well Pad - Mid Section



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - proposed infrastructure footprint adjustments

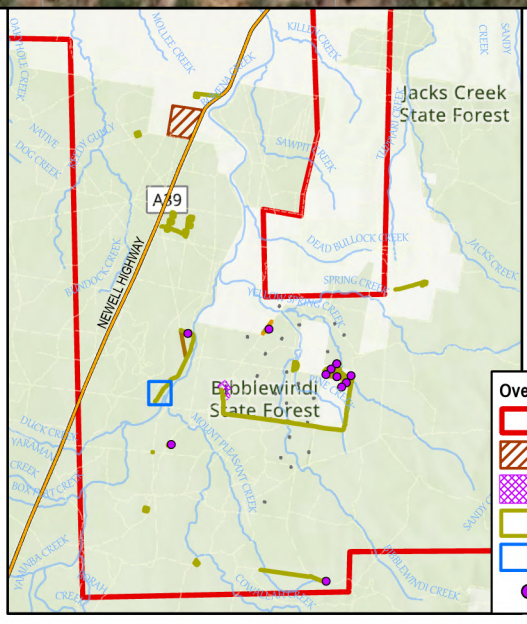
ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 3

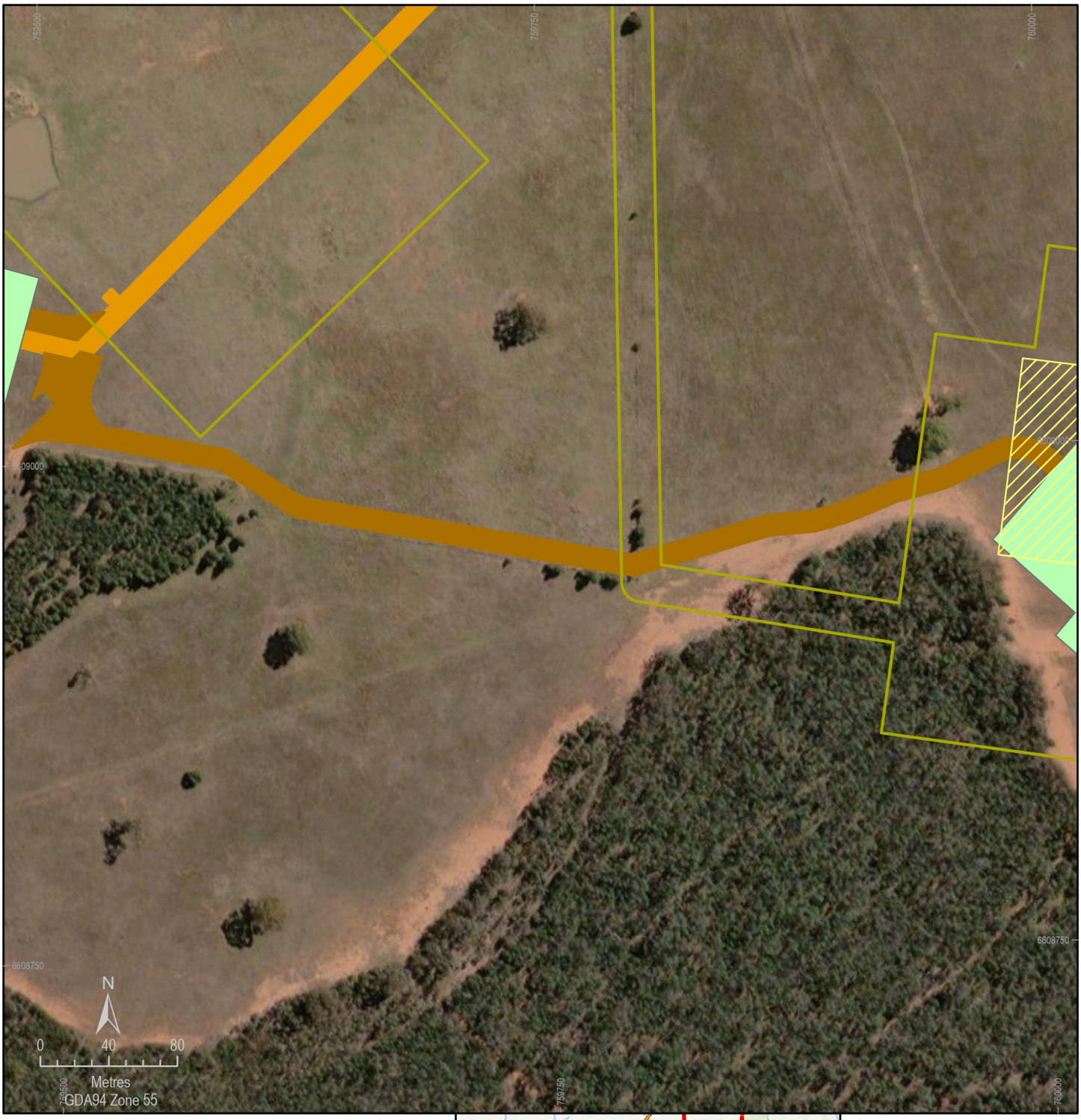


ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C14

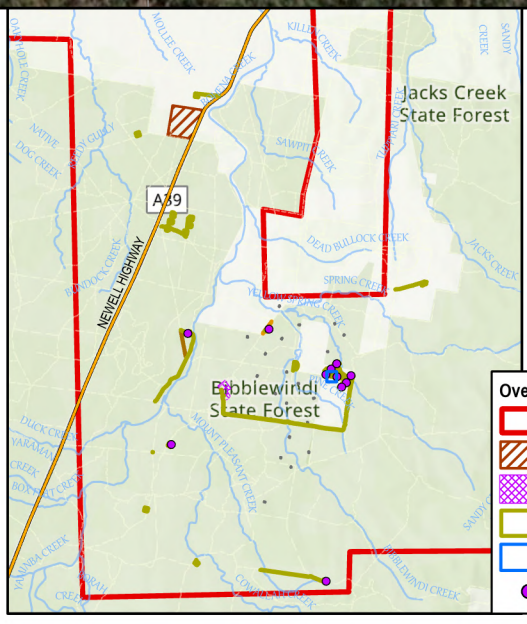
Phase 1 Access Road to Bibblewindi 31 Well Pad - Southern Section



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure C16

Phase 1 Access Road Between Dewhurst 35 and 42 Well Pads

Appendix D - Ecological micro-siting modification

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

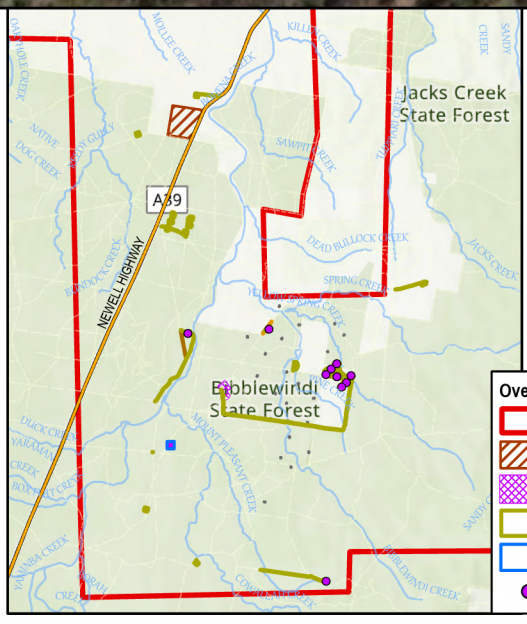
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 1
- Rank 6

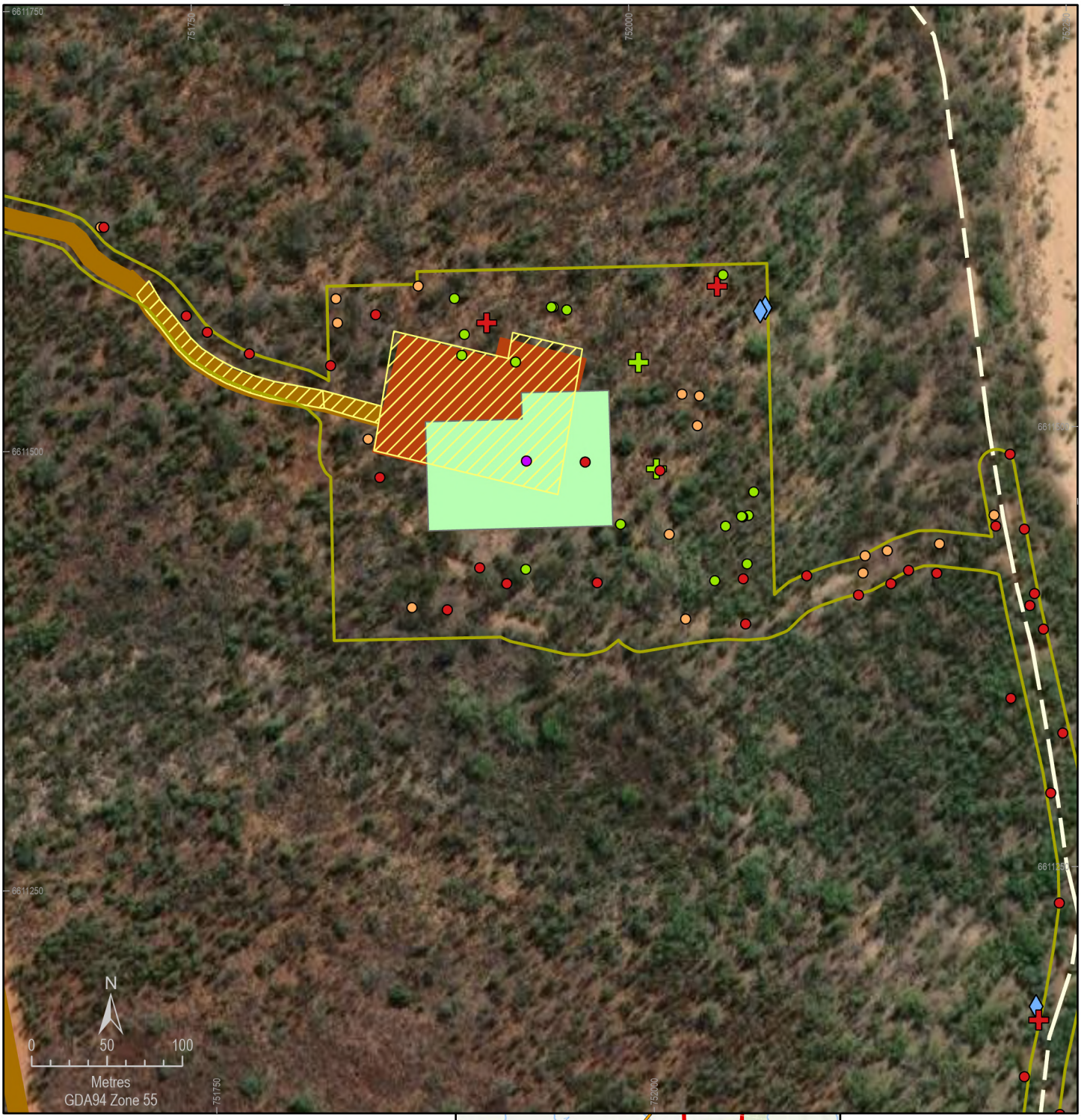


ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D1

Bibblewindi 30 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT

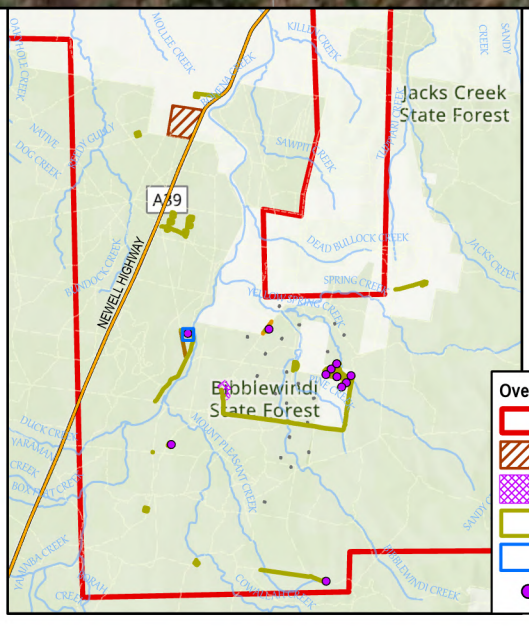
- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6

Logs

- Rank 1
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D2

Bibblewindi 31 Well Pad

Santos

LEGEND

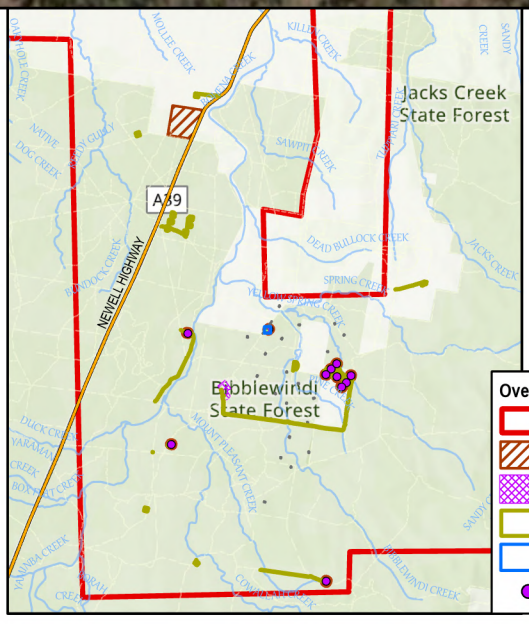
- Consolidated survey area
- Phase 1 access roads
- Phase 1 access rd - preliminary footprint
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells

ESF Ranked Features

HBT
- Rank 3

Threatened species
- Rank 6

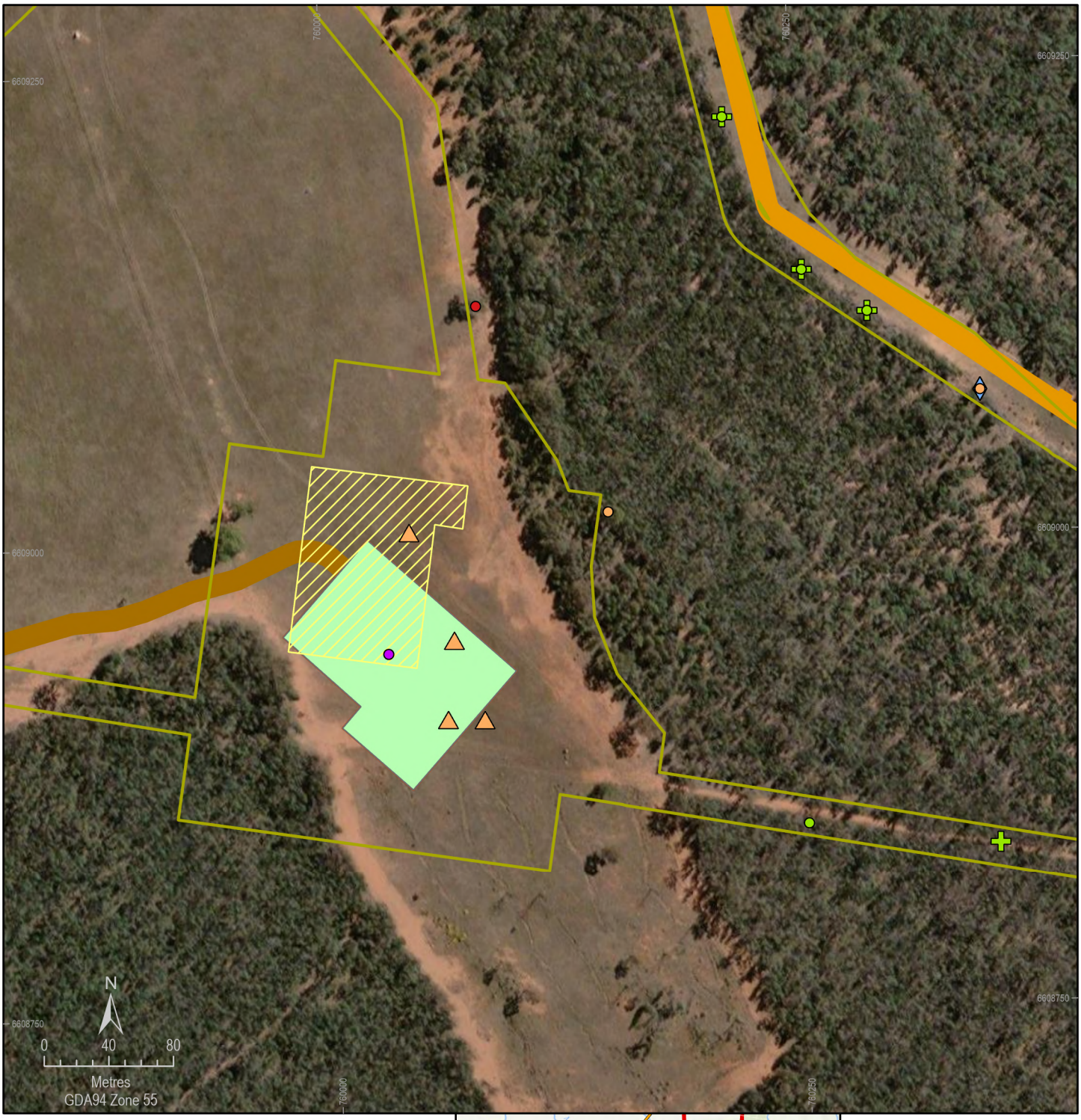
Logs
- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D3
Dewhurst 34 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

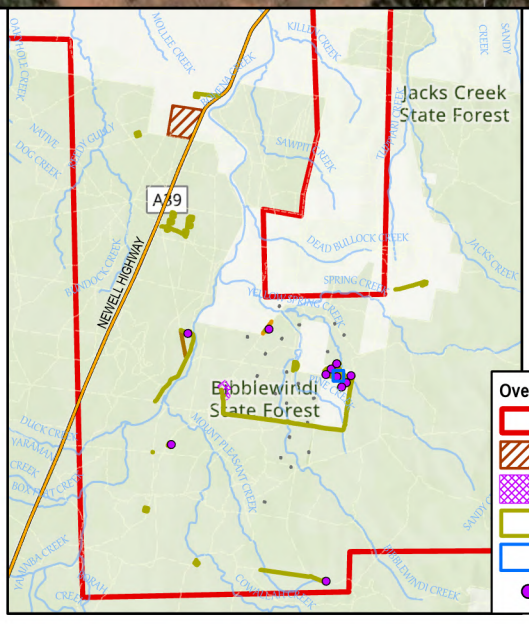
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 2

Logs
- Rank 3



Overview Legend
- NGP boundary
- Leewood
- Bibblewindi
- Consolidated survey area
- Map extent
- Proposed phase 1 wells

ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D4
Dewhurst 35 Well Pad

Santos

LEGEND

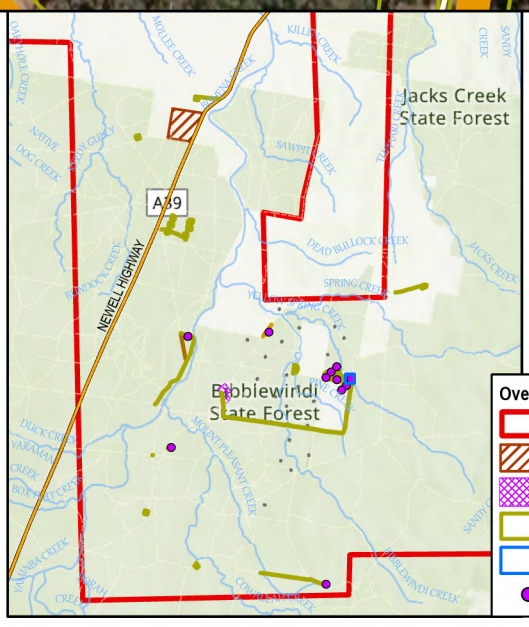
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

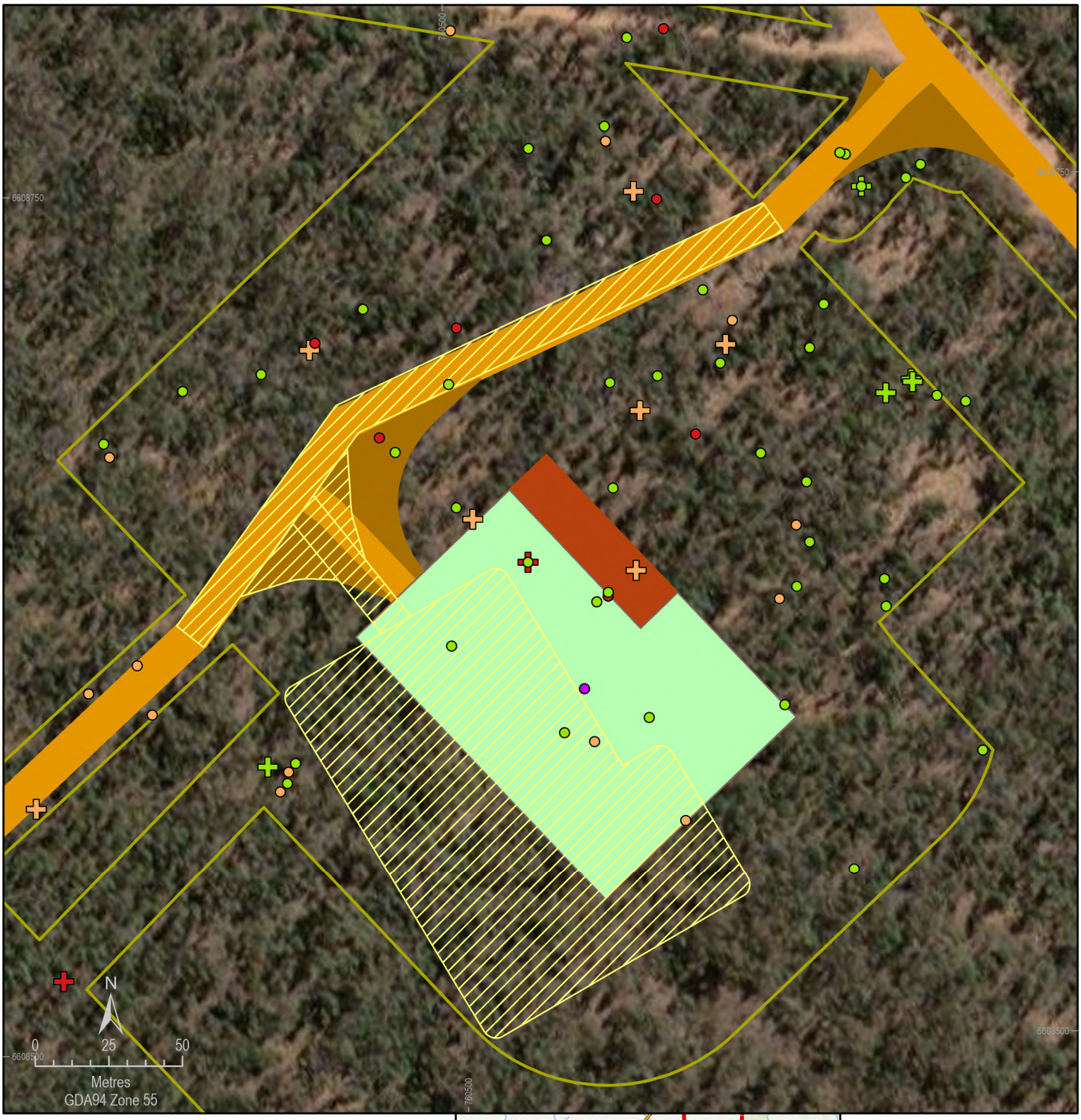


Overview Legend
- NGP boundary
- Leewood
- Bibblewindi
- Consolidated survey area
- Map extent
- Proposed phase 1 wells

ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D5
Dewhurst 37 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

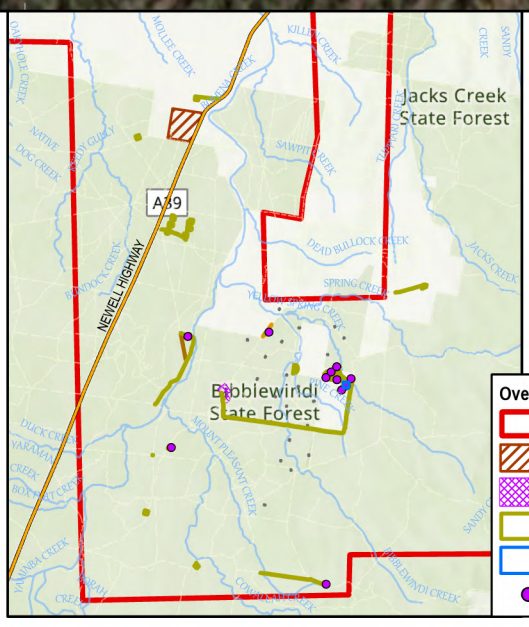
ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

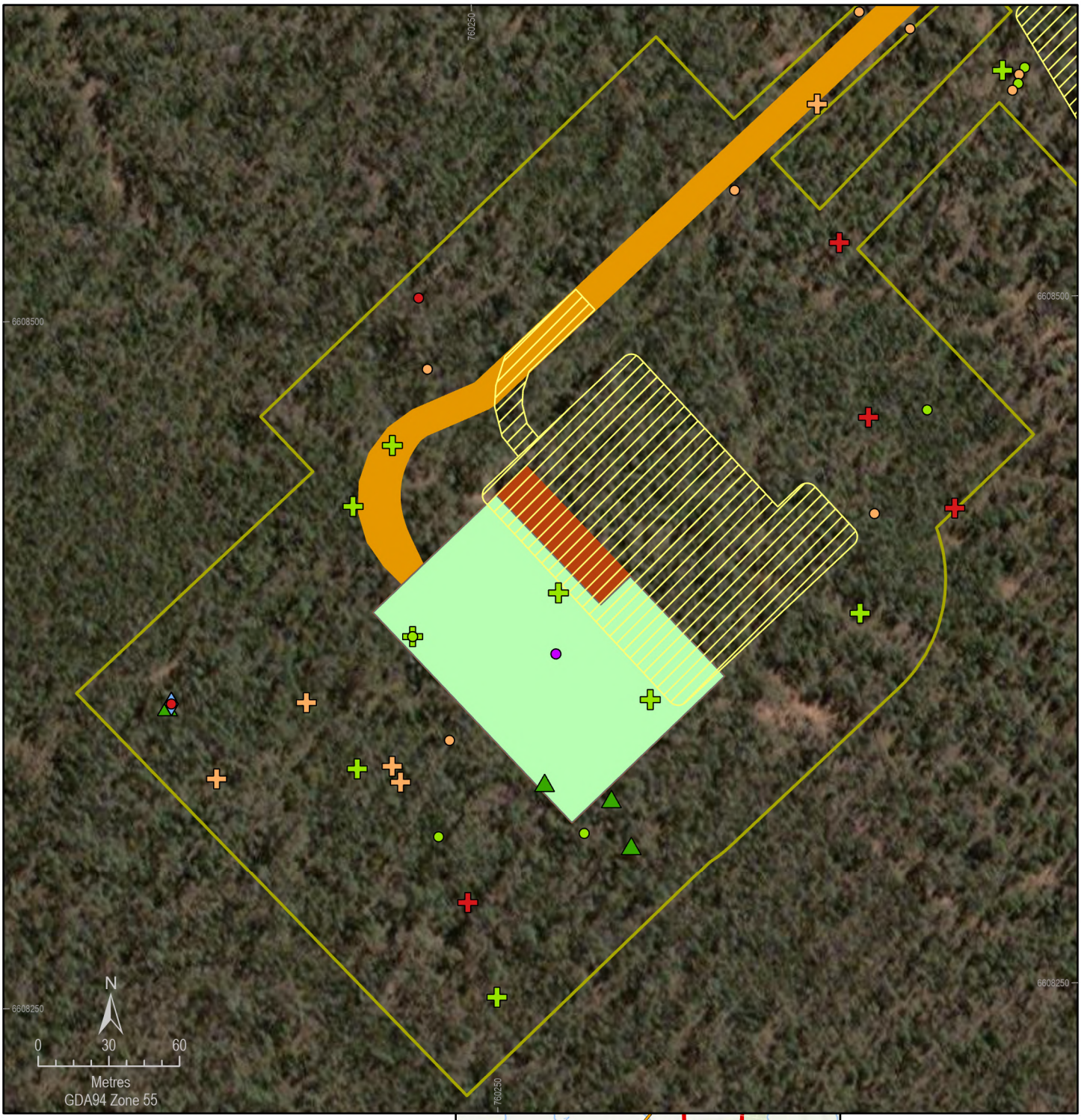


ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D6

Dewhurst 38 Well Pad



Santos

LEGEND

- Consolidated survey area
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

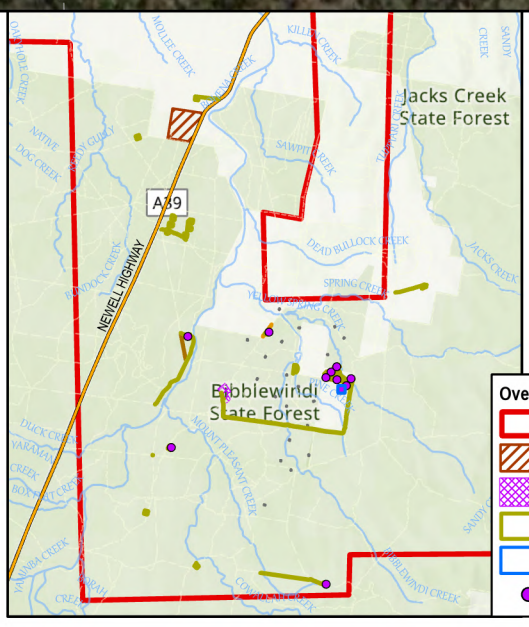
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D7
Dewhurst 39 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

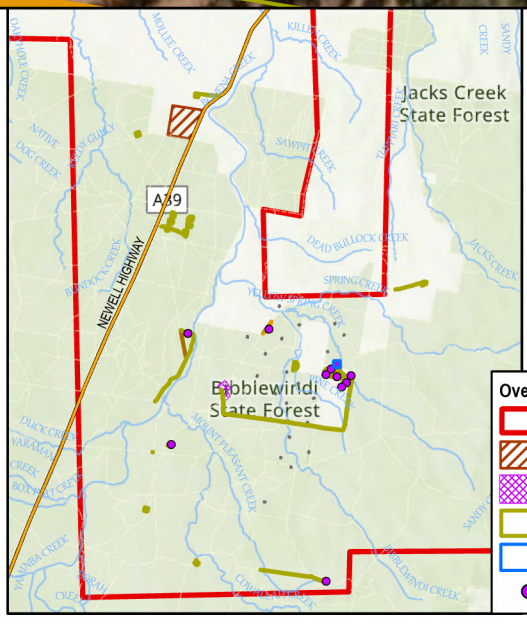
ESF Ranked Features

HBT
- Rank 1
- Rank 2
- Rank 3

Logs
- Rank 1
- Rank 2
- Rank 3

Fauna habitat
- Rank 6

Threatened species
- Rank 6



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D8

Dewhurst 40 Well Pad

Santos

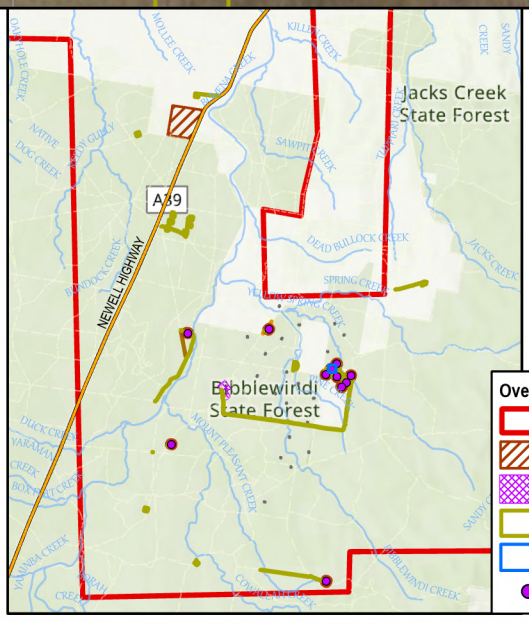
LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

ESF Ranked Features

HBT

- Rank 3



ONWARD CONSULTING

NARRABRI GAS PROJECT

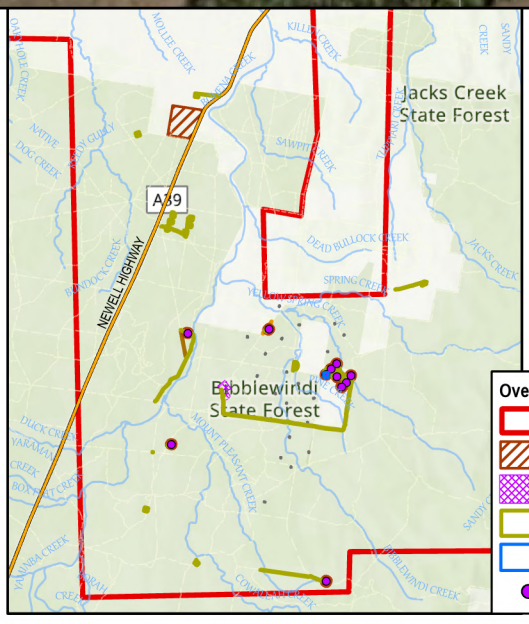
Figure D9

Dewhurst 41 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - preliminary footprint
- Phase 1 well pad - final footprint
- Proposed phase 1 wells
- Roads and tracks



ONWARD CONSULTING

NARRABRI GAS PROJECT

Figure D10
Dewhurst 42 Well Pad

Santos

LEGEND

- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - preliminary footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - final footprint
- Proposed phase 1 wells
- Roads and tracks

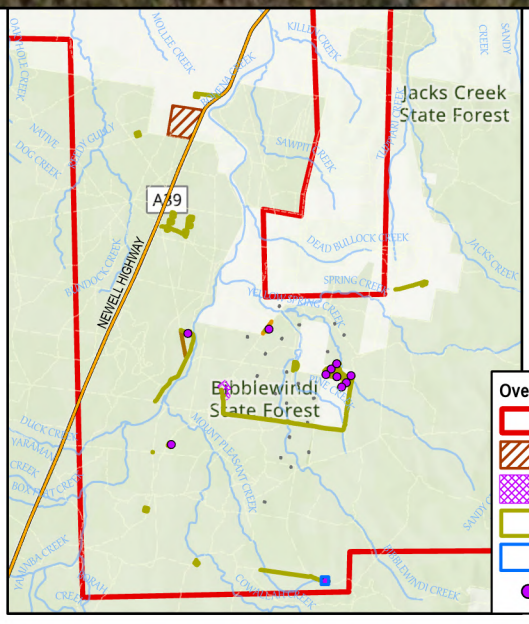
ESF Ranked Features

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 2
- Rank 3



ONWARD CONSULTING

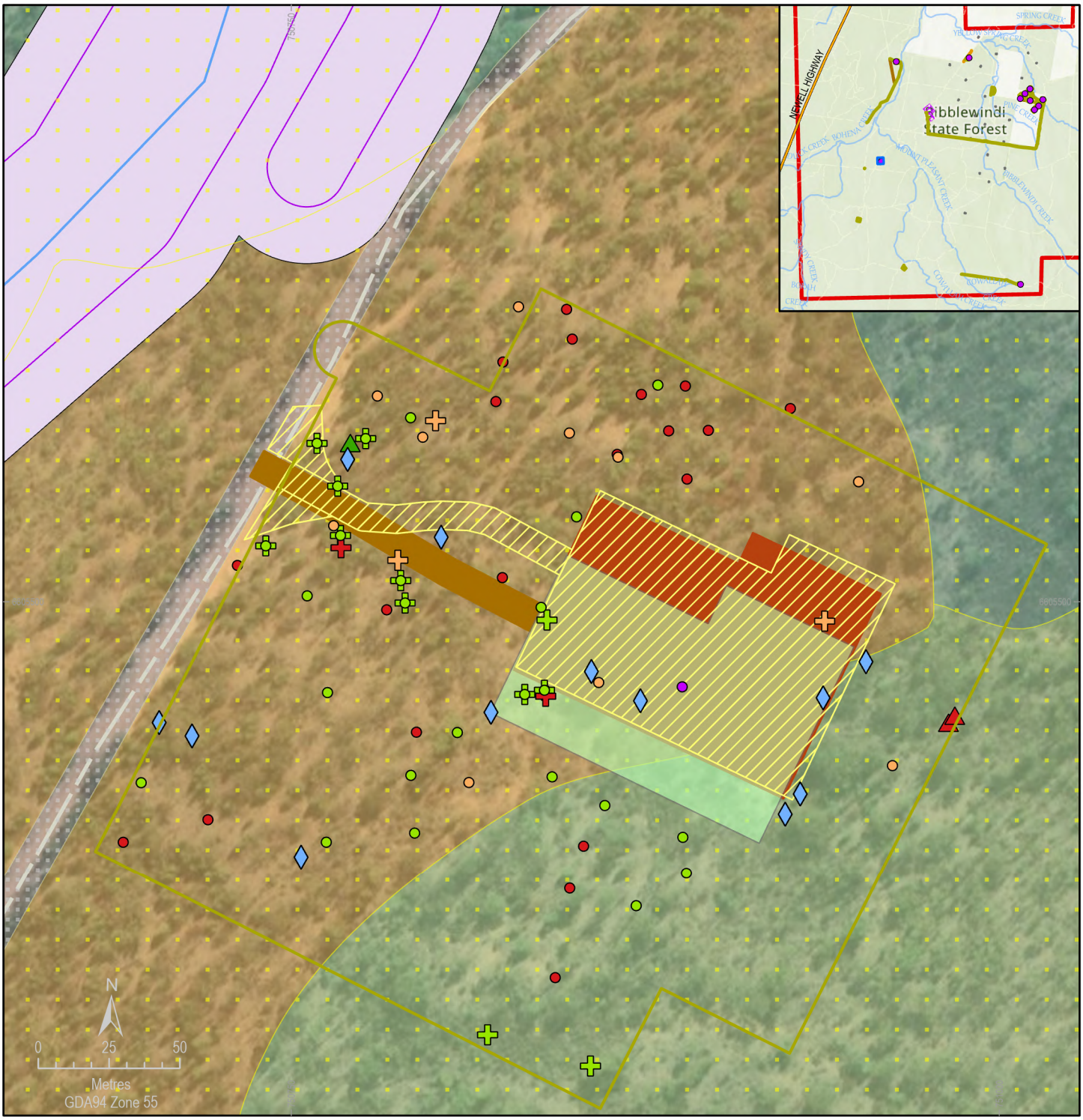
NARRABRI GAS PROJECT

Figure D11
Dewhurst 43 Well Pad

Appendix E - Cultural Heritage Compliance Report

Appendix redacted for confidentiality reasons

Appendix F - Cumulative constraints mapping



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Roads and tracks
- 40 m buffer around 2nd stream order riparian corridor
- Riparian corridors (to scale)
- Strahler stream order 2

Plant community types

- 0
- 398
- 401
- 40X

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6

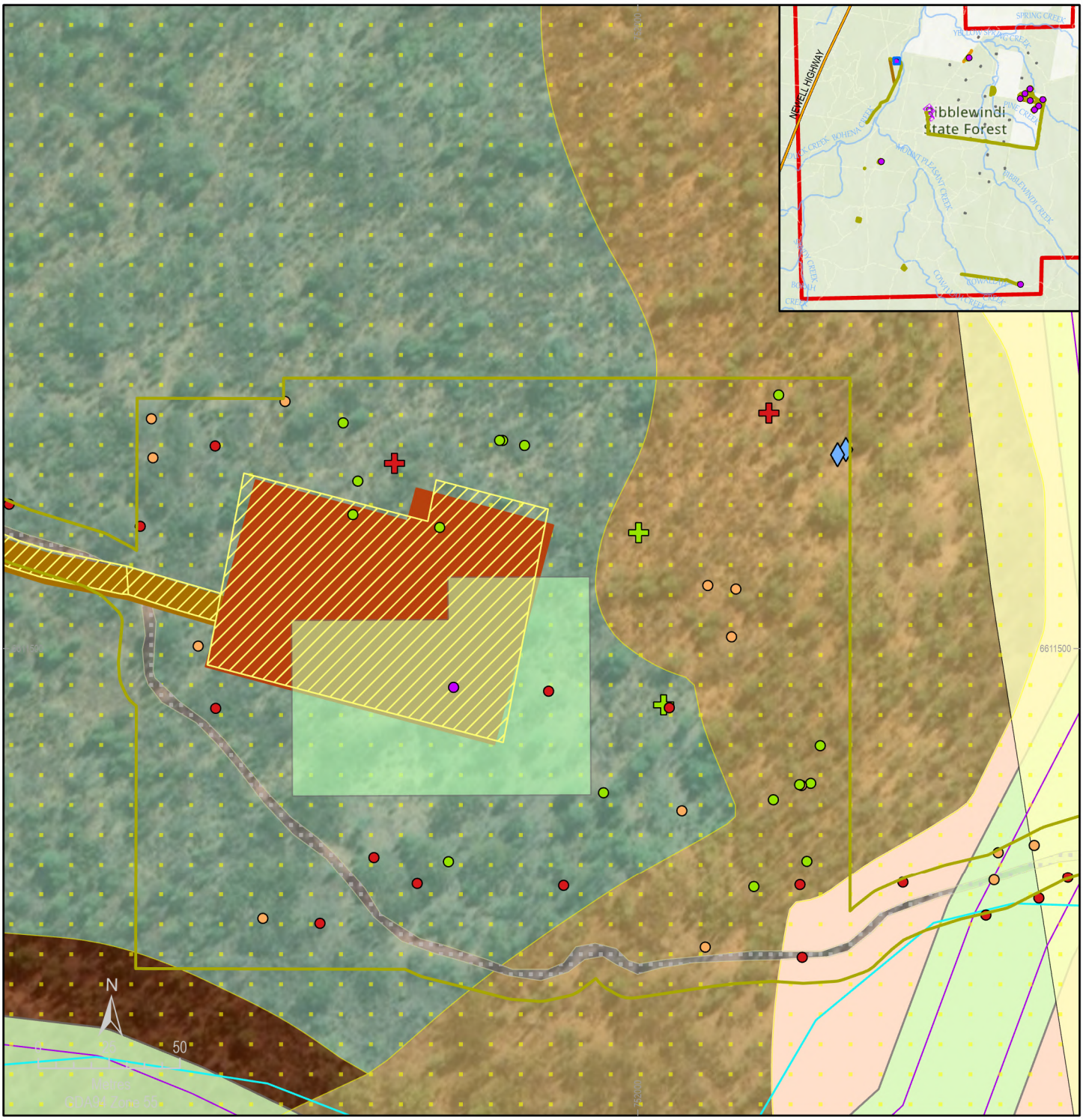
Threatened species

- Rank 1
- Rank 6

NARRABRI GAS PROJECT

Figure F1

Bibblewindi 30 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Riparian corridors (to scale)
- 80m buffer around 4th order and greater riparian corridors
- 20 m buffer around 1st stream order riparian corridor
- Strahler stream order 1

Plant community types

- 0
- 88
- 202
- 401
- 40X

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 3

Fauna habitat

- Rank 6

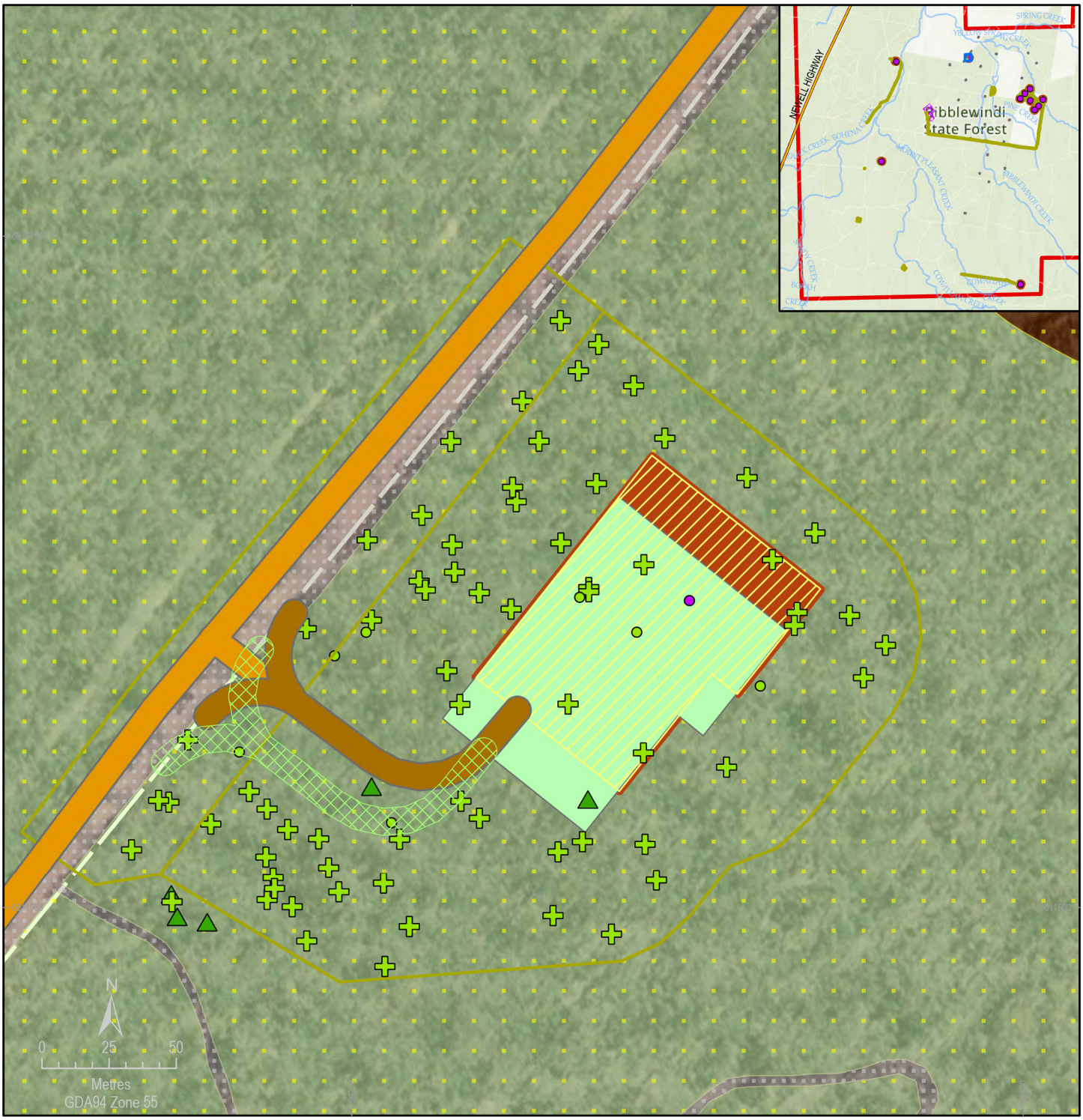
Endangered Ecological Communities

- Fuzzy Box Woodland on alluvial soils of the south western slopes, Darling Riverine Plains and Brigalow Belt South bioregions (202)

NARRABRI GAS PROJECT

Figure F2

Bibblewindi 31 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 access rd - preliminary footprint
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Roads and tracks

Plant community types

- 0
- 88
- 398

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 3

Logs

- Rank 3

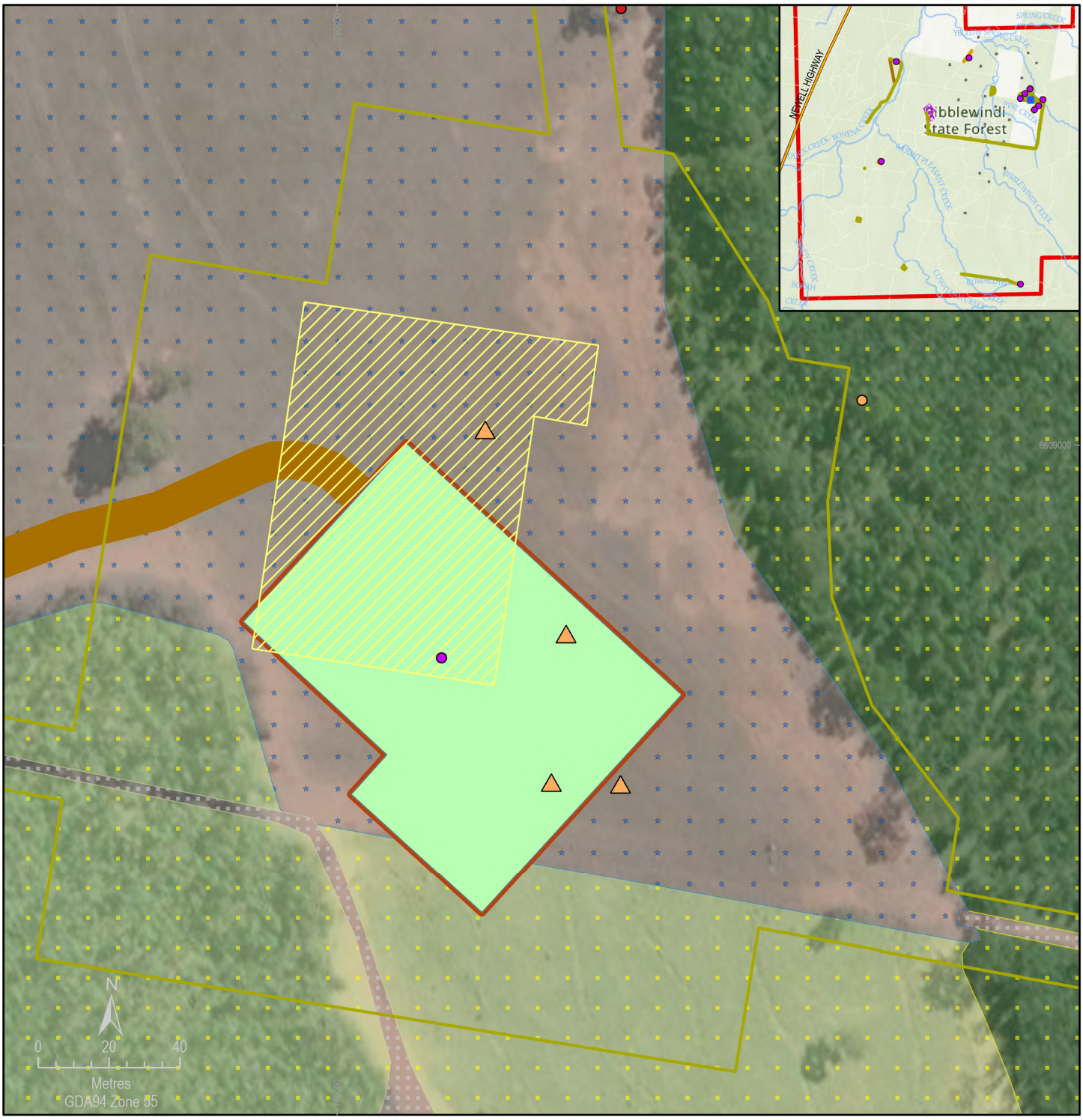
Threatened species

- Rank 6

NARRABRI GAS PROJECT

Figure F3

Dewhurst 34 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells

Plant community types

- 0
- 398
- 408

Land use type

- Native vegetation
- Other - improved Pasture
- Other - cleared

HBT

- Rank 1
- Rank 2

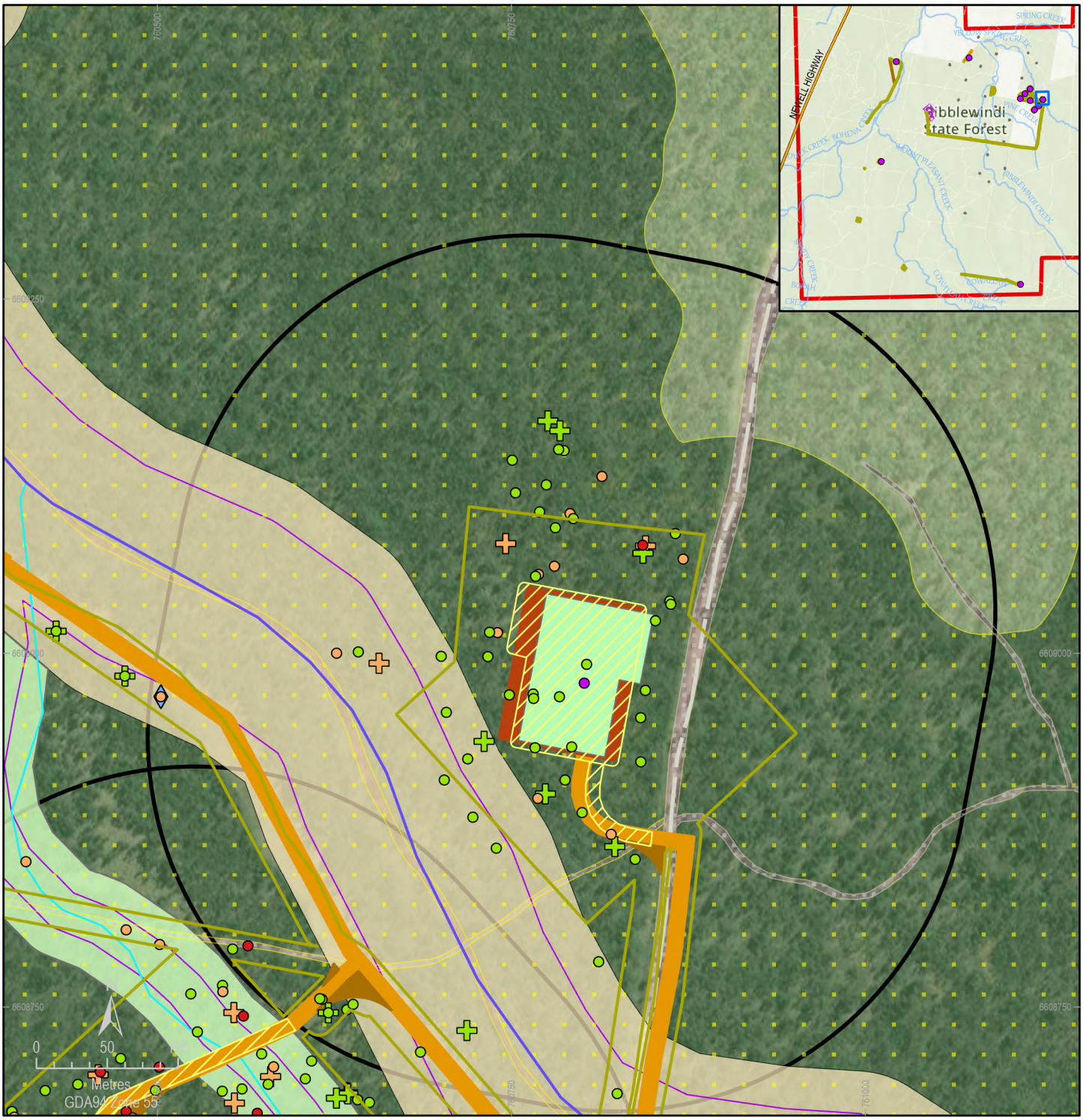
Threatened species

- Rank 2

NARRABRI GAS PROJECT

Figure F4

Dewhurst 35 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads
- Roads and tracks
- 60 m buffer around 3rd stream order riparian corridor
- 20 m buffer around 1st stream order riparian corridor
- Riparian corridors (to scale)
- Strahler stream order 1
- Strahler stream order 3

Plant community types

- 0
- 398
- 399
- 408

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 2
- Rank 3

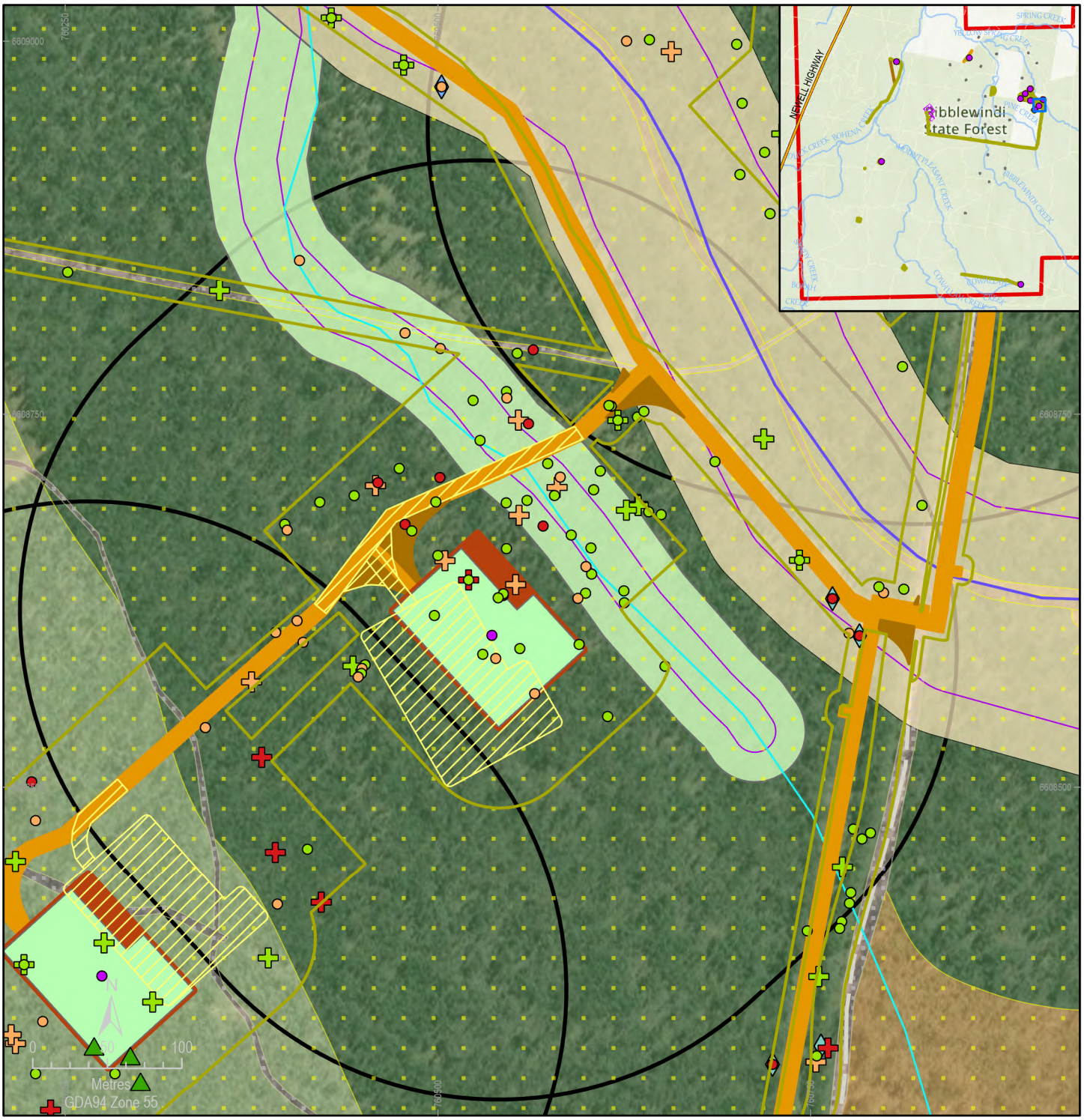
Fauna habitat

- Rank 6

NARRABRI GAS PROJECT

Figure F5

Dewhurst 37 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads
- Roads and tracks
- 60 m buffer around 3rd stream order riparian corridor
- 20 m buffer around 1st stream order riparian corridor
- Riparian corridors (to scale)
- Strahler stream order 1
- Strahler stream order 3

Plant community types

- 0
- 398
- 399
- 401
- 408

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6
- Rank 8

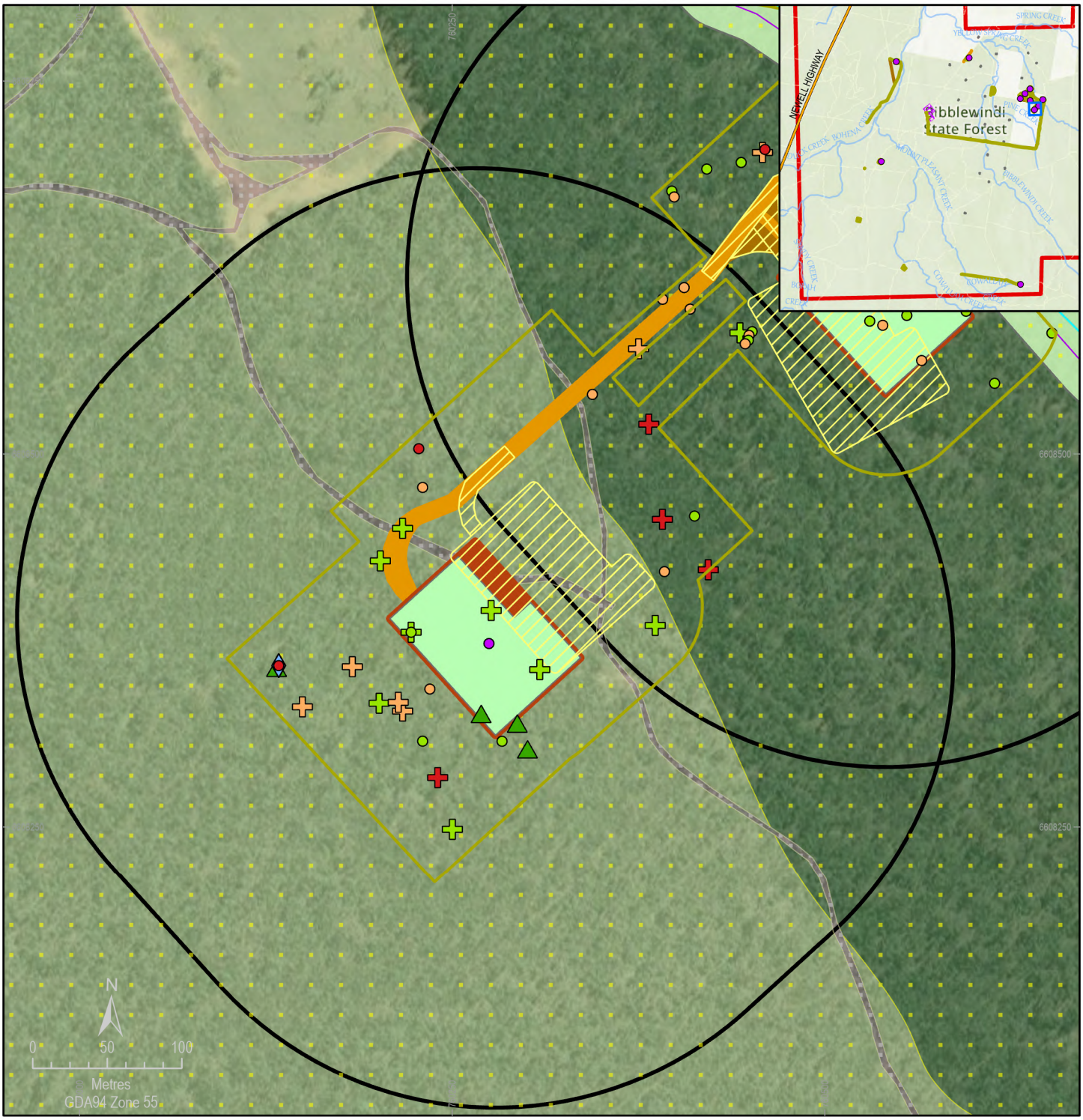
Threatened species

- Rank 6

NARRABRI GAS PROJECT

Figure F6

Dewhurst 38 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads
- 20 m buffer around 1st stream order riparian corridor
- Riparian corridors (to scale)
- Strahler stream order 1

Plant community types

- 0
- 398
- 408

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6

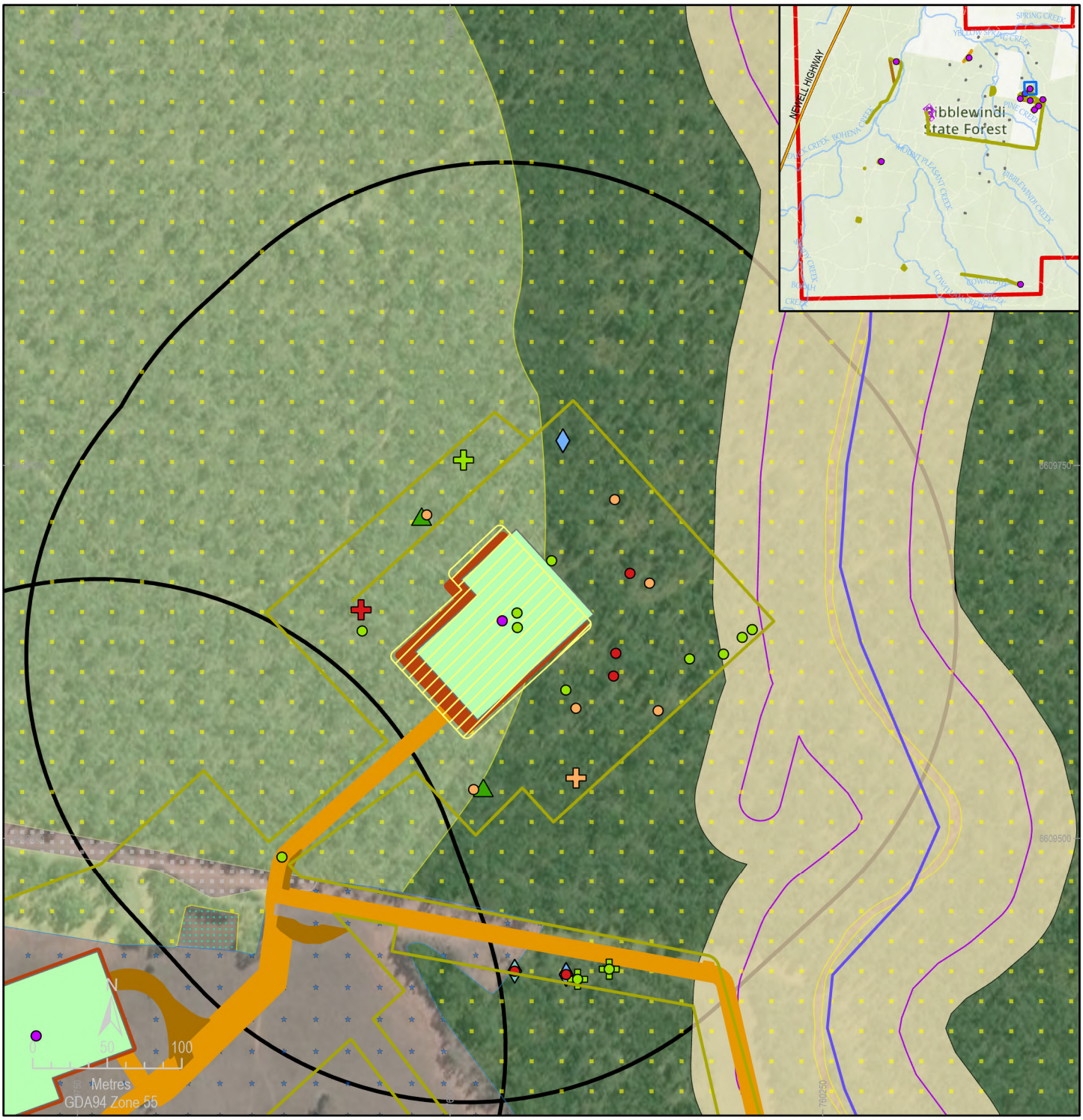
Threatened species

- Rank 6

NARRABRI GAS PROJECT

Figure F7

Dewhurst 39 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads
- 60 m buffer around 3rd stream order riparian corridor
- Riparian corridors (to scale)
- Strahler stream order 3

Plant community types

- 0
- 398
- 399
- 408

Land use type

- Native vegetation
- Other - improved Pasture
- Other - dam
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6
- Rank 8

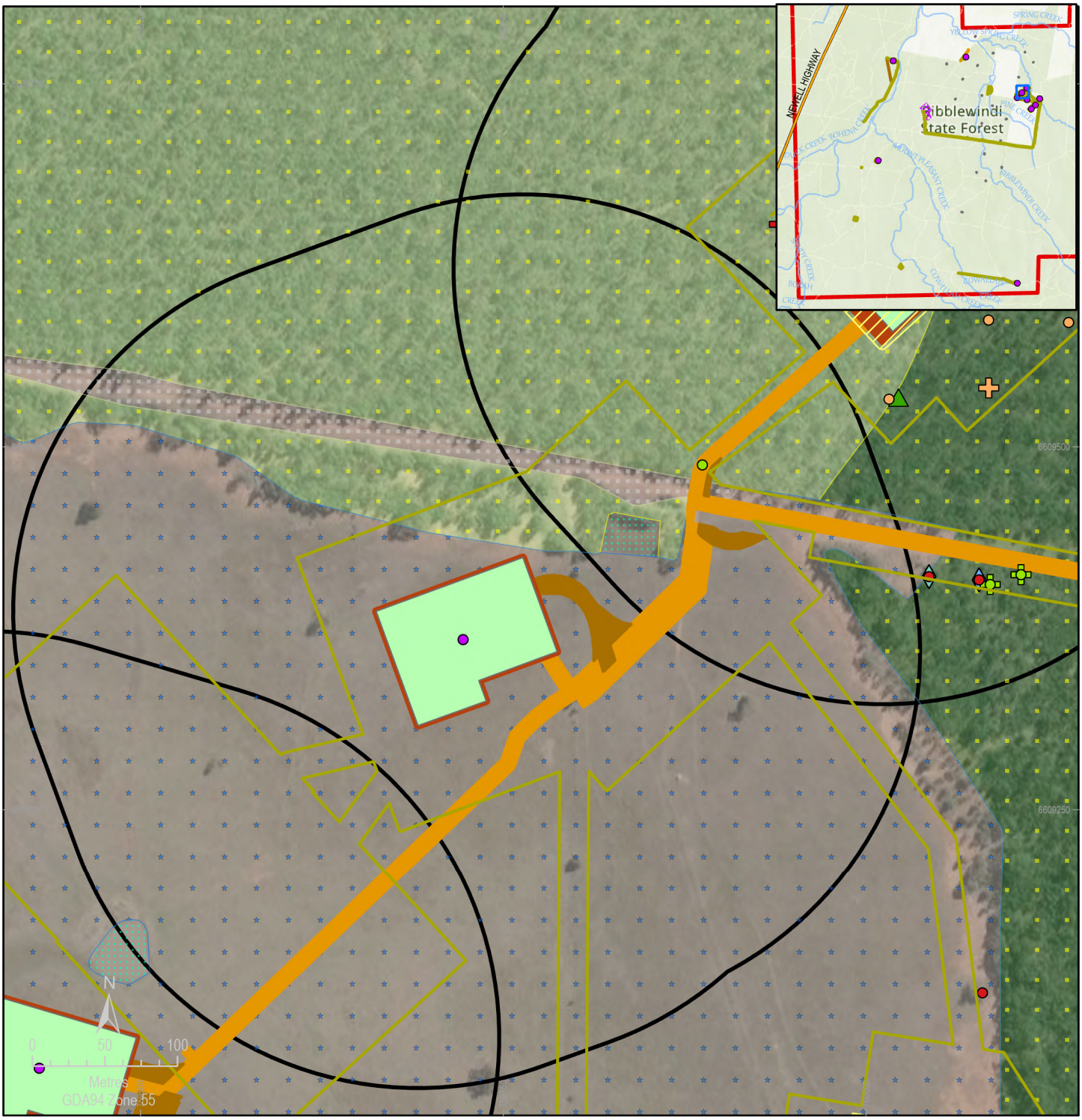
Threatened species

- Rank 6

NARRABRI GAS PROJECT

Figure F8

Dewhurst 40 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads

Plant community types

- 0
- 398
- 408

Land use type

- Native vegetation
- Other - improved Pasture
- Other - dam
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 1
- Rank 2
- Rank 3

Fauna habitat

- Rank 6
- Rank 8

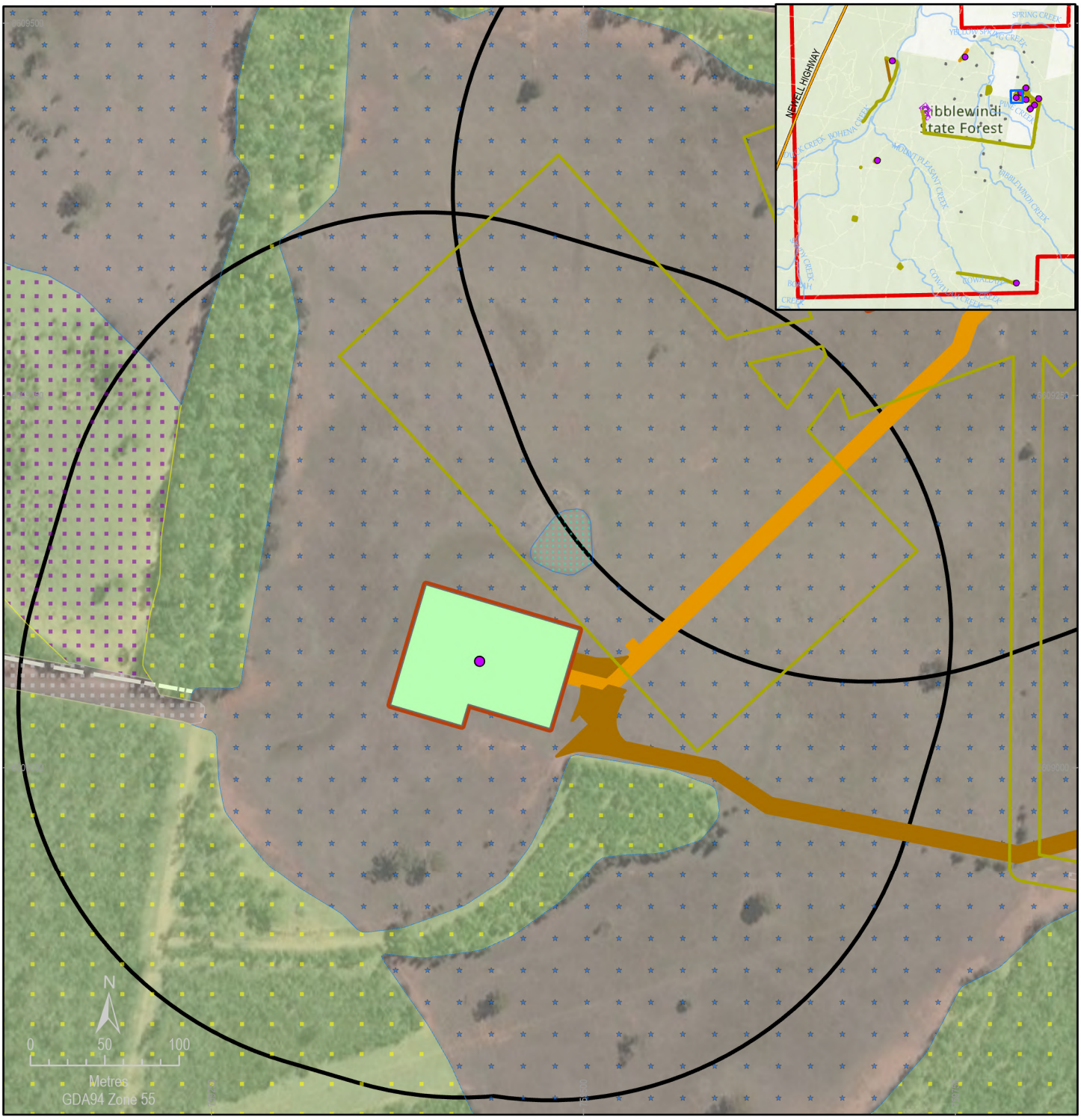
Threatened species

- Rank 6

NARRABRI GAS PROJECT

Figure F9

Dewhurst 41 Constraints



Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 flowlines
- Phase 1 well pads - final footprint
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- 250m buffer around pilot well pads
- Roads and tracks

Plant community types

- 0
- 398

Land use type

- Derived native grassland
- Native vegetation
- Other - improved Pasture
- Other - dam
- Other - cleared

NARRABRI GAS PROJECT

Figure F10

Dewhurst 42 Constraints

Santos

ONWARD CONSULTING

LEGEND

- NGP boundary
- Map extent
- Bibblewindi
- Consolidated survey area
- Phase 1 access roads
- Phase 1 well pads - final footprint
- Phase 1 well pads - proposed infrastructure footprint adjustments
- Phase 1 well pads - preliminary footprint
- Proposed phase 1 wells
- Roads and tracks

Plant community types

- 0
- 404
- 405

Land use type

- Native vegetation
- Other - cleared

HBT

- Rank 1
- Rank 2
- Rank 3

Logs

- Rank 2
- Rank 3

NARRABRI GAS PROJECT

Figure F11

Dewhurst 43 Constraints

Appendix G - Trigger action response plans

Biodiversity - trigger action response plan

Biodiversity variable	Trigger	Response
Biodiversity		
Noise causes a decline in ecosystem function	First monitoring event: Significant difference (95% confidence interval) between treatments (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index. Second and subsequent monitoring event: Significant difference (95% confidence interval) between medians of paired differences in treatments between years (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index, diurnal bird or microbat species richness.	Investigate whether noise impacts could be responsible for the difference measured at impact sites. Review the implementation of existing controls and as necessary identify additional controls (e.g. redesign of generator insulation to reduce noise). Develop a program to implement the additional controls and review monitoring results. Review BMP and monitoring program for improvement opportunities.
Light spill causes a decline in ecosystem function	First monitoring event: Significant difference (95% confidence interval) between treatments (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index. Second and subsequent monitoring event: Significant difference (95% confidence interval) between paired differences in treatments between years (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index, diurnal bird or microbat species richness..	Investigate whether light spill impacts could be responsible for the difference measured at impact sites. Review the implementation of existing controls and as necessary identify additional controls (e.g., reduced lighting at well pads, installation of filters on lights around well infrastructure). Develop a program to implement the additional controls and review monitoring results. Review BMP and monitoring program for improvement opportunities.
Traffic causes a decline in ecosystem function	First monitoring event: Significant difference (95% confidence interval) between treatments (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index. Second and subsequent monitoring event: Significant difference (95% confidence interval) between paired differences in treatments between years (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index , diurnal bird or microbat species richness..	Investigate whether noise impacts could be responsible for the difference measured at impact sites. Review the implementation of existing controls and as necessary identify additional controls (e.g., further limitation on frequency of vehicular access to well pads to the periphery of the development area, further reduce speed limits on well pad access roads, particularly for infrequently accessed areas). Develop a program to implement the additional controls and review monitoring results. Review BMP and monitoring program for improvement opportunities.
Fragmentation causes a decline in vegetation condition	First monitoring event: Significant difference (95% confidence interval) between treatments (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index. Second and subsequent monitoring event: Significant difference (95% confidence interval) between paired differences in treatments between years (Impact-Control, Impact-Reference, check Control-Reference) of at least one soundscape index , diurnal bird or microbat species richness. OR decrease of 10 or greater in VI score at any individual impact site in the absence of a similar decline at the paired control site.	Investigate the most likely indirect impact(s) responsible for the difference. This may include for example monitoring of additional survey plots in indirect impact area to determine if differences are localised rather than indicative of systemic change in condition in area. After determining the most likely indirect impact(s), develop and enact plan to ameliorate or remediate in consultation with relevant government department. Review BMP and monitoring program for improvement opportunities.
Pest plant and animals		
Previously undetected priority weed or alert species	Identification of previously undetected species listed as priority weeds in the North West Local Land Services Regional Strategic Weed Management Plan at monitoring sites, or as part of routine or opportunistic site inspections	Immediately notify Environment Advisor in writing, i.e. email. Obtain sample and provide to suitably qualified individual (e.g. Project Ecologist), the National Herbarium of New South Wales or similar institute for confirmation of species identification (if required). Report to Narrabri Shire Council weeds officer or authorised official for further escalation as necessary, e.g. to regional weed committee or relevant NSW government department. Prioritise for eradication or control. Approach may require coordination with other relevant stakeholders. Note: Emergency response may be initiated by other agencies, which may include Santos cooperation operationally and/or financially.
Weed infestation spread	Identification of species at monitoring site/s it did not occur at previously, or as part of routine or opportunistic site inspections	Complete and record inspection on Santos approved tool or system and notify the Environmental Advisor in writing. Refer to the pest risk assessment in the Pest Plant and Animal Control Protocol and prioritise according to the Santos pest management hierarchy.

Biodiversity variable	Trigger	Response
New pest animal in area	Identification of pest species not previously detected, as listed in section 4.4, at monitoring sites, or as part of routine or opportunistic site inspections	Complete and record inspection on Santos approved tool or system and notify the Environmental Advisor in writing. Review and report sighting using appropriate method from the Pest Plant and Animal Control Protocol. Document notification.
Increase in population or sightings of previously detected pest animal	Significantly higher number of pest animal detections at impact sites compared to control and / or reference sites in a monitoring event.	Complete and record inspection on Santos approved tool or system and notify the Environmental Advisor in writing. Investigate species and coordinate targeted controls depending on species involved.

Rehabilitation - trigger action response plan

Completion criteria	Aspect	Trigger / response	Green	Amber	Red	Responsibility
Rehabilitated areas are free draining except where specific water management structures have been constructed and to be retained with the final land use. Structures in place will not be undermined in the long term	Landform drainage and stability	T	Monitoring indicates rehabilitated landforms are free draining and stable	Monitoring indicates rehabilitated landforms are exhibiting minor drainage or stability issues.	Monitoring indicates rehabilitated landforms are exhibiting significant drainage or stability issues, threatening or causing rehabilitation failure.	HSER to undertake inspections of any required water infrastructure changes. HSER to engage suitably qualified persons to recommend remediation for water drainage or stability issues.
		R	No response required. Continue monitoring program.	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to address issues. Remediate as appropriate.	Suitably trained person to undertake a review of the drainage design or stability issues and provide recommendations to appropriately remediate the area. Remediate as soon as practicable. Liaison with appropriate regulatory authorities including the Resources Regulator.	
Appropriate bushfire hazard controls have been implemented in accordance with the FMP and any advice from relevant authorities	Bushfire management	T	Monitoring indicates fuel loads and fire breaks have been maintained and there is firefighting access across rehabilitation areas and water resources available for fighting fires.	Monitoring indicates fuel loads and fire breaks have not been maintained. In the event of a fire, this would result in firefighters not being able to access the site or water resources.	A fire on site damages rehabilitated areas.	HSER and/or Project Manager to coordinate maintenance of fire trails and/or reduction in fuel loads. HSER to update Bush Fire Management Plan.
		R	No response required. Continue monitoring program.	Reduce fuel loads and ensure access tracks are cleared. Inspect water sources are and ensure sufficient water is available.	Review and update (if required) the Bush Fire Management Plan to ensure monitoring and maintenance is completed for fuel loads and access tracks. Liaison with appropriate regulatory authorities including the NSW Rural Fire Service.	
Aboriginal cultural heritage sites remain demarcated / protected or salvaged in accordance with the ACHMP	Cultural Heritage	T	Monitoring or auditing shows all CH sites identified and managed in accordance with the ACHMP	Monitoring or auditing shows CH sites identified but not protected or artefacts not salvaged in accordance with the ACHMP on a single occasion	Monitoring or auditing shows CH sites identified but not protected or artefacts not salvaged in accordance with the ACHMP on more than one occasion	HSER to coordinate response in conjunction with the Aboriginal Cultural Heritage Advisory Group
		R	No Action required	Undertake investigation in accordance with ACHMP. Conduct toolbox talk.	Review all procedures related to protection of cultural heritage and training and make changes as required. Ensure additional training is conducted before work resumes.	
There are no active erosion features (greater than 200mm depth or width) or visible sedimentation issues that compromise land capability or the intended final land use	Erosion	T	No gully or tunnel erosion. No rilling present.	Minor gully or tunnel erosion present and/or rilling <200mm deep.	Significant active gully or tunnel erosion present and/or rilling >200mm deep.	HSER to engage a suitably trained person to undertake necessary inspections and remediation actions.
		R	No response required. Continue monitoring program.	An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable. Liaison with appropriate regulatory authorities including the Resources Regulator.	
The quality and quantity of water used within the project area conforms to the performance criteria established in the WMP	Surface water quality	T	Water quality of surface runoff or produced water used on site is within performance criteria established within the WMP.	Water quality of surface runoff or produced water used on site exceeds performance criteria established within the WMP but does not indicate a long-term rehabilitation issue	Water quality of surface runoff or produced water used on site exceeds performance criteria established within the WMP and indicates a significant or long-term issue.	HSER to undertake inspections of any required water infrastructure or land management changes.

Completion criteria	Aspect	Trigger / response	Green	Amber	Red	Responsibility
		R	No response required. Continue monitoring program.	Review and investigation of water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Reporting as per all statutory reporting requirements. Implement relevant responses and undertake immediate review to determine source of issues and implement remediation measures identified as soon as practicable. Liaison with appropriate regulatory authorities including the Resources Regulator and BCS.	
Disturbance has been restricted to the delineated area and no stockpiling of equipment, machinery, soil or vegetation has occurred beyond this boundary.	Rehabilitation timeframes	T	Monitoring or auditing shows disturbance has occurred within delineated boundary and habitat resources salvaged	Monitoring or auditing shows accidental disturbance within delineated boundary or habitat resources lost on a single occasion	Monitoring or auditing shows accidental disturbance within delineated boundary or habitat resources lost on more than three occasions	HSER to coordinate response and engage ecologists where necessary to recommend remediation options.
		R	No action required	Additional disturbance remediated within 3 months. Conduct Toolbox talks	Additional disturbance remediated within 3 months. Review pre-clearing and clearing procedure and review method for marking the limited of disturbed areas and implement changes as required. Conduct additional training.	
Topsoils and subsoils stripped during the construction of infrastructure have been stockpiled, managed, and used for final rehabilitation to the greatest extent possible	Soil management	T	Monitoring indicates topsoil/subsoil stockpiles are free of weed species	Monitoring indicates >10% but <25% cover of undesirable species present in topsoil stockpile vegetation cover	Monitoring indicates >25% cover of undesirable species present in topsoil stockpile vegetation cover	HSER to coordinate weed management personnel (either inhouse or contract).
		R	No response required. Continue monitoring stockpiles for weed presence.	Review monitoring records to identify the nature of the weeds present and recommendations from monitoring report. Employ weed management practices if required.	Engage a weed management contractor to remove noxious and problematic weeds from the site as soon as practicable. Investigate cover crop species to minimise the emergence of undesirable weed species. Liaison with appropriate regulatory authorities including the Resources Regulator and BCS.	
Disturbed areas no longer required for mining-related operations have been rehabilitated as soon as practicable to ensure that the total area of disturbance is minimised.	Rehabilitation within timeframes	T	Monitoring and auditing shows that after infrastructure decommissioning, rehabilitation objectives are being met within the timeframes outlined in this document for the relevant domain.	Monitoring and auditing shows that after infrastructure decommissioning, rehabilitation objectives have not been met within the timeframes outlined in this document for the relevant domain on one occasion.	Monitoring and auditing shows that after infrastructure decommissioning, rehabilitation objectives have not been met within the timeframes outlined in this document for the relevant domain on several occasions.	HSER to coordinate response to occurrences.

Completion criteria	Aspect	Trigger / response	Green	Amber	Red	Responsibility
		R	No response required. Continue monitoring program.	Once notified, investigate rehabilitation status for the occurrence and devise a plan to achieve missed objectives as soon as practicable. Once achieved, continue monitoring program.	Once notified, investigate rehabilitation status for the occurrence and devise a plan to achieve missed objectives as soon as practicable. Once achieved, continue monitoring program. Review procedures and practices to determine the reasons for rehabilitation timeframes not being met. Provide recommendations and conduct additional training if required.	
Native plant species richness in rehabilitated areas is on a trajectory towards reference sites	Native Ecosystem (Domain 1-3) species composition	T	Following revegetation to woodland, the number of native plant species for each form group is at least: 25% of local reference site average in the short (0-5 years) and medium term (5-15 years); 75% of local reference site average in the long term (>15- 25 years)	Following revegetation to woodland, the number of native plant species for each form group is: >10 but <25% of local reference site average in the short (0-5 years) and medium term (5-15 years); >50 but <75% of local reference site average in the long term (>15-25 years).	Following revegetation to woodland, the number of native plant species for each form group is at least: <10% of local reference site average in the medium term (5-15 years); <50% of local reference site average in the long term (>15-25 years).	HSER to obtain advice from an ecological consultant.
		R	No response required. Continue monitoring program.	Review native seed mix and amend accordingly. Consider remedial actions such as tubestock planting or re-seeding to achieve required species composition.	An inspection of the site will be undertaken by a suitably trained person. Investigate remedial options to achieve required species composition. Liaison with appropriate regulatory authorities including the Resources Regulator and BCS.	
Canopy cover, midstory cover and groundcover is comparable to reference sites	Species cover	T	Following revegetation to woodland, total cover for each form group in rehabilitated areas is: >10% of local reference site average in the medium term (0- 5 years); >20% of local reference site average in the medium term (5- 15 years); >50% of local reference site average in the long term (>15- 25 years).	Following revegetation to woodland, total cover for each form group in rehabilitated areas is: <10% of local reference site average in the short term (0-5 years); >10% but< 20% of local reference site average in the medium term (5-15 years); >25% but <50% of local reference site average in the long term (>15-25 years).	Following revegetation to woodland, total cover for each form group in rehabilitated areas is: <10% of local reference site average in the medium term (5-15 years); <25% of local reference site average in the long term (>15-25 years).	HSER to obtain advice from an ecological consultant.
		R	No response required. Continue monitoring program.	Review rehabilitation procedures where required to increase vegetation cover	A suitably trained person to inspect the site. Investigate use of appropriate management options to remediate. Remediate as appropriate. Liaison with appropriate regulatory authorities including the Resources Regulator and BCS.	

Completion criteria	Aspect	Trigger / response	Green	Amber	Red	Responsibility
There are no significant weed infestations and weed presence is no greater in rehabilitated areas than at reference sites	Weed occurrence	T	Monitoring indicates there are no priority weeds present in pasture, and no priority weeds or high threat exotic weeds in woodland. Monitoring indicates that weed cover is no greater than at reference sites	Monitoring indicates there are priority weeds present in pasture, or priority weeds or high threat exotic weeds in woodland, and/or that weed cover is up to 25% greater than of that at reference sites.	Monitoring indicates there are priority weeds present in pasture, or priority weeds or high threat exotic weeds in woodland, and/or that weed cover is more than 25% greater than that at reference sites	HSER to coordinate weed management personnel (either inhouse or contract).
		R	No response required. Continue monitoring program.	Review monitoring report to identify the nature of the weeds present and recommendations from monitoring report. Engage a weed management contractor to remove noxious and problematic weeds if required.	Engage a weed management contractor to remove noxious and problematic weeds from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate. Liaison with appropriate regulatory authorities including the Resources Regulator and BCS.	
Feral and pest animal species are controlled in accordance with relevant legislation and the Pest Plan	Pest Management	T	Monitoring records indicate that feral and pest animal species are controlled in accordance with relevant legislation and do not present a risk to rehabilitation.	Monitoring records indicate that one feral and/or pest animal species is not being controlled in accordance with relevant legislation and/or presents a risk to rehabilitation.	Monitoring records indicate that more than one feral and pest animal species are not being controlled in accordance with relevant legislation and/or present a risk to rehabilitation.	HSER to coordinate pest animal management personnel (either inhouse or contract).
		R	No response required. Continue monitoring program.	Review pest animal monitoring report and consider recommendations. Engage a pest animal control contractor to re- establish compliance with relevant legislation or to remove risk to rehabilitation.	Review pest animal monitoring report and consider recommendations. Engage a pest animal control contractor to re- establish compliance with relevant legislation or to remove risk to rehabilitation.	
Monitoring verifies that the number of trees with hollows that are visible from the ground increases to at least 50% of local reference site average in the long term	Habitat feature establishment	T	In native ecosystem land uses, from 15 years after rehabilitation, the number of hollow bearing trees and fallen logs >10cm in diameter is > 50% of that at reference sites	In native ecosystem land uses, from 15 years after rehabilitation, the number of hollow bearing trees and fallen logs >10cm in diameter is >25% but <50% of that at reference sites	In native ecosystem land uses, from 15 years after rehabilitation, the number of hollow bearing trees and fallen logs >10cm in diameter is <25% of that at reference sites	HSER to engage an ecologist if necessary and coordinate response.
		R	No response required. Continue monitoring program.	Review other vegetation indicators and assess if vegetation community is not conforming in any other criteria. If not, engage an ecologist to review the site. Continue monitoring program.	Engage an ecologist to review the site and recommend remedial actions or conduct additional assessment, if necessary. Continue monitoring program.	
Rehabilitation reconnects habitat where it has been fragmented by the Project	Habitat connectivity	T	Monitoring indicates corridors are successfully established and consistent with the desired vegetation community composition and are suitable for fauna species movement.	Habitat corridors are successfully established and consistent with the desired vegetation community composition however are not suitable for fauna species movement (size, habitat complexity)	Monitoring indicates that vegetation corridors do not contain the desired vegetation community composition and are not likely to become suitable for the movement of fauna species.	HSER to seek advice from an ecologist.
		R	No response required. Continue monitoring program.	Investigate whether sufficient habitat features (rock piles, felled hollow bearing trees, nest boxes etc.) are available and have been incorporated into the corridors. Undertake remedial action if necessary.	Engage ecologist to recommend remedial rehabilitation works such as additional planting or seeding, soil amelioration, or weed reduction. Ensure sufficient habitat features are available for fauna. Liaison with appropriate regulatory authorities including BCS.	

Completion criteria	Aspect	Trigger / response	Green	Amber	Red	Responsibility
Pasture species mix establishment in rehabilitated areas is representative of analogue sites	Agricultural land (Domain 4) species composition	T	From two years following revegetation to grassland, species composition in pasture consists of >75% of those within the reference site or which are suitable for grazing	From two years following revegetation to grassland, species composition in pasture consists of >50% but <75% of those within the reference site or which are suitable for grazing	From two years following revegetation to grassland, species composition in pasture consists of <505% of those within the reference site or which are suitable for grazing	HSER to seek advice from an agronomist.
		R	No response required. Continue monitoring program.	Investigate additional weeding and re-seeding where required and ensure that the seed mix utilised is consistent with desired species composition.	An inspection of the site will be undertaken by a suitably trained person. Investigate remedial options to achieve required species composition. Liaison with appropriate regulatory authorities including the Resources Regulator.	
Vegetative cover in rehabilitated areas is representative of analogue sites	Agricultural land (Domain 4) ground cover	T	From twelve months following the revegetation of pasture, ground cover is >75% of local reference site average.	From twelve months following the revegetation of pasture, ground cover is >50% but <75% of local reference site average.	From twelve months following the revegetation of pasture, ground cover is <50% of local reference site average.	HSER to seek advice from an agronomist.
		R	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	An inspection of the site will be undertaken by a suitably trained person. Investigate use of appropriate management options to remediate. Remediate as appropriate. Liaison with appropriate regulatory authorities including the Resources Regulator, Local Land Services and BCS.	
There are no bare patches of ground in rehabilitated areas	Bare Ground Occurrences	T	No bare patches of rehabilitation indicating poor soil/spoil quality.	Some small patches of bare ground, or poor vegetation growth indicating a potential issue with soil quality.	Large areas (>400 m^2) of bare ground, or poor vegetation growth indicating a potential issue with soil quality.	HSER (in conjunction with specialist external consultant, if necessary) to determine root cause of poor vegetative outcomes. HSER to arrange any necessary soil rework.
		R	No response required. Continue monitoring program.	Conduct investigation and take samples of soil to determine the need for ameliorants or other management options.	Engage a consultant to assist with recommendations to appropriately remediate soil quality and depth. Remediate as soon as practicable. Liaison with appropriate regulatory authorities including the Resources Regulator, and BCS.	

Site Water Balance – trigger action response plan

Trigger Level	Characteristics of Level	Relevant performance measure	Actions	Action by	Notification
NORMAL	≤75% Maximum operating volume treated water storage Beneficial re-use options available for treated water disposal	• Maximise water recycling, reuse and sharing opportunities • Maximise beneficial reuse of treated water • Minimise the need for discharge of treated water to Bohena Creek	• No remedial action necessary	NA	• N/A
LEVEL 1	≤85% Maximum operating volume treated water storage One or more beneficial reuse/water disposal option unavailable, e.g. irrigation impractical due to heavy rainfall.	• Maximise water recycling, reuse and sharing opportunities • Maximise beneficial reuse of treated water • Minimise the need for discharge of treated water to Bohena Creek	• Review field production strategy • During wet season (October to February) shut-in field if necessary • Develop an appropriate remedial solution or other water reduction strategies. • Weekly review meeting	Field Supervisor	**Internal** • Water Management Review Team • Site Operators • Field Production Team
LEVEL 2	≤95% Maximum operating volume treated water storage	• Maximise water recycling, reuse and sharing opportunities • Maximise beneficial reuse of treated water • Minimise the need for discharge of treated water to Bohena Creek	• Shut-in field PW production / stop the flow of water into the pond/cell • ENSW GM notification • Finalise and implement water reduction strategy as per Level 1 • Advise EPA and DPE • Increase review meeting frequency to daily	Operations Manager	**Internal** • Water Management Review Team • Site Operators • Field Production Team • ENSW GM **External** • EPA, DPE, relevant land holders
UNACCEPTABLE	> 100% Maximum operating volume treated water storage Water is being released to the environment	• Maximise water recycling, reuse and sharing opportunities • Maximise beneficial reuse of treated water • Minimise the need for discharge of treated water to Bohena Creek	• Activate IMT • Execute mitigation and spill containment strategies as appropriate • Adopt contingency measures from Level 2 • Daily WQ sampling (including receiving environment) and reporting • Implement Pollution Incident Response Management Plan • Daily review meeting	Operations Manager	**Internal** • Water Management Review Team • Site Operators • Field Production Team • IMT • ENSW GM **External** • EPA and other agencies as required under the PIRMP

Attachment 1 - Public Safety Management Plan

Santos

NARRABRI GAS PROJECT

Public Safety Management Plan

PHASE 1

0041-150-PLA-0025

Date	Revision	Reason for Issue	Author	Checked	Approved
11 November 2022	0A	For consultation	Onward Consulting	[redacted]	[redacted]

Acronyms and Abbreviations

Acronym	Description
AS/NZS	Australian Standard/New Zealand Standard
BOM	Australian Bureau of Meteorology
CCC	Community Consultative Committee
CoC	Conditions of consent for the NGP SSD 6456
CSG	coal seam gas
DPE	The NSW Department of Planning and Environment
DPE Water	The Water Group within DPE
DPIE	The former NSW Department of Planning, Industry and Environment
EMP	environmental management plan
EMS	Environmental Management Strategy
EIS	environmental impact statement
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	environment protection licence under the POEO Act
ERP	NGP Emergency Response Plan
ESD	emergency shutdown
FCNSW	Forestry Corporation of NSW
GIS	geographical information systems
ha	hectare
HAZOP	Hazard and Operability Study
HDPE	high density polyethylene
HSER	health, safety, environment and risk
kg	kilogram
kg/ha	kilograms per hectare
L	litre
LNG	liquefied natural gas
m	metre
m^2	square metre
m^3	cubic metre
ML	megalitre
ML/day	megalitre per day
ML/y	megalitre per year
mm	millimetre
PAL	petroleum assessment lease under the PO Act
PEL	petroleum exploration licence under the PO Act

Acronym	Description
PHA	preliminary hazards analysis
PO Act	*Petroleum (Onshore) Act 1991* (NSW)
POP	Petroleum Operations Plan (for PAL 2)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
POEO Regulation	Protection of the Environment Operations (General) Regulation 2022
PPL	petroleum production lease under the PO Act
PPLA	petroleum production lease application under the PO Act
PSMP	Public Safety Management Plan
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SMS	Santos Safety Management System
UHF	ultra-high frequency
VHF	very high frequency
WHS Act	*Work, Health and Safety Act 2011* (NSW)
WHS Regulation	Work Health and Safety Regulation 2017
WHS MPS Act	*Work Health and Safety (Mines and Petroleum Sites) Act 2013* (NSW)
WHS MPS Regulation	WHS (Mines and Petroleum Sites) Regulation 2022

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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 Tintsfield 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 various 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. The Project area covers about 950 square kilometres (95,000 hectares) in size and the Project footprint will only directly impact about 1% of that area.

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:

- Tintsfield 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 treatment plant 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;
- 1 deep reservoir monitoring bore (converted corehole);
- 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.

The full definitions of the approved activities for Phases 2, 3 and 4 of the Project are provided in the consent. Further details regarding the staging of the works and the exact scope for each are as approved in the Field Development Plan (**FDP**).

1.2 Scope and purpose

This Public Safety Management Plan (**PSMP**) has been developed in accordance with the requirements of the CoC and provides details on the management and mitigation of risks to public safety during construction and operation of the full Project development to minimise any harm to members of the public.

This Plan is prepared prior to the construction of any gas field infrastructure to complement and as an attachment to the FDP, to the satisfaction of the Planning Secretary. It outlines the obligations in relation to managing public safety and how all reasonable and feasible measures, as appropriate, will be implemented to prevent, mitigate or minimise public safety risks that may result from the proposed Phase 1 activities. The relevant consent conditions are provided in full in section 3.1.3.

The PSMP has been developed in accordance with the requirements of the SSD 6456 conditions of consent (**CoC**) B4(h)(i), B5 and B6. The PSMP forms part of an existing framework of safety management plans under the Santos Safety Management System (**SMS**) that are applicable to the NGP. The objective of the PSMP is to provide for the adequate management of public safety and access within the Project Area.

As required by CoC B6, Santos will implement the latest revision of this Plan once approved by the Planning Secretary.

1.3 Preparation of this Plan

This Plan has been prepared by Mr. Servaes van der Meulen and Mr. Mark Vile of Onward Consulting Pty Ltd, who are accomplished environmental professionals with more than 20 years' experience each. Considering their individual and combined industry experience and expertise, both Servaes and Mark are deemed to be suitably qualified and experienced for the preparation of this Public Safety Management Plan as part of the FDP, as required by CoC B4(a). Development support was provided by Santos Project HSER personnel.

1.4 Consultation

As required by CoC B4(h)(i), this PSMP has been prepared in consultation with the NSW Rural Fire Service (**RFS**), the Forestry Corporation of NSW (**FCNSW**) and NSW Health.

Comments received from RFS were related to information/orientation sessions, which will be organised by Santos once Phase 1 has commenced. The comments provided by FCNSW were related to future discussions with Santos regarding the resolution process around Santos and public access requirements; and the use of security cameras in the forest.

No response was received from NSW Health, with efforts by both Santos and DPE to expedite consultation feedback not successful.

Records of consultation and responses to all comments are provided in Appendix A.

1.5 Structure of this Plan

The structure of this PSMP is as follows:

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 NGP, including consultants, contractors and their subcontractors

Section 3 — Outlines the statutory provisions relevant to the public safety management

Section 4 — Describes and details the public safety risks and management measures

Section 5 — Provides an overview of the emergency response process, and the suite of relevant NGP documents

Section 6	Details the incident, non-compliances and complaints management processes required under the consent
Section 7	Describes the reporting, evaluation and review requirements relevant to this Plan
Section 8	References
Section 9	Glossary
Appendix A	Consultation records
Appendix B	Compliance conditions relevant to this Plan

1.6 Distribution

A copy of the approved PSMP 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 any 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.

Further, a controlled copy of this PSMP 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 PSMP 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 will be 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 roles, responsibilities, authorities and accountabilities of all key personnel involved in the environmental management of the Project, including the requirements and obligations in this PSMP. All roles, responsibilities and accountabilities have been assigned in accordance with Santos Management System *SMS-MS_14 People Management Standard*.

3. Regulatory requirements

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 4.1 of Part 4 of the EP&A Act and has been 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 *Petroleum (Onshore) Act 1991* (NSW) (**PO Act**) and relevant codes of practice and guidelines outlined below;
- EPL 20350 issued by the EPA and the provisions of the *Protection of the Environment Operations Act 1997* (**POEO Act**);
- *Work Health and Safety Act 2011* (NSW);
- Work Health and Safety Regulation 2017 (NSW);
- *Work Health and Safety (Mines and Petroleum Sites) Act 2013* (NSW);
- Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW); and
- the conditions of consent for the NGP SSD 6456.

3.1 Compliance conditions

Compliance conditions associated with the following licence(s), lease(s) and consent(s) are or may be relevant to this Plan:

- 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; and
- SSD 6456.

3.1.1 PEL 238

There are no specific conditions or obligations in PEL 238 related to public safety or public safety management.

3.1.2 PPL 3 and PAL 2

Lease condition 6 of PPL 3 and PAL 2 is relevant to safety management and states the following:

(a) All operations must be carried out in conformity with the *Schedule of Onshore Petroleum Exploration and Production Safety Requirements* published by the Department of Primary

Industries, as amended from time to time[1]. The Lease holder must prepare a Safety Management Plan in accordance with the Schedule.

(b) The design, fabrication, installation, inspection, testing, operation and maintenance of all gas gathering pipelines shall conform to the appropriate Australian Standards. Technical records, inspection reports and the results of any tests must be made available to an inspector on request.

These requirements are not relevant to this PSMP, however they are fully addressed in the NGP Safety Management Plan and the Petroleum Operations Plan (**POP**) for PAL 2 which has been approved by the Resources Regulator.

3.1.3 Development Consent SSD 6456

A number of SSD 6456 consent conditions are either directly or indirectly applicable to the PSMP. The key conditions are B4(h)(i) and B77, which are provided below. Table B1 in Appendix B specifies where each of the requirements of all the consent conditions relevant to this PSMP are addressed.

Consent condition B4 states that prior to the construction of any gas field infrastructure, Santos must prepare a Field Development Plan for the relevant gas field infrastructure to the satisfaction of the Planning Secretary. This plan must:

(a) be prepared by a suitably qualified and experienced person/s;

(b) be prepared in consultation with the:

(i) EPA, DPE Water, BCS, Resources Regulator and Council;

(ii) owners of land not owned by Santos, upon which gas field infrastructure is proposed to be located;

(iii) Community Consultative Committee;

(iv) Water Technical Advisory Group;

(v) Greenhouse Gas Emissions Advisory Group;

(vi) Aboriginal Cultural Heritage Advisory Group;

(vii) Biodiversity Advisory Group;

……

(h) include a:

(i) Public Safety Management Plan (this plan), prepared in consultation with RFS, FCNSW and NSW Health, to ensure public safety and manage access in the project area, including verification of minimum safe separation distances between all potentially hazardous facilities

Consent condition B77 states that Santos must ensure that storage, handling, and transport of:

(a) dangerous goods is done in accordance with the relevant Australian Standards and guidelines, particularly *AS1940 and AS1596*, the *Dangerous Goods Code*, and the EPA's *Storing and Handling of Liquids: Environmental Protection – Participants Manual*; and

(b) any explosives are managed in accordance with the requirements of the Resources Regulator.

[1] On 1 February 2016, the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 replaced the operation of the *Schedule of Onshore Petroleum Exploration and Production Safety Requirements* under the *Petroleum (Onshore) Act 1991*.

3.1.4 WHS legislation

The *WHS (Mines and Petroleum Sites) Act 2013* (**WHS MPS Act**)) and the WHS (Mines and Petroleum Sites) Regulation 2022 (**WHS MPS Regulation**) apply to all petroleum sites. A petroleum site is a workplace at which petroleum operations are carried out and includes any fixtures, fittings, plant or structures at the workplace that are used, or were formerly used, for petroleum operations.

These laws, together with the *Work Health and Safety Act 2011* (**WHS Act**) and the Work Health and Safety Regulation 2017 (**WHS Regulation**), regulate health and safety at workplaces where petroleum operations are carried out in NSW.

The Santos Safety Management System and related management plans and documents (refer to Figure 1.1) contain detailed descriptions of the relevant NSW WHS legislation and as such this has not been further addressed in this Plan.

3.2 Relevant codes, standards, policies and guidelines

3.2.1 Dangerous Goods Code

The *Australian Code for the Transport of Dangerous Goods by Road & Rail* (NTC, 2020) (the **Dangerous Goods Code**) sets out the requirements for transporting dangerous goods by road and rail.

The Dangerous Goods Code only sets out requirements and guidelines relating to the transport of explosives and radioactive materials where these goods are transported together with other dangerous goods, or where the dangerous goods have a subsidiary hazard of another class. For completeness and international uniformity, the Dangerous Goods Code includes the full Dangerous Goods List and the classification criteria for all classes and divisions of dangerous goods.

Note that the Dangerous Goods Code does not contain any provisions relating to usage, storage or security of these goods.

3.2.2 Australian Standard / New Zealand Standard

Australian Standard / New Zealand Standard (**AS/NZS**) 1940:2017 - *The storage and handling of flammable and combustible liquids* provides requirements for the planning, design, construction, and safe operation of all installations in which flammable or combustible liquids are stored or handled. In separate sections it deals with minor storage, package storage and handling, storage in tanks, fuel dispensing, piping and tank auxiliaries, operations and fire protection facilities. Appendices deal with tank venting, combustion characteristics, fire exposure protection, gas-freeing precautions and principles, and power station and grid transformers.

AS/NZS 1596:2014 - *The storage and handling of LP Gas* sets out requirements and recommendations for the safe storage and handling of liquified petroleum (LP) gas, in cylinders and bulk tanks. It sets out requirements for design, construction, commissioning and operation of installations for the storage and handling of LP Gas. Separate sections deal with above-ground and underground tanks, piping systems, cylinders and their locations, automotive filling installations, and operations. Appendices cover emergency plans, refuelling, fire protection, impact protection, leakage testing, hazardous areas, driver instructions and the transport and location of exchange cylinders.

3.3 EIS commitments

In 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 public safety management have been listed Table 3.1, 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.

Table 3.1 - EIS commitments relevant to public safety

Number	EIS commitment relevant to public safety	Section reference
16.1	A Bushfire Management Plan will be implemented.	Refer to the Fire Management Plan
16.2	Signage will be installed in accordance with Australian standards to alert of underground infrastructure.	Section 4.4.1
16.3	All facilities will be designed and operated under the applicable Australian safety standards and protocols.	Section 3.2
16.4	Dangerous goods will be stored and transported in accordance with the Australian Dangerous Goods Code.	Section 4.3
16.5	Chemicals will be stored and handled in accordance with relevant Australian Standards, including AS 1940-2004[2] - *The storage and handling of flammable and combustible liquids*.	Section 4.3 Refer also to the PIRMP
16.6	Refuelling will occur with suitable containment when volumes greater than 50 litres are involved and not within 40 metres of a watercourse.	Section 4.3.1
16.7	Class 3 Packing Group III Flammable Liquids will be stored appropriate distances from site boundaries.	Section 4.3

As described in section 7 of this Plan and section 8 of the EMS, this Plan will be subject to regular evaluation and review. This will include the EIS commitments to ensure they remain current, applicable, and generally improve the environmental performance of the Project.

[2] Note that AS/NZS 1940 was updated in 2017.

4. Public safety risks and management measures

This Plan will not consider risks associated with produced water, treated water or brine storage as these have been considered in the Produced Water Management Plan, the Surface Water Management Plan and the Dam Safety Emergency Plan. The latter forms as part of the Pollution Incident Response Management Plan. Note also that prior to Phase 2, Santos will prepare a Fire Safety Study, a Hazard and Operability Study (**HAZOP**), a Final Hazard Analysis, a Construction Safety Study and a Pipeline Safety Management Study as required under consent condition B72.

The management measures considered in this section have the goal of managing access to operational areas of the NGP and ensuring public safety. The major risks to public safety identified in the EIS and in other risk assessments throughout the development of the Project are:

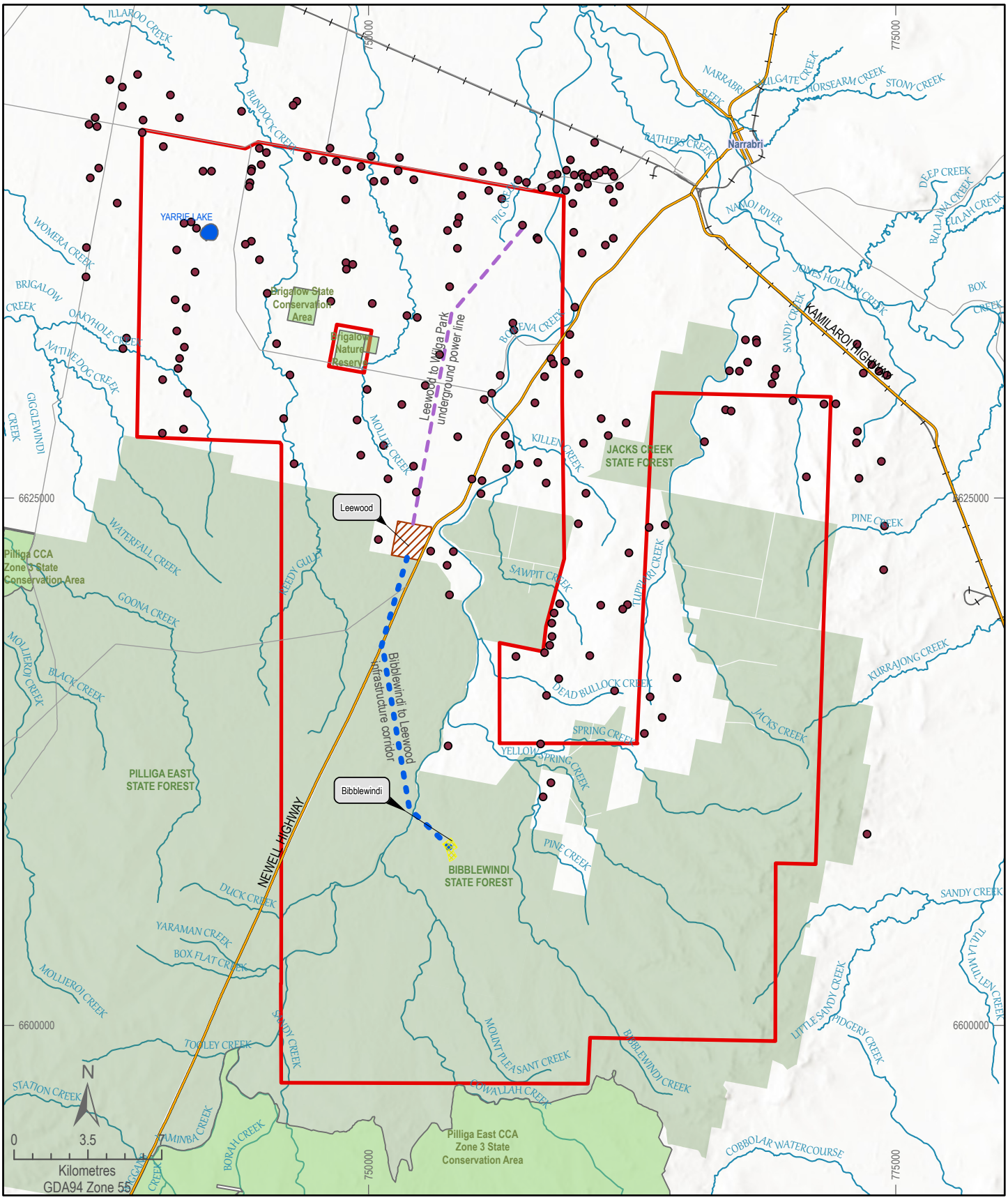
- bushfire;
- site security management;
- transport and handling of dangerous goods; and
- loss of gas containment leading to an explosion or fire.

There are 114 sensitive receivers within the Project area which are all dwellings, except for the University of Sydney Cosmic Ray Field Station. The closest sensitive receivers to the Bibblewindi and Leewood facilities are shown in Figure 4.1 and the distances from the two facilities are summarised in Table 4.1.

Table 4.1 - Sensitive receivers in proximity to the Bibblewindi and Leewood facilities

Sensitive receptor	Distance from (m)		Lot	Plan	Easting	Northing
	Leewood	Bibblewindi				
217	350	> 5000	2	DP 771141	752947	6622483
216	750	> 5000	62	DP 804736	750465	6623033
189	1333	> 5000	1	DP 623250	754023	6622462
191	1351	> 5000	2	DP 623250	753725.4	6621811
182	1513	> 5000	4	DP 757097	752266.9	6625285
179	2064	> 5000	183	DP 814965	750922.1	6625912
192	2229	> 5000	3	DP 623250	753839.5	6620410
172	2698	> 5000	185	DP 814965	752133	6626511
183	2838	> 5000	5	DP 843278	755332.2	6625208
177	2982	> 5000	5	DP 790376	754902.9	6625901
178	3259	> 5000		DP 232897	755380.8	6625826
169	3589	> 5000	17	DP 757084	749633.3	6627032
167	3656	> 5000	182	DP 814965	750712.5	6627495
163	4458	> 5000	161	DP 802977	754230.7	6627905
173	4518	> 5000	22	DP 746781	756542.9	6626399
214	> 5000	4969	4	DP 757126	758278.2	6610833
212	8930	4784	35	DP 757087	753772.8	6613249

Note: Refer to EIS Appendix S for specific details on the residence numbering and locations.



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LEGEND

- NGP boundary
- Leewood
- Bibblewindi
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor
- Sensitive receivers
- Highway
- Major roads
- Railway
- Watercourse
- State Forest
- Parks and reserves
- Lakes and dams

NARRABRI GAS PROJECT

Figure 4.1

Sensitive Receivers Within Three Kilometres of the Project Area

4.1 Bushfire

The risk of a bushfire igniting from a Project-related activity and impacting on life and property has been assessed for both the construction and operational stages of the Project. Project-related activities which, if not mitigated, may have the potential to generate an ignition that would result in a bushfire. Examples include untended vegetation around pilot flares, hot works, vehicles /machinery driving through long grass and / or accidental ignitions (such as from cigarettes).

These potential ignitions would need to coincide with a period of elevated fire danger (such as a hot dry windy day) and would have to be initiated in contravention of current process, procedures and contract requirements.

The Fire Management Plan has been developed to ensure the implementation of proactive and preventative actions to reduce, so far as reasonably practicable, risks associated with bushfire events including, but not limited to:

- loss of life or major injuries;
- loss of or damage to production infrastructure or property;
- damage to other infrastructure;
- damage to the environment;
- disruption to activities/ impact of business continuity; and
- loss of stock from surrounding pastoral leases

Certain activities are conducted throughout the year to mitigate the bushfire risk. A summary of these risks is presented in Table 4.2 below. For full details on bushfire management strategy and management measures refer to the Fire Management Plan.

Table 4.2 - Fire management planning table

Activity	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Assess asset protection zones				■								
Assess seasonal fuel hazard risks		■	■	■	■							
Map hazard reduction burning, grazing, grading, mulching program.			■	■	■							
Map required fire break maintenance					■							
Update maps emergency response use					■	■						
Review field signage (water points & relevant roads) and replace as necessary				■	■							
Detail a budget for implementation	■											
Update contact lists					■	■						
Implement hazard reduction program					■	■						
Review / update fire competency training		■	■									
Check and service equipment						■	■					
Declare fire season								■				
Monitor and communicate	■						■	■	■	■	■	■
Pre-fire season meeting with STO representative(s), FCNSW and RFS							■					

The NGP Emergency Response Plan[3] (**ERP**) contains a bushfire situation checklist, similar to Table 4.3 below, designed to enable all personnel to respond to a bushfire. Depending on the category of the fire certain actions are mandated in the checklist in order to mitigate potential safety impacts. For full details of emergency response procedures to bushfire including guidelines for surviving a 'burn over' refer to the Fire Management Plan.

[3] The current approved ERP is dated October 2018, and is in the process of being updated. An Emergency Plan, as required by CoC B74, will be prepared prior to the commencement of Phase 2.

Table 4.3 - Bushfire situation checklist

All personnel	
• If you start a fire and can put it out with a beater or fire extinguisher do so (category 1 fire) • If the fire is larger than a few square metres, flame height greater than 0.3m, or the fire is gaining on you, do not attempt to extinguish it, stop and report fire immediately to the On Scene Commander (category 2+ fire)	
If you observe a fire or smoke, or are responding to a category 2 fire (as above) raise the alarm, providing as much information on the fire as possible including: • time of reporting the fire • location of the fire and any distinguishing landmarks • approximate size of the fire and / or height of the flames • the speed that it is moving and in what direction • whether it is contained or likely to spread • the approximate wind speed and direction • the nature of the vegetation and terrain the fire is in • the nature of the vegetation and terrain where it might spread to • any sites in close proximity to the fire	
If unsafe to remain in your location due to fire heading your way, go to the nearest Major Refuge Point	
If unable to get to a Major Refuge Point, take actions to prepare your vehicle for a burnover	
On-Scene Commander	
• Verify fire details and estimate fire category using the Fire Management Plan • Notify the Fire Management Coordinator and advise the GLNG USO[4] Emergency Commander • Provide SITREP to Emergency Commander • Establish an exclusion zone if practicable • Handover role to the Fire Management Coordinator or delegate upon arrival at emergency scene	
Emergency Commander	
Coordinate movement of personnel to safe refuges: • major refuges (i.e.major infrastructure, town) • minor refuges (i.e. flat open ground - grassland as predominant vegetation within 100 mm of the site, site cleared - mineral earth or burnt ground, minimum 30-40 m separation from any intact vegetative fuel as per the Fire Management Plan) • Activate Incident Management Team as required	
Note: The Fire Management Plan outlines all other required actions to be taken in a bushfire emergency with NSW Operations.	

[4] GLNG USO - Gladstone LNG Upstream Operations

4.1.1 Management measures

The following measures will be implemented to mitigate the potential impacts to public safety from bushfire:

- instruction of NGP's emergency response procedures is provided to all NGP personnel in their induction process and in ongoing training;
- a Fire Management Plan is maintained;
- Santos currently maintains emergency response and safety plans for current operations. These will be updated to incorporate any new site or operational areas;
- Santos assurance process will maintain and monitor the implementation and effectiveness of the Fire Management Plan to ensure all mitigation measures are employed;
- restrictions to hot works;
- identification of specific asset protection zones and strategic fire advantage zones around assets where vegetation management is required;
- preparation of an annual works mitigation schedule to identify works required to prepare asset protection, and maintenance to the assets themselves to improve their resilience to bushfires. This may include sealing gaps, installing shielding (such as fencing or window shutters) and using thicker materials in the walls, doors and windows;
- Santos maintains all sites as fuel free areas, complete with gravel bases. Regular inspections are conducted to ensure no re-growth occurs; and
- pilot flares incorporate shielding and a hardened asset protection zone to reduce the potential for accidental ignitions (designed to reduce the likelihood of an ignition to as low as reasonably practicable).

4.2 Site security management

Santos has developed and implemented the NGP Security Management Plan to define the methodology and process for the identification and mitigation of security risks throughout the project. This includes but is not limited to civil works, drilling and completion, development, construction (including pipeline) and production. The NGP Security Management Plan provides specific guidance to enable the establishment, implementation, and maintenance of a consistent security risk management process that shall be applied throughout all operations, works, assets, and infrastructure encompassed under the NGP.

4.2.1 Management measures

Santos has developed an overarching Project Security Risk Assessment. This document intends to provide a holistic baseline project security risk assessment which can be used as a guide for the development of specific subordinate operational or asset security risk assessments as required.

The following management measures will be implemented to mitigate the potential impacts to public safety from security risks:

- apply a three-level security alert approach;
- complete activity/site security assessments for all proposed work locations;
- complete pre-mobilisation security assessments for Project truck movements; and
- maintain base security measures, including:
  - fixed CCTV network that provides coverage of critical infrastructure;

  - mobile trail cameras and trailer mounted cameras that can be relocated to support Project activity;
  - perimeter security around all operational infrastructure in the NGP with locked gates to prevent unauthorised access;
  - access control. Santos has established specific controls for visitors to an NGP Asset. Visitors wishing to access the asset/facility may be issued temporary access and shall be required to be escorted at all times by an authorised NGP employee who has already completed the induction and has been granted access to the relevant security zone. This person shall be responsible for the visitor for the period designated on the visitor's card;
  - alarm systems;
  - security lighting;
  - valve protection.
- perimeter fencing and signage around all operational infrastructure in the NGP. The signage includes:
  - contact information for the NGP;
  - hazard and risk warning; and
  - warnings against trespassing.
- site-specific security assessments for each established NGP asset, including:
  - Wilga Park Power Station;
  - Leewood Water Treatment facility;
  - Bibblewindi Facility;
  - well head sites;
  - Narrabri Operations Centre; and
  - the Narrabri shop front.
- a log of all vehicle movements entering facilities or worksites will be maintained. No visitor or personal vehicles are permitted to be driven on site unless contracted to conduct work. All vehicle parking shall be located within designated parking zones. The following details of non-Santos vehicles will be recorded:
  - driver's name;
  - vehicle make;
  - vehicle model;
  - vehicle colour; and
  - registration number.
- UHF and VHF communication channels on site;
- contracted security personnel at sites of major infrastructure when the security risk requires it;
- security inspections carried out by Narrabri Operations HSER personnel to ensure the security controls detailed within the relevant security risk assessments remain functionally implemented; and
- drills and exercises to test the overall security preparedness.

The protocol for the use of security cameras in State forests, as listed above, will be developed through discussions with FCNSW.

4.3 Transport and handling of dangerous goods

As part of the EIS a preliminary hazard analysis (**PHA**) was prepared for the Project, contained in Appendix S of the EIS. Classes of dangerous goods to be transported to, stored and utilised on the Project were assessed using a risk assessment methodology from the NSW *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development* (now the *State Environmental Planning Policy (Resilience and Hazards) 2021*) The PHA examined well pads, the Bibblewindi facility and the Leewood facility. Note that although SEPP 33 has been repealed, the associated Hazardous Industry Planning Advisory Papers published by DPE are still applicable.

Well pads

Dangerous goods that may be found at well pads are listed in Table 4.4 below. Only small amounts of these goods will be held at the drill site/well pad at any time as they will be stored at the Narrabri Operations Centre and transported to site as required. Methane will be present in the gathering lines and other well infrastructure however it is not possible to say with certainty what volume of methane will be present as any time. Therefore, it has been considered as part of the PHA and assessed accordingly.

Table 4.4 - Dangerous goods present at well pads

Chemical	UN number	Class	Packing group	Maximum quantity	
				Site	NOC
Methane	1971	Class 2.1 Flammable gas	N/A	See note	N/A
Glutaraldehyde	3265	Corrosive liquid, acidic, organic N.O.S	III	1200 L	6000 L
Methanol	1230	Class 3 flammable Liquid	II	70 L	350 L
		Subsidiary risk: Class 6.1 toxic substances			
Sodium Hydroxide	1824	Class 8 Corrosive substances	II	800 kg	4000 kg

Note: Methane will be present in the gathering system lines and infrastructure, but an exact volume cannot be known

The biocide / antimicrobial (glutaraldehyde) may be classified as a Class 8 PG III corrosive acidic organic liquid, and the methanol is a Class 3, PG II flammable liquid. The SEPP (Resilience and Hazards) threshold for these two materials is 50 tonnes for Class 8 and 10 tonnes for Class 3, respectively. Sodium hydroxide used in pH stabilisation is a Class 8 PG II corrosive liquid with a SEPP (Resilience and Hazards) threshold of 25 tonnes. It is stored at the drill site and the Narrabri Operations Centre. The quantity of these three materials do not exceed the thresholds provided in SEPP (Resilience and Hazards), therefore they were not necessary to include in the PHA.

None of the drilling chemicals that are classified as dangerous goods will be present on the well pads in large enough quantity to trigger a PHA. The risk to the public from the presence of these chemicals at the well pad is therefore low. However, management measures will still be put in place to further reduce the likelihood of members of the public coming into contact with these substances (see section 4.3.1 below).

Bibblewindi Facility

The dangerous goods that will be stored at the Bibblewindi facility are listed in Table 4.5 below.

Table 4.5 - Dangerous goods located at the Bibblewindi facility

Chemical	UN number	Class	Packing group	Maximum quantity on site
Methane	1971	2.1 Flammable Gas	N/A	See below [a]
Hydraulic oil	See below [b]	3 Flammable Liquids	III	400 L
Lubricating oils	See below [b]	3 Flammable Liquids	III	500 L
Cleaning and solvents	See below [c]	3 Flammable Liquids	III	Negligible
Corrosion inhibitor	See below [b]	3 Flammable Liquids	III	6000 L (5.7 tonne)
Oxygen	1072	2 Non-flammable, non-toxic gases	N/A	16 x 7.2 m^3 G size cylinders (0.16 tonne)
Acetylene	1001	2.1 Flammable Gases	N/A	16 x 7.2 m^3 G size cylinders (0.13 tonne)
Compressed nitrogen	1066	2.2 Non-flammable, non-toxic gases	N/A	32 x 7.2 m3 G size cylinders (0.29 tonne)

[a] Methane will be present in the gathering system lines and infrastructure but an exact volume cannot be known

[b] The exact hydraulic and lubricating oils will be determined during detailed design, however the Dangerous Goods Class and Packing Group are expected to be as above.

[c] Various cleaning agents and solvents are expected to be used for maintenance purposes. The quantity is expected to be negligible compared to the thresholds for Risk Screening

The process equipment containing methane at the Bibblewindi in-field gas compression facility is greater than 30 metres from the site boundary. However, a conservative assumption was made in the EIS to consider the Bibblewindi in-field gas compression facility as 'potentially hazardous industry' regardless of the proximity of the equipment to the site boundary. Therefore, a PHA was conducted to further assess the risk the Class 2.1 Flammable Gas poses to surrounding land users.

A quantity of 32 tonnes of Class 3 Packing Group III Flammable Liquids is considered 'potentially hazardous industry' if it was present 10 metres from the facility boundary in areas where there are sensitive receivers. Hydraulic oil and lubricating oil storage tanks will be at least 10 metres from the facility boundary whilst the nearest sensitive receptor to the Bibblewindi facility is approximately 5 km away, therefore on the basis of Class 3 Flammable Liquids, the Bibblewindi in-field gas compression facility is not potentially hazardous.

Leewood Facility

The dangerous goods to be stored at Leewood Facility are listed in Table 4.6. The process equipment containing methane at Leewood central compression facility is greater than 30 metres from the site boundary, however as the exact quantities of gas are not yet known, an assumption has been made to consider Leewood as 'potentially hazardous industry' regardless of the proximity of the equipment to the site boundary. This required a PHA to be conducted for the EIS to further assess the risk the Class 2.1 Flammable Gas poses to surrounding land users.

A quantity of 109 tonnes of Class 3 Packing Group III flammable liquids is considered 'potentially hazardous industry' if it was present 15 metres from the facility boundary in areas where there are sensitive receivers. Hydraulic oil, lubricating oil and corrosion inhibitor storage tanks will be greater than

15 metres from the facility boundary, therefore on the basis of Class 3 flammable liquids; the Leewood Compression Facility is not potentially hazardous.

Although the specific biocide used for water treatment has not yet been determined, it may represent a Class 8 Corrosive Substance, with a subsidiary risk Class 6.1 toxic substance. It is present in quantities in excess of the threshold set out in SEPP (Resilience and Hazards) for Class 6.1 toxic substances and therefore is considered potentially hazardous industry. This required a PHA for the EIS to further assess the risk to surrounding land users and is contained within section 4.3 of Appendix S of the EIS.

The total quantity of Class 8 corrosive substances at the Leewood facility are present in quantities in excess of the threshold presented in SEPP (Resilience and Hazards). This required a PHA to further assess the risk to surrounding land users and is contained within section 4.3 of Appendix S of the EIS.

Transport of dangerous goods

During the operational phase, some transport of dangerous goods will be required to support Project activities. An estimate of the frequency of dangerous goods transport movements is provided in section 4.2.4 of Appendix S of the EIS. The Project will not result in movements of dangerous goods in excess of the thresholds presented in SEPP (Resilience and Hazards). Using SEPP (Resilience and Hazards) as a guide, a route evaluation study is not recommended.

There will be no blasting as part of the Phase 1 activities. Any explosives however will be managed at all times in accordance with the requirements of the Resources Regulator.

Table 4.6 - Dangerous goods located at the Leewood facility

Chemical	Purpose	UN Number	Class	Packing Group	Anticipated maximum quantity on site	Usage
Methane	Product	1971	2.1 Flammable Gas	N/A	See below [a]	Continuous
Hydraulic oil	Hydraulic systems	See below [b]	3 Flammable Liquids	III	10 tonnes	Continuous
Lubricating oils	Lubrication systems	See below [b]	3 Flammable Liquids	III	10 tonnes	Continuous
Cleaning and solvents	Maintenance use	See below [c]	3 Flammable Liquids	III	Negligible	Continuous
Corrosion inhibitor	Water conditioner	See below [b]	3 Flammable Liquids	III	6,000 L (5.7 tonnes)	Continuous
Oxygen	Maintenance use	1072	2.2 Non-flammable, non- toxic gases	N/A	16 x 7.2 m^3 G Cylinders (0.16 tonnes)	Continuous
Acetylene	Maintenance use	1001	2.1 Flammable Gases	N/A	16 x 7.2 m^3 G Cylinders (0.13 tonne)	Continuous
Compressed nitrogen	Maintenance use	1066	2.2 Non-flammable, non- toxic gases	N/A	32 x 7.2 m^3 G Cylinders (0.29 tonne)	Continuous
Sodium hypochlorite (10 % wt/wt)	Water treatment chemical	1791	8 Corrosive Substances	III	28 m^3 (37 tonnes)	Intermittent
Aqueous ammonia (25 % wt/wt)	Water treatment chemical	2672	8 Corrosive Substances	III	1.5 m^3 (1.4 tonnes)	Intermittent

Chemical	Purpose	UN Number	Class	Packing Group	Anticipated maximum quantity on site	Usage
Sodium bisulphite (33 % wt/wt)	Removal of chlorine	2693	8 Corrosive Substances	III	3.5 m^3 (4.8 tonnes)	Intermittent
Hydrochloric acid (33 % wt/wt)	Chemical Clean in Place (CIP)	1789	8 Corrosive Substances	II	65 m^3 (75 tonnes)	Intermittent
Sulphuric acid (98 % wt/wt)	Chemical Clean in Place (CIP)	1830	8 Corrosive Substances	II	< 1 m^3 (1.85 tonnes)	Intermittent
Caustic soda (30 % wt/wt)	Membrane filtration CEB/CIP	1824	8 Corrosive Substances	II	19 m^3 (25 tonnes)	Intermittent
Biocide (Nalco 7330) Isothiazolinone (see below [d])	Inhibition of bacterial growth	2922	8 Corrosive Substances Subsidiary risk: 6.1 Toxic Substances	III	9 m^3 (11 tonnes)	Intermittent

Notes:

[a] Methane will be present in the gathering system lines and infrastructure but an exact volume cannot be known

[b] The exact chemical is yet to be determined. The Dangerous Goods Class and Packing Group are expected to be as above.

[c] Various cleaning agents and solvents are expected to be used for maintenance purposes. The quantity is expected to be negligible compared to the thresholds for Risk Screening.

[d] May not be stored on the site at all times.

Hazards involving dangerous goods

As part of the PHA documented in Appendix S of the EIS a table of hazards involving dangerous goods was included, which is partially reproduced in Table 4.7. This shows the residual risk of each hazard as assessed in the EIS, which was determined to be low to very low for dangerous goods hazards.

Table 4.7 - Hazards involving dangerous goods

Unwanted event	Project activity	Residual risk
Uncontrolled loss of containment of small quantity (less than 100 L) of liquid chemicals or dangerous goods	Construction & operation	Very Low
Uncontrolled loss of containment of large quantities (greater than 100 L) of liquid hydrocarbons	Construction & operation	Low
Uncontrolled loss of containment of large quantities (greater than 100 L) of liquid chemicals or dangerous goods	Construction & operation	Low
Uncontrolled loss of containment of gas from wellhead and wellhead equipment. Potential for fire or explosion.	Operation	Very Low
Uncontrolled loss of containment of gas from underground gathering lines (low pressure). Potential for fire or explosion.	Operation	Very Low
Uncontrolled loss of containment of gas from underground Bibblewindi to Leewood pipeline (medium pressure). Potential for fire or explosion.	Operation	Low
Uncontrolled loss of containment of gas from facilities (Leewood). Potential for fire or explosion.	Operation	Very Low
Uncontrolled loss of containment of gas from facilities (Bibblewindi). Potential for fire or explosion.	Operation	Very Low

4.3.1 Management measures

The following management measures will be implemented to minimise the hazards associated with exposure to dangerous goods:

- members of the public will be physically excluded from exploration drill sites, operational areas and any other facilities where dangerous goods are stored;
- to minimise the likelihood of biocide release, it will be stored at the water treatment plant in accordance with the requirements of the Dangerous Goods Code;
- to minimise the likelihood of a release of corrosives, each will be stored in accordance with the requirements of the Dangerous Goods Code, which considers secondary containment, separation of incompatible chemicals etc. There will be separate storages for the central gas processing facility and the water treatment plant to eliminate the potential for cross mixing of the different chemicals;
- all facilities will be designed and operated under the applicable Australian safety standards and protocols;
- chemicals will be stored and handled in accordance with relevant Australian Standards, including AS 1940-2017 - *The storage and handling of flammable and combustible liquids*;
- refuelling will occur with suitable containment when volumes greater than 50 litres are involved and not within 40 metres of a watercourse;

- all dangerous goods to be stored and transported in accordance with the Australian Dangerous Goods Code; and
- all Class 3 Packing Group III flammable liquids will be stored 10 metres from the Leewood facility boundary and 15 metres from the Bibblewindi facility based on anticipated quantities.

4.4 Uncontrolled loss of containment of gas

Risks associated with loss of containment of methane gas have been assessed in the PHA in Appendix S of the EIS semi-quantitatively by determining the likelihood of gas releases using industry failure data, followed by modelling of the consequences of the fire or explosion if the hazard were to occur (see Table 4.8 for a summary). The likelihood and worst-case consequence analysis for a release of methane gas is presented in section 4.3.2 of Appendix S in the EIS. The risk assessment is presented in section 4.3.3 of Appendix S of the EIS. A conservative approach was undertaken in the assessment and a PHA was conducted for the facilities in relation to the release of Class 2.1 flammable gas.

In order for a gas release to cause harm to people, the released gas must first ignite. Two scenarios of ignition are possible, immediate ignition resulting in a jet fire or delayed ignition leading to a flash fire or explosion. The risk associated with a gas release is based on the combination of the release frequency, probability of immediate and delayed ignition and associated consequence distance to generate a risk result at sensitive receivers. All risks are assessed as having a remote probability on the basis that combining the release frequencies with ignition probabilities results in a frequency less often than once in 100 years.

The low frequencies estimated in the semi quantitative assessment in Appendix S of the EIS are due to the combination of low release frequencies and low reactivity of methane. Furthermore, all electrical equipment installed within the gas processing facilities will be certified as appropriate for installation in a flammable / explosive environment resulting in low immediate and delayed ignition probabilities.

There are no consequences analysed that have the potential to impact sensitive receivers in the vicinity of the wellheads, gathering lines, Bibblewindi in-field gas compression facility or the Bibblewindi to Leewood gas line.

4.4.1 Management measures

The following management measures will be implemented for pipelines and underground infrastructure:

- in order to minimise the likelihood of ignition, all electrical equipment installed within the gas processing facilities will be certified as appropriate for installation in a flammable / explosive environment. Furthermore, appropriate gas detection, isolation and blowdown systems will be designed as determined by ‘safety in design’ requirements throughout the Project;
- gathering systems will be buried, with all valves above ground of metal and locked closed unless opened by an operator. If wells are shut in as above, pressure in gathering systems will decline. If a pipeline is compromised, the pressure will decline in gathering systems, sensors will close the fail safe valve at wellheads. In addition, the gas compression units will continue to extract gas from the gathering system, while the gas source (wells) is shut off, the compressors will draw the remaining gas out of the system;
- appropriate signage will be installed in accordance with Australian Standards to alert landholders and the general public to underground infrastructure;
- safety in design will be incorporated into the design and construction of all facilities and infrastructure; and

- the pipelines will be the subject of a Safety Management Study that is compliant to Australian Standard *AS 2885.1-2018 Pipelines - Gas and liquid petroleum Part 1: Design and construction*. Santos will also prepare a Pipeline Safety Management Study prior to Phase 2.

4.5 Sensitive receivers and amenity

4.5.1 Residences

In accordance with CoC B1, no Project-related infrastructure will be located within 200 m of any residence (occupied or otherwise). Figure 6.2 shows a 200 m buffer around the nearest residences to the Phase 1 infrastructure. It confirms that the proposed Phase 1 infrastructure locations fully comply with this requirement.

4.5.2 Infrastructure siting and well pad spacing

No telecommunications towers are approved to be or will be constructed as part of the Phase 1 activities.

No production wells are approved to be constructed as part of Phase 1.

In accordance with CoC B1, all pilot well pads will be spaced at least 250 metres apart, as shown in Figure 6.3. Only the pilot well set of Dewhurst 37-42 are shown, since the other wells are located in isolation. The minimum distance between the well pads is 270 m.

4.5.3 Production well pads and neighbouring properties

In accordance with CoC B1, no pilot or production well pads must be located within 100 m of any privately-owned land or other land not owned by Santos, unless otherwise agreed with the landowner, and a copy of this agreement has been forwarded to the Planning Secretary.

As detailed in Table 5.1, seven of the proposed well pads, core holes and monitoring bores are located on private property. Santos is finalising negotiated land access agreements with the respective owners, and a copy of the agreements will be provided to the Planning Secretary prior to the commencement of Phase 1.

Table 4.8 - Risk assessment of gas release consequences

Location	Description of consequences/impact	Likelihood estimate[1]	Potential likelihood category	Potential consequence for offsite impact[2]	Qualitative risk rating
Wellheads	Jet fire from a 100 mm hole with jet fire heat radiation of 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure) extending 50 m downwind.	4.2E-08	Remote	Minor or medically treated injury, lost time injury	Very Low
	Fireball from a catastrophic failure of a vessel with a 4.7 kW/m^2 effect distance of 18 m.	1.6E-05	Remote	Minor or medically treated injury, lost time injury	Very Low
Gas gathering lines	Jet fire from a full bore rupture (FBR) at the centre of the pipeline with jet fire heat radiation of 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure), extending a distance of 165 m downwind.	3.0E-07	Remote	Minor or medically treated injury, lost time injury	Very Low
Bibblewindi in-field gas compression facility	Jet fire from a 100 mm hole with jet fire heat radiation of 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure) extending 82 m downwind.	4.2E-08	Remote	Minor or medically treated injury, lost time injury	Very Low
	Fireball from a catastrophic failure of a 2m^3 vessel with a 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure) effect distance of 49 m.	1.6E-05	Remote	Minor or medically treated injury, lost time injury	Very Low
	Explosion from a catastrophic failure of a high pressure 2m^3 vessel with a 7 kPa overpressure (representing a 10% chance of injury) effect distance of 62 m..	1.6E-05	Remote	Minor or medically treated injury, lost time injury	Very Low

Location	Description of consequences/impact	Likelihood estimate[1]	Potential likelihood category	Potential consequence for offsite impact[2]	Qualitative risk rating
Bibblewindi to Leewood Gas Line	Jet fire from a full bore rupture (FBR) at the centre of the pipeline with jet fire heat radiation of 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure), extending a distance of 386 m downwind.	3.0E-07	Remote	Minor or medically treated injury, lost time injury	Very Low
Leewood Central Gas Compression Facility and	Jet fire from a high pressure full bore rupture (250 mm pipeline at 6,500 kPag) with jet fire heat radiation of 4.7 kW/m^2 (representing second degree burns after 30 seconds exposure) extending 321 m downwind.	3.6E-07	Remote	Minor or medically treated injury, lost time injury	Very Low

1: Estimate calculated by combining the frequency of release and the probability of ignition.

2: At location of sensitive receptors. Maximum consequence of medical treatment injury assumed as there are no sensitive receivers in the impact zone

5. Emergency response

5.1 Santos emergency response philosophy

Santos' response to any incident or emergency is prioritised according to the PEAR model, as shown below.

Element	Impact on
P – People	Safety and welfare of personnel, internally and within the community
E – Environment	Environmental values at risk
A – Assets	Production and / or business function assets
R - Recovery	Recovery of production and business operations

All emergencies are managed as follows:

- emergency shutdown (**ESD**), evacuate, activate fixed systems;
- provide first aid and request additional medical support as appropriate;
- muster and account for personnel in the affected area; and
- mobilise emergency services.

5.2 Scene preservation

When an incident occurs, the most important objective is the safety of personnel, including the public. To assist in investigative processes, we need to prevent material evidence from being removed or relocated in any way. This is especially true if the incident is a high potential or fatal incident. The scene of an incident must be treated with the utmost care so as to not contaminate or destroy evidence. The following minimum protocols will be adhered to in order to protect the scene and evidence:

- establish a perimeter to protect the scene;
- evacuate non-involved persons and prevent unauthorised persons from entering the scene;
- prevent any damage of the scene or evidence; consider protecting evidence from the elements by placing a sheet or erecting a tent over them;
- do not move anything unless absolutely necessary; record any evidence found or moved (i.e. what, where, by whom and when);
- maintain an accurate 'scene log' to record the names and times of everyone who enters and / or leaves the scene;
- photograph or video record the scene as well as individual objects before moving anything;
- isolate witnesses from each other and from other persons and record their statement; and
- maintain control of the scene until handed over to Emergency Services.

6. Incidents, non-compliances and complaints

6.1 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 and include the location and nature of the 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 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).

6.2 Unpredicted impact protocol

It is considered unlikely that the activities during Phase 1 will result in any unpredicted or unforeseen impacts to public safety as set out in this Plan. However, in accordance with CoC D3(f), the following strategy outlined in Table 6.1 below will be adopted in the event where the infrastructure is not sited in in accordance with this Protocol, and the locational criteria.

Table 6.1 - Unpredicted impact protocol

Step	Strategy
1	Stop any relevant activity immediately and implement corrective actions to reduce or minimise the unpredicted risk to public safety
2	Review the unpredicted impact or risk and consider the following: • activities that may have triggered this event; and • relevant deviations from the management procedures and measures.
3	Notify the relevant agencies and departments
4	If appropriate, commission an investigation by an appropriate specialist
5	Based on the results of the investigation, develop the appropriate amendment and amelioration methods

Step	Strategy
6	Implement the information from the investigation to review, and if necessary, update this PSMP (and related documents where relevant) which will include any or all of the following: • a review and where required, revision of the public safety risks in section 4; • a review and where required, revision of the management controls in section 4; • a review the actions that may have been taken prior to event; and • implement any relevant training based on the findings of the investigation to avoid any recurrence of the unpredicted impact.

6.3 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.

7. Reporting, evaluation and review

7.1 Annual Review

In accordance with condition D8 and as further described in section 6 of the EMS, Santos will review the performance of its public safety management for the previous calendar year by the end of March and report the relevant results within the Annual Review, to the satisfaction of the Planning Secretary. The Annual Review will at minimum provide the following information regarding:

- the effectiveness of the management measures to prevent, and if prevention is not reasonable and feasible, to minimise any impact to historical heritage items; and
- any public safety-related incidents or non-compliances.

Further, the annual review under consent condition D8 requires a number of items to be reviewed or assessed. In summary these are:

- monitoring results and complaints;
- non-compliances and incidents;
- compliance with performance measures;
- 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 historical heritage management process.

7.2 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.

7.3 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 PSMP is updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the Project.

In the review of the various conditions requiring annual reviews, suitability assessments and performance evaluations, this PSMP will 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;
- due to any significant change to the design or operation of the management processes as described herein. If there is ambiguity in relation to whether there is a significant change, Santos will consult with the Planning Secretary to determine whether the PSMP must be reviewed; and
- otherwise at intervals of no longer than one year.

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 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 Santos will submit the revised PSMP to the Planning Secretary for approval within 6 weeks of the review.

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

7.4 Improvement measures

Consent condition D3(g) requires that this Plan includes a program to investigate and implement ways to improve the environmental performance of the Project over time; and CoC D3(i) states that the Plan is to include a protocol for the periodic review. The protocol for review is set out by consent conditions D8, D4 and D5, which have been addressed in sections 7.1 and 7.3 above.

Measures that may be implemented following review and evaluation may include the following:

- audit of historic heritage management system, reviewing historic heritage management measures;
- implementation of modifications to the historic heritage management system; and
- additional monitoring and inspections.

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.

8. References

EPA (2007). *Storing and Handling of Liquids: Environmental Protection – Participants Manual*. Department of Environment and Climate Change NSW.

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9. Glossary

Term	Definition
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
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.
Council	Narrabri Shire Council
Department	The NSW Department of Planning and Environment (DPE)
EIS	The Environmental Impact Statement titled Narrabri Gas Project Environmental Impact Statement, dated 31 January 2017, submitted with the development application, including the response to submissions and supplementary response to submissions, and the additional information provided to the Department in support of the application
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
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, Westport workers accommodation 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
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
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
Major facilities	Leewood facility and Bibblewindi facility
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
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
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

Term	Definition
	infrastructure and subsurface infrastructure, major facilities, wells and well pads and other gas field infrastructure
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
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
Unacceptable risk	The level of risk at which mitigation actions are deemed to be warranted.
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
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, or other area as may be approved in the Field Development Plan

Appendix A - Consultation records

Santos

Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Public Safety Management Plan**
STAKEHOLDER:	**FCNSW – [redacted]**
CONSULTATION RELEASE DATE:	**30 September 2022**
COMMENTS DUE DATE:	**14 October 2022**

General Feedback	
Key Issues	
Suggestions for improvement	

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*
4	Conflicting land use objectives	To be agreed supplementary to the PSMP, FCNSW and Santos to meet to discuss likely conflicts of access with other public stakeholders and agree to pathways for resolution (i.e. apiarists wanting to use roads proposed for temporary closure or hunters using firearms adjacent to well development sites etc).
4.2.1		Use of security cameras. FCNSW and Santos to hold discussion to consider other stakeholders and the protocol for implementing.

Santos

Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Public Safety Management Plan**
STAKEHOLDER:	**NSW Rural Fire Service**
CONSULTATION RELEASE DATE:	**4 October 2022**
COMMENTS DUE DATE:	**18 October 2022**

General Feedback	
Key Issues	
Suggestions for improvement	We would suggest that the document include an annual RFS information/orientation day for local brigade crews

Section	**Type of feedback (e.g. readability, usability,)**	**Specific Feedback** *Detail specific issues with certain sections in the document*

Public Safety Management Plan – comments received on Revision B (draft)

Comments received from FCNSW and RFS

Item	Section #	Section heading	Existing text	Comment	Final response
1		General Feedback	No specific text reference	**[RFS]** We can see no real issues with the plan and I will catch up about some more orientation sessions	Santos to arrange to discuss with the RFS opportunities for orientation sessions.
2			No specific text reference	I would suggest that the document include an annual RFS information/orientation day for local brigade crews	Santos to arrange to discuss with the RRS opportunities for information and orientations sessions for local brigade crews.
3	4	Public Safety Risks and Management Measures	No specific text reference	**[FCNSW]** Conflicting land use objectives. To be agreed supplementary to the PSMP, FCNSW and Santos to meet to discuss likely conflicts of access with other public stakeholders and agree to pathways for resolution (i.e. apiarists wanting to use roads proposed for temporary closure or hunters using firearms adjacent to well development sites etc).	Santos will arrange a discussion with FCNSW to agree a resolution process for where conflicting Santos and public access requirements arise.
4	4.2.1	Management measures	No specific text reference	Use of security cameras. FCNSW and Santos to hold discussion to consider other stakeholders and the protocol for implementing.	Santos will arrange a discussion with FCNSW to agree a protocol for installation and use of security cameras in the forest.

Appendix B - Compliance conditions relevant to this Plan

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

SSD 6456 consent conditions directly relevant to this Plan	Section reference
Consent condition A1 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.	Section 1.2
Consent condition A5 The Applicant may only undertake the development in the following stages:	Section 1.1.2 Section 1.2
a) Phase 1, comprising ongoing exploration and appraisal activities;	
b) Phase 2, comprising construction activities for production wells and related infrastructure;	
c) Phase 3, comprising gas production operations; and	
d) Phase 4, comprising gas well and infrastructure decommissioning, rehabilitation and mine closure.	
Consent condition A23 With the approval of the Planning Secretary, the Applicant may:	
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	Section 1.2
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);	No combination proposed as part of this Plan
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	Section 1.2 Section 12.3
d) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by a consent	No combination proposed as part of this Plan
Consent condition B4 Prior to the construction of any gas field infrastructure, the applicant must prepare a Field Development Plan for the relevant gas field infrastructure to the satisfaction of the Planning Secretary. This plan must:	
(a) be prepared by a suitably qualified and experienced person/s;	Section 1.3
(h) include a:	
(i) Public Safety Management Plan, prepared in consultation with RFS, FCNSW and NSW Health, to ensure public safety and manage access in the project area, including verification of minimum safe separation distances between all potentially hazardous facilities; and	This Plan Section 1.3
Consent condition B77 The Applicant must ensure that the storage, handling, and transport of:	

SSD 6456 consent conditions directly relevant to this Plan	Section reference
a) dangerous goods is done in accordance with the relevant Australian Standards and guidelines, particularly AS1940 and AS1596, the Dangerous Goods Code, and the EPA's Storing and Handling of Liquids: Environmental Protection – Participants Manual; and	Section 4.3
b) any explosives are managed in accordance with the requirements of the Resources Regulator.	There is no blasting as part of Phase 1.
Consent condition D3 The Applicant must ensure that (where relevant) the management plans required under this consent include:	
(a) summary of relevant background or baseline data;	
(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	Section 3
(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 4
(c) any relevant commitments or recommendations identified in the documents that together comprise the NGP EIS;	Section 3.2
(d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 4
(e) a program to monitor and report on the:	Section 7
(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;	Section 6.2
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 7.4
(h) a protocol for managing and reporting any:	
(i) incident, non-compliance or exceedance of any impact assessment criterion and performance criterion	Section 6.1
(ii) complaint; or	Section 6.3
(iii) failure to comply with other statutory requirements; and	Section 6.1
(i) a protocol for periodic review of the plan.	Section 7.3

SSD 6456 consent conditions directly relevant to this Plan	Section reference
Consent condition D4 Within 2 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 this consent, the Applicant must review the suitability of existing strategies, plans and programs required under this consent.:	Section 7.3
Consent condition D5 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. **Note**: *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.*	Section 7.3
Consent condition D6 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.	Section 6.1
Consent condition D7 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. **Note**: *A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance*	Section 6.1
Consent condition D8 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.	Section 7.1
Consent condition D9 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.	Section 7.2
Consent condition D13 From the commencement of Phase 1, until the completion of all rehabilitation required under this consent, the Applicant must:	

SSD 6456 consent conditions directly relevant to this Plan	Section reference
(a) make copies of the following information publicly available on its website: (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 1.4 Section 6 Section 7.4
b) keep such information up to date.	Section 1.6 Section 7.4

Attachment 2 - Property Management Plan

(due to confidentiality the Property Management Plans are provided to the DPE separately)