ENGENY

SANTOS CSG PTY LTD

Material Change of Use – Infrastructure Associated with Petroleum Activities

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21 JUNE 2023

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Rev	Date	Description	Author	Reviewer	Project Mgr.	Approver
0	21/06/2023	Client Issue	Heather Brennan / Tegan Ireland	Ben Stewart	Tegan Ireland	Tegan Ireland
Signatures:						

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1. INTRODUCTION

1.1 Project Background

This Material Change of Use (MCU) report has been prepared for the Coordinator General by Engeny Australia Pty Ltd (Engeny) on behalf of Santos GLNG. The report has been prepared to accompany the MCU application works for proposed within the boundaries of the Surat Basin Infrastructure Corridor State Development Area (SBICSDA) (Figure 1.1).

It should be noted that the project works involves construction outside of the SBICSDA within Lot 3 FT845130. This is referred to as the Construction Disturbance Zone. This report will only address construction within the SBICSDA, referred to as the proposed crossing point.

The proposed works within the SBICSDA is linear infrastructure co-located to gas appraisal and development wells being:

- Gas and water gathering pipelines; and
- Underground HV electricity lines.

The proposed works have been assessed under the 2014 Santos GLNG Project Gas Field Development Project EIS (GFD Project EIS) and the current scale and intensity of operations within the relevant petroleum tenement, Petroleum Lease (PL) 176/1088 is authorised under Environmental Authority EPPGG03515915.

The GFD Project EIS Figure 1-2, presented in Appendix A, shows the scale of Gas Field Development project (GFD Project) area.

Figure 1.1 also shows PL 176/ PL 1088 in relation to the proposed works.

1.2 Subject Site

The section of the SBICSDA subject to this application is that which is contained within PL 176/PL 1088 and comprises of Lot 27 FT969 (subject site). in the construction disturbance zone extends into Lot 3 FT845130. The location of the works within the subject site and intersecting with the SBICSDA are shown on Figure 1.1.

An overview of the area subject to the GFD Project EIS and its relationship to the SBICSDA is shown on the GFD Project EIS Figure 8-7, which is contained in Appendix A.

1.3 The Proponent

The Proponents for this application are the holders of PL176/ PL 1088 for the Santos GLNG Project, being:

- Santos CSG Pty Ltd;
- KGLNG E&P Pty Ltd;
- Total E&P Australia;
- PAPL (Upstream II) Pty Limited; and
- Total E&P Australia II.

1.4 Surat Basin Infrastructure Corridor State Development Area Application Triggers

The *Surat Basin Infrastructure Corridor State Development Area: Development Scheme* February 2014 (Development Scheme) requires that approval from the Queensland Coordinator-General be obtained for carrying out a material change of use of any premises within the SBICSDA. Assessment of the proposed works against the objectives of the Development Scheme are addressed further in Section 3 of this report.

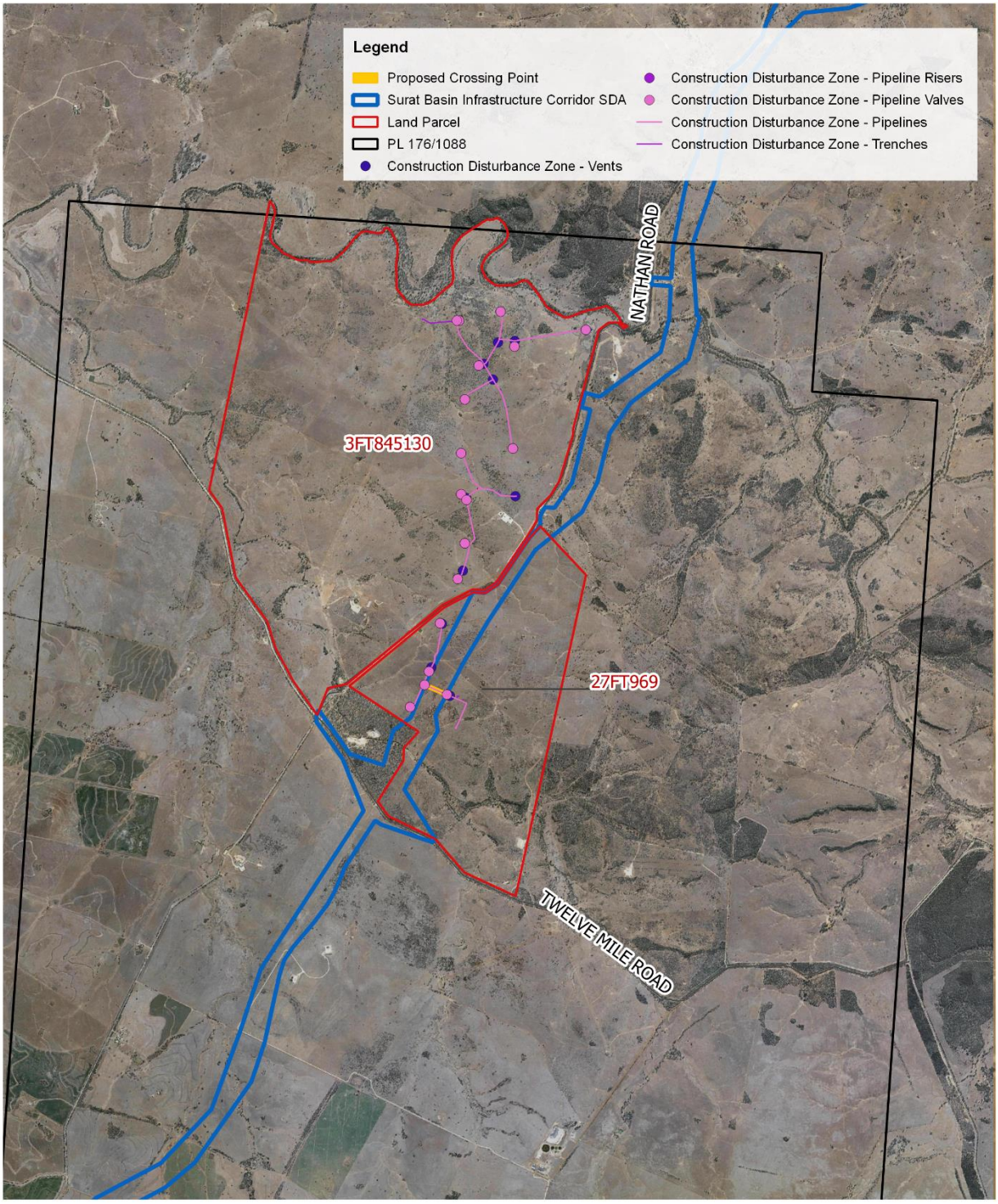


Figure 1.1: Site Locality

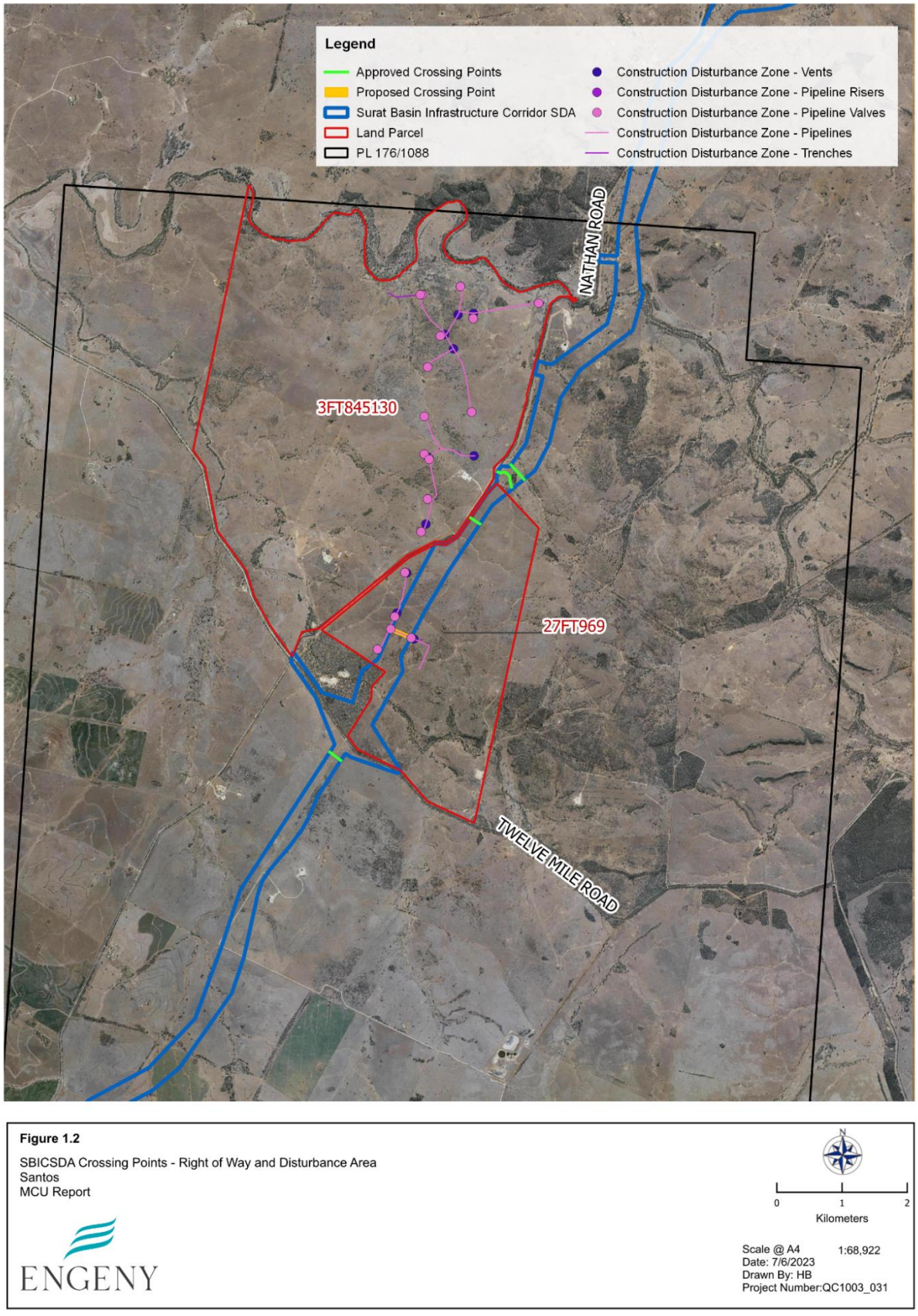


Figure 1.2: SBICSDA Crossing Points – Right of Way and Disturbance Area

1.5 GFD Project Background

Santos GLNG intends to further develop its Queensland coal seam gas resources to augment supply of natural gas to its Curtis Island liquefied natural gas facility. The GFD Project, which the works subject to this application are part of, is an extension of the existing approved gas field development and will involve the construction, operation, decommissioning and rehabilitation of production wells and the associated supporting infrastructure over a project life exceeding 30 years.

The associated GFD Project EIS was approved with conditions on 3 December 2015 to expand the GLNG project's gas field tenure from 6,887km^2 to 10,676km^2 with up to 6,100 production wells in addition to the currently approved 2,650 wells.

The GFD Project includes:

- Production wells;
- Fluid injection wells, monitoring bores and potential underground gas storage wells;
- Gas and water gathering lines;
- Gas and water transmission pipelines;
- Gas compression and treatment facilities;
- Water storage and management facilities;
- Access roads and tracks;
- Accommodation facilities and associated services (e.g. sewage treatment);
- Maintenance facilities, workshops, construction support, warehousing and administration buildings;
- Utilities such as water and power generation and supply (overhead and/or underground);
- Lay down, stockpile and storage areas;
- Borrow pits and quarries; and
- Communications.

The final number, size and location of these components will be determined progressively over the life of the GFD Project and will be determined by the location, size and quantity of the gas resource and includes consideration of land access agreements and environmental and cultural heritage values.

The scale and intensity of the activities currently approved to take place within the PL176 portion of the GFD project is described in Section 1.7 below.

The components of the GFD Project which are the subject of this application were detailed in Section 1.1 of this report.

1.6 Project Environmental Impact Assessment Process

In November 2012 the Queensland Coordinator-General declared the GFD Project to be a significant project for which an EIS is required. The GFD Project was also determined by the Commonwealth Minister for Environment to be a controlled action for which an EIS is required and it was identified that Commonwealth interests would be assessed in conjunction with State interests under the bilateral agreement between the Commonwealth and Queensland Governments.

The final terms of reference for the project were issued on the 28 March 2013 and the draft GFD Project EIS subsequently prepared. The EIS was available for public consultation between 10 November 2014 and 22 December 2014. Subsequent to the public consultation period, additional information was requested by the Coordinator-General and provided by Santos GLNG. The GFD Project EIS was approved with conditions by the Coordinator General on 3 December 2015.

(Santos GLNG Gas Field Development Project | State Development, Infrastructure, Local Government and Planning)

As required by the terms of reference, the project approval requirements were addressed in detail in Chapter 2 and Appendix C of the GFD Project EIS.

1.7 Existing Environmental Authority and Petroleum Lease

The works proposed to be located within the SBICSDA will be undertaken under the existing Environmental Authority (EA) (EPPG03515915) approved in November 2021 (Appendix B). These works are authorised to take place within PL 176.

The Environmentally Relevant Activities to which the EA relates are:

- Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7 that includes an activity from Schedule 2 with an AES.
- Resource Activity, Schedule 2A, 03: A petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area.

Schedule A to the EA identifies a number of specific prescribed Environmentally Relevant Activities (non-resource activities) that are authorised by the EA, none of which are proposed to be undertaken within the SBICSDA.

The works approved under the EA include petroleum activities such as exploration, appraisal and development wells, compressor facility(ies), sewerage treatment plant(s), accommodation and water treatment facilities; specified environmentally relevant activities; stimulation activities and incidental activities.

The scale and intensity of the petroleum activities is summarised in Schedule A, Table 1 of the EA, which can be found in Appendix B of this Report.

The current EA, authorised an additional 350 Gas Field Development Project wells within PL 176, as well as incidental activities related to the establishment of these wells including:

- Construction of gas gathering and transmission pipelines
- Construction of water gathering pipelines
- Installation of electricity lines.

1.8 Public Consultation

1.8.1 GFD Project EIS

Extensive consultation activities were undertaken as part of the GFD Project EIS, in addition to ongoing engagement by Santos GLNG as part of its existing operations in the Surat and Bowen Basins. Santos GLNG engaged extensively with landholders, communities, local and State government and key interest groups shown in Table 1.1. Accordingly, a waiver of the referral, public notification, and review stages of the MCU application assessment is requested in accordance with Section 8.2(11) of the SBICSDA Development Scheme.

TABLE 1.1: APPLICABLE STAKEHOLDERS

Stakeholder Group	Organisation
Local government (mayor, councillors and relevant council officers)	• Banana Shire Council • Central Highlands Regional Council • Maranoa Regional Council • Western Downs Regional Council.
State government departments and agencies	• Department of Aboriginal and Torres Strait Islander and Multicultural Affairs • Department of Agriculture, Fisheries and Forestry • Department of Communities, Child Safety and Disability Services • Department of Community Safety • Department of Education, Training and Employment

Stakeholder Group	Organisation
	• Department of Energy and Water Supply • Department of Environment and Heritage Protection • Department of Housing and Public Works • Department of Justice and Attorney General • Department of Local Government, Community Recovery and Resilience • Department of National Parks, Recreation, Sport and Racing • Department of Natural Resources and Mines • Department of Premier and Cabinet • Department of Science, Information Technology, Innovation and the Arts • Department of State Development Infrastructure and Planning • Department of Tourism, Major Events, Small Businesses and the • Commonwealth Games • Department of Transport and Main Roads • Department of Treasury and Trade • Queensland Gas Fields Commission • Queensland Health, including: • Emerald Hospital • South West Hospital and Health Service • Springsure Multi-Purpose Health Centre • Taroom Hospital • Wandoan Out-patients Clinic • Queensland Police Service, including: • Emerald, Rolleston, Roma, Springsure, and Wandoan Police • Queensland Rural Fire Service • Skills Queensland.
Federal government departments and agencies	• Australian Department of the Environment • Central Queensland Medicare Local • Independent Expert Scientific Committee.
Communities	• Arcadia Valley • Injune • Surat • Roma • Mitchell • Wandoan

Stakeholder Group	Organisation
	• Yuleba • Wallumbilla • Taroom • Rolleston • Springsure
Aboriginal and Torres Strait Islander groups and services	• Mandandanji • Iman • Bidjara • Karingbal Endrosed Parties • Sandlewood Aboriginal Projects • QueensCommunity and interest groupsland South Native Title Services • Charleville and Western Areas Aboriginal Torres Strait Islander Community • Health
Landholders	• Affected landholders within authority to prospect tenements and petroleum • leases
Environment and agricultural groups	• AgForce • Dawson Catchment Co-ordinating Association • Fitzroy Basin Association • Basin Sustainability Alliance • Queensland Great Artesian Basin Advisory Council • Queensland Marry-Darling Committee • Upper Dawson Wildlife Preservation Society.
Community and interest groups	• Advance Injune • Banana Shire Historical Society • Creative Injune • Hodgson Hall Committee • Injune Tourism and Information Centre • Juandah Heritage Society (Wandoan) • Rolleston Library • Roma and District Family History Society • Roma Tourism Association • Springsure Progress and Tourism Association • Surat and District Development Association

Stakeholder Group	Organisation
	• Taroom District Development Association • Taroom Lions Club • Taroom Historical Society • Wandoan Progress Association • Yuleba Development Group.
Local business and industry groups	• Central Highlands Development Corporation • Commerce Roma • Emerald Chamber of Commerce • Wandoan Chamber of Commerce.
Local schools and training providers	• Arcadia Valley State School • Golden West Employment and Training • Injune State School and P&C • Rolleston State School and P&C • Roma State College • Roma Training Reference Group • Southern Queensland Institute of TAFE • Springsure State School and P&C • St Johns School (Roma) • Surat State School • Wandoan State School.
Community service providers	• Blue Care Roma Community Care • Roma Interagency Group • Anglicare Roma.
Media and community publications	• The Western Star • Central Telegraph • Chinchilla News • Rolleston Rag • Taroom Tidings • Bauhinia Chatter.

Of particular relevance to this MCU application, consultation was undertaken with the following organisations:

- Western Downs Regional Council;
- Department of Agriculture, Fisheries and Forestry;
- Department of Environment and Heritage Protection (now Department of Environment and Science);

- Department of State Development Infrastructure and Planning (now Department of State
- Development, Infrastructure, Local Government and Planning);
- Department of Transport and Main Roads;
- Wandoan Out-patients Clinic;
- Wandoan Police;
- Wandoan Chamber of Commerce;
- Wandoan Progress Association;
- Wandoan State School; and
- The Western Star.

1.8.2 Ongoing and Historic Consultation

At the time of securing tenure in 2000, Section 78Q of the *Petroleum Act 1923* (the relevant petroleum legislation for PL176) required that Santos GLNG enter into a Conduct and Compensation Agreement (CCA) with each landholder subject to the MCU application. Section 79S of the *Petroleum Act 1923* provided the requirements for a CCA:

> *79S Content of conduct and compensation agreement*
>
> *(1) A conduct and compensation agreement must-*
>
> *(a) provide for the matters mentioned in section 79R(1); and*
>
> *(b) be written and signed by or for the 1923 Act petroleum tenure holder and the eligible claimant; and*
>
> *(c) state whether it is for all or part of the compensation liability; and*
>
> *(d) if it is for only part of the compensation liability, state-*
>
> *(i) details of each activity or effect of the activity to which the agreement relates; and*
>
> *(ii) the period for which the agreement has effect; and*
>
> *(e) provide for how and when the compensation liability will be met.*
>
> *(2) A conduct and compensation agreement may-*
>
> *(a) extend the holder's compensation liability to the claimant or any future compensation liability that the holder may have to the claimant to any renewal of the 1923 Act petroleum tenure; and*
>
> *(b) provide for—*
>
> *(i) monetary or non-monetary compensation; or Example of non-monetary compensation - A conduct and compensation agreement may provide for the construction of a road for the claimant.*
>
> *(ii) a process by which it may be amended or enforced; and Example of a process for amendment - A conduct and compensation agreement may provide for compensation under it to be reviewed on the happening of a material change in circumstances for the 1923 Act petroleum tenure including a change in the extent of activities required under a later development plan for a lease.*
>
> *(c) provide for any compensation that is or may be payable by the holder to the eligible claimant under the Environmental Protection Act.*
>
> *(3) This section does not limit the matters that may be provided for in a conduct and compensation agreement.*

Relevant to this MCU application, the above requires that each landholder agree on the location of the proposed pipelines, and power lines within the property prior to construction. Appendix AA of the GFD Project EIS provides a summary of the landholder engagement process undertaken by Santos GLNG, including:

1. Early engagement over a 6-12 month period. Early engagement activities can include:
    - Explaining the gas development process from exploration to production;

- Providing landholders with access to technical advice;
- Undertaking property mapping;
- Undertaking tours of existing gas activities in other areas;
- Explaining the methodology for determining compensation; and
- Discussing and develop further rules of conduct for undertaking petroleum activities.

2. Pre-planning and desktop review. The preliminary location of petroleum activities is determined taking into account property level constraints, including:
   - Agricultural land uses;
   - Avoiding smaller land parcels where relative impacts may be greater;
   - Co-locating pipelines, power lines and access roads along fence lines and property boundaries or topographic features where practical; and
   - Locating development activities away from intensively used areas of the property.
3. Land access proposal and landholder agreement including formal presentation of the land access proposal, discussion and negotiations and development of the Conduct and Compensation Agreement. Delivering the land access proposal will require field based inspections of proposed sites with landholders to discuss and agree on:
   - General site location;
   - Site design including practices to minimise the area of land required;
   - How the site will be accessed from the nearest road;
   - How property operations are likely to be impacted and appropriate mitigation works including road maintenance and dust suppression; and how Santos GLNG and its contractors will conduct themselves on the property.

The landholder has the opportunity to seek legal review of the Conduct and Compensation Agreement and Santos GLNG will meet reasonable legal costs associated with this review.

Santos GLNG is required to gain regulatory approvals and/or enter into agreements with the owner of infrastructure intersecting proposed petroleum activities. These approvals and agreements include:

- Notice prior to carrying out works near third party infrastructure under the *Electricity Act 1995*;
- Approval to carry out road works on State-Controlled Roads under the T*ransport infrastructure Act 1994;*
- Agreements with existing pipeline owners under *Petroleum Act 1923* and/or the *Petroleum and Gas (Production and Safety) Act 2004;*
- Approval to use public utility easement on non-freehold land or freehold land under the *Land Act 1994* and/or *Land Title Act 1994*; and
- Obtain agreement to interfere with a service provider's infrastructure under the *Water Supply (Safety and Reliability) Act 2008.*

Relevant to works proposed within the SBICSDA, infrastructure locations have been scouted with relevant landowners, taking into account their preferences. These infrastructure locations will be formally accepted by relevant landholders through the CCA process described above.

Relevant to works proposed within PL176/ PL1088, Santos GLNG is required to consult with SunWater for any crossings of the Woleebee Creek to Glebe Weir Pipeline located within and adjacent to the SBICSDA.

However, it is noted that Santos GLNG's proposed crossings of the Woleebee Creek to Glebe Weir Pipeline are not located within the SBICSDA, and therefore do not form part of the MCU application. Notwithstanding, Santos GLNG's would enter into a 3rd party crossing agreement with SunWater as required by Section 192 of the *Water Supply (Safety and Reliability) Act 2008*.

In addition, the grant of the petroleum lease and associated environmental authority for PL176/PL1088 in 2000, was subject to public notice (i.e. s42 of the *Environmental Protection Act 1994* Reprint No. 4B) via newspaper advertisement of the lease area and proposed activities, including those activities proposed as part of this MCU application. This consultation was undertaken prior to the declaration of the SBICSDA under Part 10 of the *State Development and Public Works Organisation (State Development Areas) Regulation 2009.*

Given the above mentioned extensive and ongoing consultation activities that have occurred for the infrastructure relevant to this MCU application (and with the GFD Project), it is recommended that no further Public Notification is undertaken as part of the SDA assessment.

2. PROPOSED ACTIVITY

2.1 Site Location

GFD Project area comprises 35 petroleum tenements, one of which, PL176/ PL1088, incorporates the site subject to this application. As detailed in Section 1.2, the works are proposed to be located on Lot 27 FT969.and Lot 3Ft845130.

The location of this lot in relation to the SBICSDA and the area in which the works are proposed to be undertaken are shown on Figure 1.2, as the proposed crossing point.

2.2 Activities Subject to this Application

The co-located linear infrastructure is proposed to be constructed and operated within the SBICSDA, are:

- Gas and water gathering pipelines; and
- Underground electricity lines.

The linear infrastructure detailed above will be contained within one crossing point of the SBICSDA (Figure 1.2). At the nominated point of crossing the SBICSDA is approximately 316m wide. The infrastructure will cross the full width of the SBICSDA, however, there will be some flexibility in design and sitting within the Right of Way (RoW). The construction disturbance footprint will be restricted to the RoW and a buffer comprising an approximately 15,600m^2 area (50m x 316m at its widest point).

The EA authorises, subject to conditions, the construction of the proposed gas and water gathering pipelines, and electricity lines within PL176/PL1088.

2.2.1 Gas and Water Gathering Pipelines

To transport gas and water from the production wells to the gas compression facilities, gas and water gathering pipelines will be required to be constructed. Construction of these will be undertaken using a combination of conventional earthmoving equipment and specialist pipeline equipment. Water gathering pipelines will consist of high-density polyethylene pipe of a 110mm in diameter, while the gas gathering pipelines will be a diameter of 250mm and constructed from steel and HDPE The construction footprint for co-located gathering pipelines within the SBICSDA would be approximately 1.56 ha , and a minimal operational footprint with RoW maintained.

Gas and water gathering pipelines will be buried to a minimum depth of 1200mm below natural ground level within the SDA. This is detailed on the Service Layout Drawing attached as Appendix C.

Signage will be provided to identify the locations of the gathering lines. Santos GLNG proposes to use their standard construction methodology for laying services via open trench and backfilling which has been approved as part of other applications for works in the SBICSDA. This is detailed further in Section 2.2.3.

2.2.2 Electricity Lines

Power will be reticulated across the SBICSBA via below-ground power lines co-located with the proposed water and gas gathering pipelines.

Power lines will be buried to a minimum of 1200mm depth within the SBICSDA, including mechanical cable protection which shall be placed not more than 75mm above the power lines. This is detailed on the Service Layout Drawing attached as Appendix C.

2.2.3 Construction under a Rail Corridor

Santos GLNG proposes to employ their standard works methodology for burying services which has been approved for previous MCU activities in the SBICSDA. This involves trenching and back filling where the cable and pipelines are to be laid. At the base of the trench sand bags will be used to protect pipes and cables as required. The pipes will be located at a minimum depth of 1200mm.

Backfill material will consist of material excavated from the trench with large course material and rocks filtered out in the immediate layers around the pipes/cables to prevent damage. Courser material will be used in the upper layers of the trench as long as there are enough soft materials to fil voids.

To prevent subsidence all voids will be filled with sufficient soft fine materials. The topsoil layer will be replaced once trench is sufficiently filled. The reinstated area will be compacted to ensure the ground is settled. If there are inconsistencies in ground levels further topsoil material of equal quality will be imported and placed in the area of disturbance until the natural ground level has been restored. Signage will be placed in the ground above the newly laid services, so their location is easily identified in future.

This methodology is shown in design drawings attached as Appendix C.

In accordance with the previous MCU approval for Infrastructure Facility (gas and water gathering pipeline, access tracks/roads and electricity and communication lines) APC2016/005, Santos GLNG are proposing that Condition 5 of that approval also be applied to this application. The requirement is that *Technical Requirement No. MCE-SR-16 Requirements for Services under the Railway Corridor (Non-QR Services)* in particular section 2.6.1 (Electrical Power Cables), 2.6.2 (Gas Lines) and Section 7 (Trenching) be applied should a rail proposal be approved in this location.

This will require the infrastructure approved as part of this application to be re-laid in accordance with the above requirements. A copy of the previous MCU approval conditions set by the Coordinator-General for the past SBICSDA crossing carried out by Santos will be included as part of the SDA application.

2.2.4 Road Transport

Materials and plant/machinery required for construction would be transported to the site largely using existing roads. The use of local and state controlled roads for the project would be subject to the traffic and transport commitments provided in Appendix 4 of the Coordinator-General's evaluation report on the environmental impact statement for the GFD Project, including continued engagement with the Department of Transport and Main Roads and regional councils in the application of new and existing infrastructure agreements to the GFD Project.

Due to the proposed construction work within the SBICSDA occurring on private land, it is not Santos GLNG's intent to develop a site specific traffic management plan for the private access roads. Traffic management will be agreed with the land owner through the CCA agreement process.

2.3 Decommissioning and Rehabilitation

To minimise the long term impacts of the GFD Project within the SBICSDA, all significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder will be rehabilitated.

This is reflected in EA conditions, Schedule J which outlines requirements for rehabilitation.

Under the EA, a Rehabilitation Plan must be developed by a suitably qualified person and must include the following:

a) rehabilitation goals; and

b) procedures to be undertaken for rehabilitation that will:

   i. achieve the final rehabilitation acceptance criteria set out in the EA; and

   ii. provide for appropriate monitoring and maintenance

Decommissioning will involve the safe dismantling and removal of infrastructure and assets, while rehabilitation will involve the restoration of landform and vegetation in accordance with the requirements of the environmental authority for PL176. Rehabilitation will generally commence following construction activities and the removal of temporary infrastructure and be completed within 12 months.

2.3.1 Gas and Water Gathering Pipelines

Where there are no future beneficial uses of pipelines, they would be decommissioned at the end of gas production and left in place to minimise further disturbance. Where pipelines pass under a railway line they will be cut and filled with a structural material (e.g., concrete) to prevent potential future subsidence due to corrosion or breakage in accordance with regulatory requirements.

The EA requires that pipeline trenches must be backfilled, and topsoils reinstated within three months after pipe laying. Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction. The EA also requires that backfilled, reinstated and revegetated pipeline trenches and right of ways must be:

a) a stable landform

b) re-profiled to a level consistent with surrounding soils

c) re-profiled to original contours and established drainage lines; and

d) vegetated with groundcover which is not a declared plant pest species, and which is established and growing

2.3.2 Electricity Lines

Electricity lines would remain in situ as they have potential beneficial uses following the end of gas production and would not impact future uses of the SBICSDA.

2.3.3 Supporting Infrastructure

Where there are no future beneficial uses, supporting infrastructure including signage and fencing would be removed in accordance with regulatory requirements and the right of way will be rehabilitated in accordance with conditions of the environmental authority.

2.4 Proposed Project Timeline

Approved exploration and appraisal activities are currently underway across the GFD Project's petroleum tenure to improve understating of the available gas resources. For the purpose of the assessment undertaken as part of the project EIS an indicative 30 year program has been produced (refer to Section 1.8.1 of this report). Of this, production from the wells associated with the Scotia gas field that are approved under the current EA have been progressively being explored, appraised and developed since 2017. It is anticipated that the works proposed as part of this application that intersect the SBICSDA will take place within the 2023 program of works.

3. DEVELOPMENT SCHEME OF SBICSDA

3.1 Introduction

The provisions of the Development Scheme for SBICSDA are applicable for the assessment of the land uses proposed to be undertaken as part of the GFD Project which falls within the SBICSDA.

The SBICSDA intersects with the GFD project in the Scotia gas field, extending for 17km through PL 176/1088. Of this 17km there are five crossing points of infrastructure with the SBICSDA, all located in the northern half of PL 176/PL1088 (Figure 1.2). Four of these crossing points have been approved under APC2016/005.

The proposed crossing point shown in Figure 1.2, is the area that is subject to this application.

The activities described in Section 2 of this report can be classified as both infrastructure facilities (electricity lines/cables) and service infrastructure (water reticulation/distribution) which are uses that are considered consistent with the corridor and highly likely to meet the SBICSDA Objectives. Materials transportation infrastructure is not defined in the consistent use table of the Development Scheme, however an assessment of the SBICSDA Objectives against all of the proposed activities is presented in Section 3.2.

3.2 Intent and Objectives of Development Scheme for SBICSDA

The SBICSDA Development Scheme details the intent of the development scheme and the objectives that it is seeking to achieve. The intent of the Development Scheme is to ensure that land uses are appropriate for the SBICSDA, provides for referral and public consultation, and to assist in achieving ecological sustainability of activities undertaken within the SBICSDA.

An assessment of the GFD Project against both the intent and objectives of the SBICSDA has been undertaken to determine the appropriateness of the proposed uses (Table 3.1). This assessment ensures that the proposed land uses do not result in the sterilisation of land for future activities while allowing for flexibility for Santos GLNG in the development of the gas fields.

TABLE 3.1: OBJECTIVE OF DEVELOPMENT SCHEME FOR SBICSDA

Objective	Response
(a) provide, manage and plan land for the establishment of an open access multi-user railway of regional, state and national significance, other rail infrastructure and the establishment of other key infrastructure projects to facilitate economic development	This objective allows for the construction of key infrastructure projects within the boundaries of the SBICSDA. Given the nature of the proposed infrastructure and services, they will not result in the sterilisation of land within the SBICSDA and will therefore not restrict the construction of operation of the multi-user railway or other key infrastructure.
(b) manage and plan for the impacts of development on existing infrastructure	The GFD Project will utilise existing infrastructure, such as access track and electricity and telecommunication infrastructure where possible to minimise the development footprint.
(c) ensure that the integrity and functionality of the SBICSDA is maintained and protected from land uses and activities that may be incompatible with, or adversely affect, the use of the SBICSDA for an open access multi-user railway of regional, state and national significance and other rail	Large scale key project infrastructure is not proposed to be located within the SBICSDA, with the only infrastructure being that detailed in Section 2 of this report. This will assist in ensuring that the integrity and functionality of the SBICSDA is maintained. The activities and infrastructure located within the SBICSDA will be designed and located such that there is no impact on the future construction or operation of the rail line. The disturbance area will be restored to a sufficient standard as required by the project EA EPPG03515915, and if the railway is approved, Santos GLNG will ensure the infrastructure complies with the *Technical Requirement No. MCE-SR-*

Objective	Response
	16 Requirements for Services under the Railway Corridor (Non-QR Services).
(d) ensure the physical characteristics of land are considered in determining the suitability and location of development	The physical characteristics of the section of the SBICSDA to which this application relates, and an assessment of potential impact on this is provided in Section 5 of this report. This information has been collated from the studies undertaken for the GFD Project EIS and a review of current desktop environmental resources.
(e) ensure development recognises and protects cultural heritage and community values	Cultural heritage and community values are addressed in Section 4.4 of this report. This information has been collated from the studies undertaken for the GFD Project EIS.
(f) ensure the impacts of development on the environment, including cumulative impacts, are minimised to meet the requirements of applicable government policies	An assessment of the potential impacts of the project has been undertaken and is detailed in Section 5. This is supported by proponent commitments and mitigation measures proposed to be undertaken as detailed in the GFD Project EIS. Current approvals that regulate the activities within PL176 include: • Environmental Authority EPPG03515915 (Appendix B); and • Approved CHMP with the relevant indigenous parties.
(g) ensure areas of high ecological significance within and adjacent to the SBICSDA are protected	There are no areas of high ecological significance within the affected section of the SBICSDA. This has been reviewed and is addressed further in Section 4.3. The EA under which Santos GLNG currently operates limits disturbance to Category A and B Environmentally Sensitive Areas, unless specifically approved.

4. EXISTING ENVIRONMENT

The environmental constraints detailed in this Chapter are summarised in Figure 4.1, showing the areas of interest and environmentally sensitive areas in relation to the proposed works.

4.1 Land Use

The GFD Project, and in particular the area which intersects with the SBICSDA and subject to this application supports a range of land uses, dominated by:

- Cattle breeding;
- Agriculture; and
- Rural residences.

The properties on which the works are proposed are comprised of large rural holdings with rural activities being undertaken. Regional social infrastructure is provided in Wandoan.

4.2 Site Physical Characteristics

4.2.1 Geology, Topography and Soils

The area subject to this application is located within an area dominated by geological units belonging to both the Jurassic age Walloon Coal Measures (Surat Basin) and the late Permian Bandanna Formation (Bowen Basin).

The site is located within the Taroom Hills physiographic region which consists of gently sloping to strongly undulating dissected broad upland plateau remnants, predominately on sandstone, with steep ravines and sandstone escarpments. Some areas consist of broad low interfluves. The topography of the area is characterised by low-relief undulating low hills with the elevation of Lot 5 FT1027 ranging from 300m to 260m AHD.

The SBICSDA traverses several soil types. Dark brown and grey-brown soils (dermosols) medium to deep (0.6m to >1.0m) are the dominant soils, however the corridor also extends over areas of Duplex soils (chromosols, kurosols and sodosols) with neutral to moderately alkaline, locally strongly alkaline subsoils.

These include both soils of shallow to medium depth and also medium to deep soils. The duplex soils include problem soil classes being Sodic/dispersive soils and sandy duplex soils.

The main agricultural land classes over which the southern part of the SBICSDA lies include cropping land and limited crop land. The wider area is Class A agricultural land under the Agricultural Land Classification with the proposed works located within a Strategic Cropping Area under the *Regional Planning Interests Act 2014*.

4.2.2 Surface and Groundwater

The site is located within the catchment of the Dawson River and the Upper Dawson river sub-catchment which is part of the Fitzroy River Basin. The mapping undertaken for the GFD Project EIS indicates that the SBICSDA crosses one main waterways, Bungaban Creek (which is a tributary of Junanah Creek) within PL176.

The proposed works are not located within immediate vicinity of Bungaban Creek. Rainfall and streamflow in the surface waters is characterised by a distinct seasonal and highly variable nature. There is no historic water quality monitoring data for the existing Santos GLNG Scotia gas field component of the SBICSDA.

The nearest mapped waterways to the proposed works are Stakeyard Creek (a non-perennial category 2 waterway and a medium risk waterway for the purposes of fisheries values) almost 2km to the west, and Bullock Creek (a non-perennial category 3 waterway and a high risk waterway for fisheries values) just over 1 km to the north of the proposed works.

There is evidence of unmapped drainage lines within the property, adjacent and setback from the SBICSDA that will likely collect surface water at times of high rainfall.

In the Upper Dawson catchment, the predominant uses of surface water are for livestock, domestic supply and water harvesting. There are existing water entitlements for domestic supply and for stock on lots intersecting with the SBICSDA.

4.2.3 Air and Noise Environment

The subject site is located in a largely rural area with the main sources of air pollutants likely to be particulates associated with rural activities and from wind-blown dust. The main sources of noise are from traffic and farm machinery.

4.3 Ecological Characteristics

The proposed SBICSDA crossing point (see Figure 2) is largely devoid of vegetation having been cleared for grazing and other rural activities. Table 4.1 provides a summary of the terrestrial ecology features identified for the subject site.

TABLE 4.1: TERRESTRIAL ECOLOGY SITE CHARACTERISTICS

Ecology	Site Characteristics
Significant Flora	Nine conservation significant flora species listed under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the *Nature Conservation Act 1992* have been recorded in ecological surveys undertaken for the GFD Project. However, none of these species were recorded within the proposed SBICSDA crossing location. Essential habitat for 10 conservation significant flora species has been mapped within the GFD project area. However, no essential habitat has been mapped within the proposed SBICSDA crossing location. The Queensland Protected Plants Trigger map was requested for the area on 6 June 2023and these results show there are no EVNT flora species or high-risk triggers areas within or adjacent to the proposed works area or the wider Lot 27 FT969.
Significant Fauna	Thirteen conservation significant fauna species listed under the provisions of the EPBC Act and/or the *Nature Conservation Act 1992* have been recorded in ecological surveys undertaken for GFD Project. However, none of these species were recorded within the proposed SBICSDA crossing location. Essential habitat for eight conservation significant fauna species has been mapped within the GFD project area. However, none of these habitats were mapped within the proposed SBICSDA crossing location in PL 176/ PL 1088. A Wildlife Online search was conducted on 6 June 2023 in order to interrogate up to date databases for rare and threatened species that may have been sighted in the area. Over a search area of 5km no conservation significant records were retrieved.
Environmentally Sensitive Areas (ESAs)	No ESAs have been identified within the proposed SBICSDA crossing location. Category C or R containing endangered ESAs has been mapped ~230 m north of the SBICSDA crossing location. Category C or R containing Of-Concern has been mapped ~270 m south of the SBICSDA crossing location. ESAs have been mapped as intersecting with the construction disturbance zone outside of the SBICSDA crossing location. ESAs will not be impacted by the proposed works within the SBICSDA crossing location.
Matters of State Environmental Significance (MSES)	No MSES have been identified within the proposed SBICSDA crossing location. The nearest MSES are as follows: – ~ 400m southeast and northwest: MSES regulated vegetation (GBR Riverine)

	– ~ 700m southwest: MSES regulated vegetation (endangered or of concern)
Matters of National Environmental Significance	An updated EPBC Act Protected Matters search (disturbance area with 5km buffer) was conducted on 6 June 2023, where 5 listed threatened ecological communities, 32 listed threated species, and 12 listed migratory species were identified as potentially occurring. Of these the only listed species 'known to occur' within the area was Brigalow (*Acacia harpophylla* dominant and co-dominant). No Brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological communities occur within the direct proposed SBICSDA crossing location. The SBICSDA is mapped as non-remanent vegetation. Based on the online database Biomaps no EPBC Act listed flora or fauna species have been recorded within the proposed SBICSDA crossing location.

Aquatic ecology values within the GFD Project include watercourses, wetlands, springs and groundwater dependent ecosystems. However, none of aquatic ecology values are located within the proposed SBICSDA crossing location.

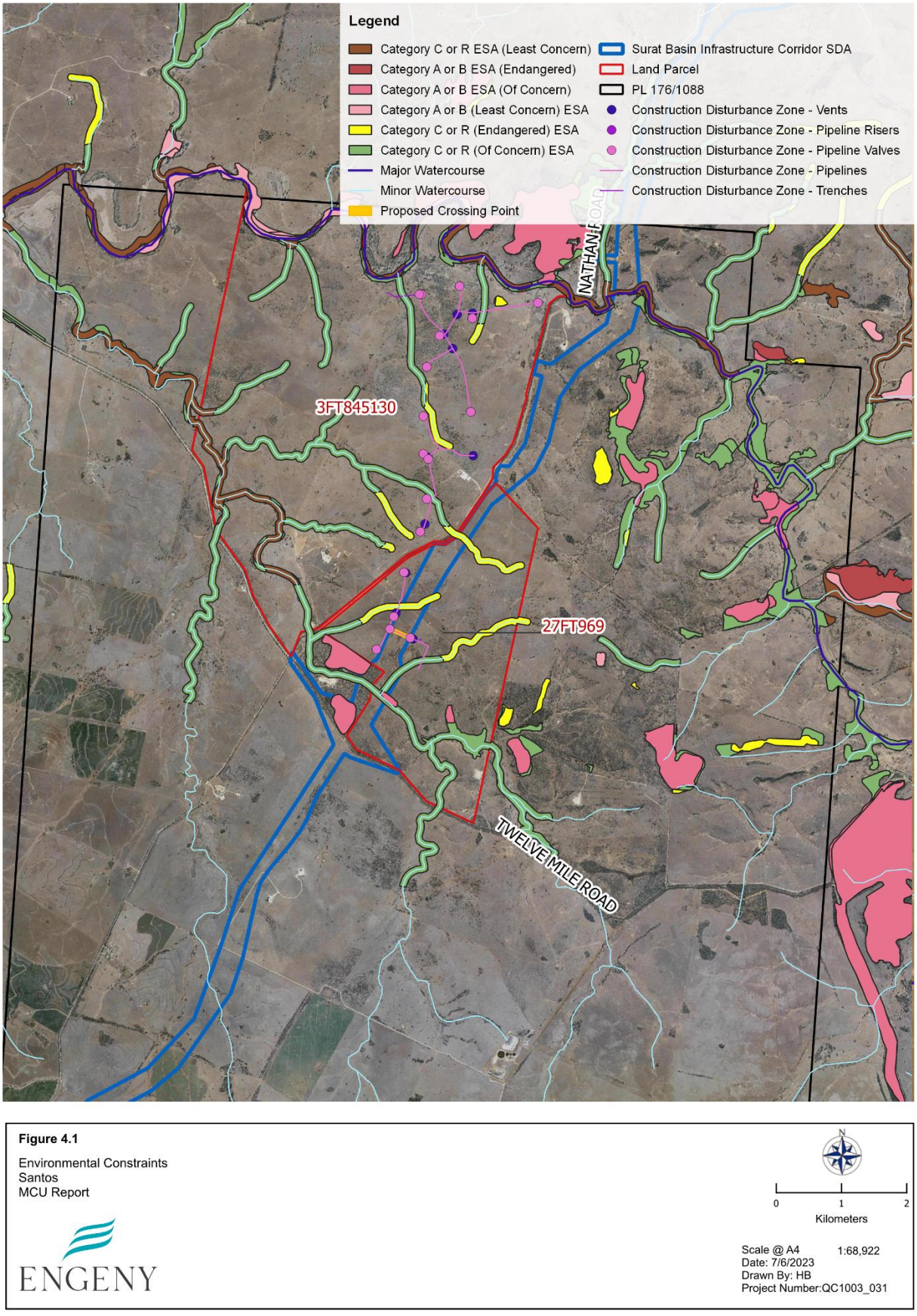


Figure 4.1: Environmental Constraints

4.4 Cultural Heritage and Community Values

4.4.1 Indigenous Cultural Heritage

Santos GLNG has developed an understanding of the indigenous cultural heritage landscape of the GLNG Project area through conducting a large number of inspections and surveys since 2009, however it is possible that other areas and places of cultural heritage may be identified during proposed operations.

In accordance with Part 7 of the *Aboriginal Cultural Heritage Act 2003*, where category A and B Aboriginal parties and areas covered by registered Aboriginal cultural heritage bodies exist, Santos GLNG has mutually agreed with the Aboriginal parties to provisions defined within Cultural Heritage Management Plans (CHMPs). A CHMP has been agreed with the Iman People (2) (QC97/55) in the eastern and central GFD Project area which commenced on 4 February 2009.

The existing CHMP covers not only the existing tenure and activities proposed but also typically contain expansion clauses that apply to areas or activities not previously covered by an agreement but are with the Aboriginal party areas of the relevant parties.

There are no national or international registered indigenous cultural heritage places located within the proposed SBICSDA crossing location.

4.4.2 Non-Indigenous Cultural Heritage

Recent desktop searches undertaken as part of this reports collation identified that within the area subject to this application there are:

- no places were identified on the World Heritage List;
- no places were identified on the National Heritage List or the Commonwealth Heritage List;
- no places currently on the Queensland Heritage Register;
- no places identified under the *Nature Conservation Act 1992*; and
- no places listed on local heritage registers.

4.4.3 Community Values

The Scotia gas field locality is noted for the production of cattle and grain and has an important heritage drawing on the Leichhardt Pot Essington expedition of 1844. The residents of this area exhibit a strong attachment to the existing rural-based identity and sprit and act to maintain, promote and share this identify through community-based events. There are indications that they are willing to embrace new economic activity and develop their community identify further while building on and sustaining their agricultural heritage.

Prior to the development of resources projects, the Scotia gas field locality showed signs of economic vulnerability, indicated by declining populations and an ageing workforce. Notwithstanding this, residents consider the ongoing viability of the region to be dependent on agriculture. The proposed works within the SBICSDA will not impact the existing agricultural uses of the land.

4.5 Cumulative Impacts

Chapter 26 of the GFD Project EIS addresses cumulative impacts of the project with these also applying to the proposed activities within the SBICSDA. This assessment included all major projects within the GFD Project that are currently being assessed, have been declared as significant projects under the *State Development and Public Works Organisation Act 1971*, may use resources located within the region that are the same as those to be used by the GFD Project, and those that could potentially compound residential impacts that the GFD Project may have on environmental or social values.

The GFD Project EIS considered the Surat Basin Rail Project which is now contained within the SBICSDA.

5. ASSESSMENT OF POTENTIAL IMPACTS AND MITIGATION MEASURES

5.1 Introduction

Santos GLNG has developed a management framework to be implemented for the GFD project. A critical component to the mitigation of impacts is the planning and analysis of projects. The framework includes the Santos GLNG's GFD Project Environmental protocol for constraints planning and field development (Constraints protocol) (GFD Project EIS Appendix Y-B). The Constraints protocol details the approach Santos GLNG will take in identifying, assessing and managing potential impacts on environmental values during field planning across the GFD project.

The constraints protocol provides a framework to guide placement of infrastructure and adopts the following management principles:

- Avoidance – avoiding direct and indirect values;
- Minimisation – minimise potential impacts;
- Mitigation – implement mitigation and management measures;
- Remediation and rehabilitation – actively remediate and rehabilitate areas; and
- Offset – offset residual adverse impacts in accordance with regulatory requirements.

An assessment of potential impacts and the proposed mitigation measures applicable to the project are addressed in the following sections.

5.2 Positioning of the Crossing Point and Impact Mitigation

The proposed SBICSDA crossing, and intersection point has been selected to minimise disturbance to existing land uses and environmental values of the site. Thus, the works, subject to this application, have largely achieved avoidance through site and route selection.

This route selection and the construction management practices that will be employed will minimise and mitigate all potential impacts.

The EA authorises, subject to conditions, the construction of the proposed gas and water gathering pipelines and electricity lines within PL176.

5.3 Land Use

The works proposed for the SBICSDA will be undertaken in a manner which ensures that they are compatible with the use of the corridor as a multi-use railway. The proposed uses will be located, designed and constructed to ensure that they do not impinge on the future rail construction or operation. The design of the SBICSDA crossing will be undertaken in accordance with Santos GLNG standard practices for laying services via trenching and backfilling with proposed plans developed for the project attached as Appendix C.

The disturbance area will be restored to a sufficient standard as required by the project EA EPPG03515915, and if the railway is approved, Santos GLNG will ensure the infrastructure complies with the *Technical Requirement No. MCE-SR-16 Requirements for Services under the Railway Corridor (Non-QR Services)*.

The GFD Project Decommissioning and Abandonment Management Plan (GFD Project EIS Appendix Y-N) describes the management framework at the ceasing of petroleum activities. This includes leaving a landform that is stable and compatible with the intended post-closure land use. This is also supported by a range of supporting management plans and procedures. These have all been amended and/or updated, as required, to align with the requirements set out in the EA, particularly for management of soil and erosion/sedimentation issues (Schedule C), monitoring programs for water (Schedule B), establishing baseline and stimulation activities (Schedule L) and rehabilitation (Schedule J) and offsets requirements (Schedule D).

5.4 Land Resources

There are a number of potential impacts to land resources as a result of the proposed activities, including:

- Change to landform;
- Loss of soil resources;
- Degradation of soil resources; and
- Uncontrolled release to soil.

An assessment of the pre-mitigated significance of the impact was undertaken as part of the GFD Project EIS with the identification that the significance of impact assessed as being most significant during the construction stage with this lessening for the operations and decommissioning stages.

Impact assessment and mitigation measures are summarised in Table 9-8 of the GFD Project EIS. Mitigation measures proposed in the GFD Project EIS in addition to the Constraints protocol include the implementation of a range of management plans such as the Environmental Management Plan (GFD Project EIS Appendix Y), Erosion and Sediment Control Plan (GFD Project EIS Appendix Y-E), Rehabilitation Management Plan (GFD Project EIS Appendix Y-M), and the Decommissioning and Abandonment Management Plan (GFD Project EIS Appendix Y-N).

These have all been amended and/or updated, as required, to align with the requirements set out in the EA, particularly for management of soil and erosion/sedimentation issues (Schedule C), monitoring programs for water (Schedule B), establishing baseline and stimulation activities Schedule I) and rehabilitation (Schedule J) and offsets requirements (Schedule D). The management plans for the project are detailed further in Section 5.10Surface Water Resources

The project works have the potential to impact on surface water through:

- Release of sedimentation as a result of construction activities;
- Temporary or permanent changes to flow regime through changes in landform, including crossings;
- Increased erosion as a result of changes in flow regime; or
- Release of contaminants through spills or uncontrolled land releases (e.g. of sewage effluent, hydrotest water, treated GLNG water, drilling fluids).

Despite there being no mapped watercourses located within the proposed SBICSDA crossing location, there is drainage lines within the wider property and waterways in adjacent areas which will require the construction crew to implement appropriate surface water management procedures, particularly during and following rain events. Notwithstanding, the GFD Project and Santos GLNG Project procedures and management plans required under the EA will be used to manage potential impacts on surface waters resulting from approved activities. Relevant plans include:

- GFD Project Environmental Management Plan
- Erosion and Sediment Control Management Plan
- Decommissioning and Abandonment Management Plan
- Land Release Management Plan
- Chemical and Fuel Management Plan, and
- Environmental Monitoring and Reporting Procedure.

These have all been amended and/or updated, as required, to align with the requirements set out in the EA, particularly for management of soil and erosion/sedimentation issues (Schedule C), monitoring programs for water (Schedule B), establishing baseline and stimulation activities Schedule I) and rehabilitation (Schedule J) and offsets requirements (Schedule D). The management plans for the project are detailed further in Section 5.10Air and Noise

5.4.1 Air Quality

The uses proposed within the SBICSDA have the potential for particulate matter (dust) and vehicle emissions associated with unmitigated construction work to result in a moderate to high magnitude impact within 500m of receptors. Where construction activities are undertaken

greater than 500m from receptors potential particulate matter and vehicle emission are considered to be low magnitude impact. The crossing points are not located within 500m of receptors according to the EIS.

Santos GLNG adopts the commitment within the Santos Ltd environmental policy and controls outlined in Environment Hazard Standard EHS05 Air emissions required to manage risks of specific hazards associated with air emission to acceptable levels, which includes:

- Planning and approvals – potential air emissions must be considered during planning of operation and activities, appropriate approvals obtained;
- On-ground activity – operations, facilities and work activities are conducted in a manner that minimise potential pollution;
- Decommissioning – decommissioning and rehabilitation activities will minimise impacts from air emissions; and
- Monitoring and reporting – exceedances will be reported to EHS Toolbox and to the relevant authority.

Schedule G of the EA set out Air Quality requirements for project.

5.4.2 Noise

Potential noise impacts may result when project activities occur within close proximity to sensitive receptors and have the potential to impact on human health and wellbeing and fauna while vibration may impact on property. Noise impacts depend on the type and number of plant operating at one time and the proximity to the sensitive receptor. Construction or operational noise or vibration impacts from the proposed works are not predicted due to the large distance between the proposed works and sensitive receptors, and the implementation of noise management measures.

A Noise Management Plan (GFD Project EIS Appendix Y-K) has been prepared for the GLNG Project including the GFD Project outlining the strategy and procedures developed by Santos GLNG to manage noise emissions. The objective of this plan are to:

- Facilitate compliance with relevant State legislation, regulations and approvals;
- Facilitation compliance with Santos Environmental Hazard Standard EHS 12 Noise emissions; and
- Provide a framework for Santos GLNG to:
  - Minimise noise emission from Santos GLNG assets and activities
  - Engage stakeholders including landholders and location community in assisting Santos GLNG in the identification and management of noise emissions
  - Identify, monitor and prioritise the management of noise emission present on Santos GLNG assets and activities minimise nuisance noise emissions to sensitive receptors.

This plan has been updated to align with EA conditions set out in Schedule F.

5.5 Ecology

There are a range of potential impacts to terrestrial and aquatic ecology that may result from the works within the SBICSDA, including:

- Vegetation clearing and associated habitat loss;
- Displacement of native flora and fauna species by weed and pest species;
- Edge effects; and
- Disturbance to fauna and fauna from noise, dust and light.

The proposed SBICSDA crossing and intersection point have been selected to minimise disturbance to vegetation and other ecological values of the site and are authorised by the EA.

A number of project management plans detail mitigation measures that are applicable to the ecological features of the GFD Project and will be implemented for uses proposed in the SBICSDA. These include:

- GFD Project Environmental Management Plan
- Fauna Management Plan
- Pest and Weed Management Plan

- Rehabilitation Management Plan, and
- Significant Species Management Plan.

These have all been amended and/or updated, as required, to align with the requirements set out in the EA, particularly for management of soil and erosion/sedimentation issues (Schedule C), monitoring programs for water (Schedule B), establishing baseline and stimulation activities Schedule I) and rehabilitation (Schedule J) and offsets requirements (Schedule D). The management plans for the project are detailed further in Section 5.10

5.6 Cultural Heritage

To avoid impact on cultural heritage places Santos GLNG will be implemented in a staged approach, the first step being the incorporation of known heritage places into the Santos GLNG GIS system to assist in ongoing constraints planning and in the field development process. In areas identified for potential development the overarching mechanism for protecting cultural heritage is the Environmental Hazard Standard (EHS) 11 Cultural Heritage which defines the process to minimise the projects impact on Cultural Heritage and to ensure that relevant statutory requirements are complied with.

The EHS 11 is supported by cultural heritage field personnel and a cultural heritage management system which ensures that construction work is undertaken according to the CHMPs and the *Aboriginal Cultural Heritage Act 2003.* This will include the implementation of cultural heritage awareness training and undertaking pre-clearance surveys.

5.7 Decommissioning and Rehabilitation

The objectives of the decommissioning and rehabilitation activities for the project are to ensure the landform is:

- Safe for humans, native fauna and livestock;
- Non-polluting; and
- Stable and able to sustain appropriate land use.

To ensure these outcomes are achieved the EA includes specific final rehabilitation acceptance criteria (J11), which will apply to works undertaken within the SBICSDA. The criteria are:

All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised

by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance

criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

(a) greater than or equal to 70 per cent of native ground cover species richness

(b) greater than or equal to the total per cent ground cover

(c) less than or equal to the per cent species richness of declared plant pest species

(d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional

(a) ecosystem(s), then:

i. at least one Regional Ecosystem(s) from the same broad vegetation group, as demonstrated by

ii. the predominant species in the ecologically dominant layer, must be present; and

iii. the Regional Ecosystem present in (J11)(d)(i) must possess an equivalent or higher conservation

iv. value (biodiversity status) than the Regional Ecosystem(s) in either the adjacent land or predisturbed

v. land.

Decommissioning and rehabilitation will occur over the life of the project and will be undertaken at the conclusion of each use. Decommissioning will occur as an activity ceases or is no longer required for the project and will be undertaken in accordance with Schedule J of the EA which sets out rehabilitation requirements.

Regular monitoring of rehabilitated areas will typically be undertaken for three years following the rehabilitation works, with the monitoring incorporating inspections for:

- Soil erosion;
- Revegetation success;
- Seed and pest introduction; and
- Integrity of water diversion drains and sediment control structures.

These works will be undertaken in accordance with the Schedule J of the EA which sets out rehabilitation requirements and requires that a Rehabilitation Plan be developed in accordance with EA condition set out in this schedule.

5.8 Management Plans

The environmental management framework used for the GLNG project is also applied to the GFD Project to achieve predictable and sustainable outcomes. An overview of the management framework is detailed below (Figure 5.1) and was described in Section 6 of the GFD Project EIS.

As the GFD Project is an extension of the gas field component of the GLNG Project, there will be common infrastructure, resources, workforces and activities across both projects. Consequently, the management plans and strategies developed and implemented for the approved GLNG Project will be applied to the GFD Project following revisions necessary to ensure that environmental conditions, values and potential risks associated with the GFD Project are adequately addressed.

Management system standards and policies which will be implemented during the GFD project to identify and control environmental health and safety risks are listed in the GFD Project EIS Table 6-3. Management Plans which apply to the GFD Project are listed in the GFD Project EIS Table 6-4 and attached to the EIS in locations defined within Table 6-4. It is through these standards and management plans that the potential impacts defined within the EIS will be controlled, and the monitoring, reporting and recording of actions will be defined. These have all been amended and/or updated, as required, to align with the requirements set out in the EA particularly for management of soil and erosion/sedimentation issues (Schedule C), monitoring programs for water (Schedule B), establishing baseline and stimulation activities Schedule I) and rehabilitation (Schedule J) and offsets requirements (Schedule D).

Figure 5.1: Overview of Santos GLNG Management Framework

6. CONCLUSIONS

SBICSDA requiring MCU approval under the provisions of the Development Scheme. The proposed works that will intersect with the SBICSDA, contained within Lot27 FT969, are:

- Gas and water gathering pipelines; and
- Electricity lines.

The existing EA authorizes, subject to conditions, the construction of the proposed gas and water gathering pipelines; and electricity lines within PL176.

The proposed SBICSDA crossing locations have been selected to minimise disturbance to existing land uses and environmental values of the sites. Thus the works, subject to this application, have largely achieved avoidance through site and route selection. This route selection and the construction management practices that will be employed will minimise and mitigate all potential impacts. At the completion of their use the relevant infrastructure will be decommissioned in accordance with relevant legislative requirements.

The GFD Project will utilise the environmental management framework that has been established for the GLNG project to minimise environmental impacts during construction, operation and decommissioning.

The proposed land uses to be undertaken within the SBICSDA are consistent with the intent and objectives of the Development Scheme and will not impinge on future rail activities within the SBICSDA or result in land sterilisation.

7. QUALIFICATIONS

(a) In preparing this document, including all relevant calculation and modelling, Engeny Australia Pty Ltd (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

(b) Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

(c) Engeny reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:

  (i) Additional sources of information not presently available (for whatever reason) are provided or become known to Engeny; or

  (ii) Engeny considers it prudent to revise any aspect of the works in light of any information which becomes known to it after the date of submission.

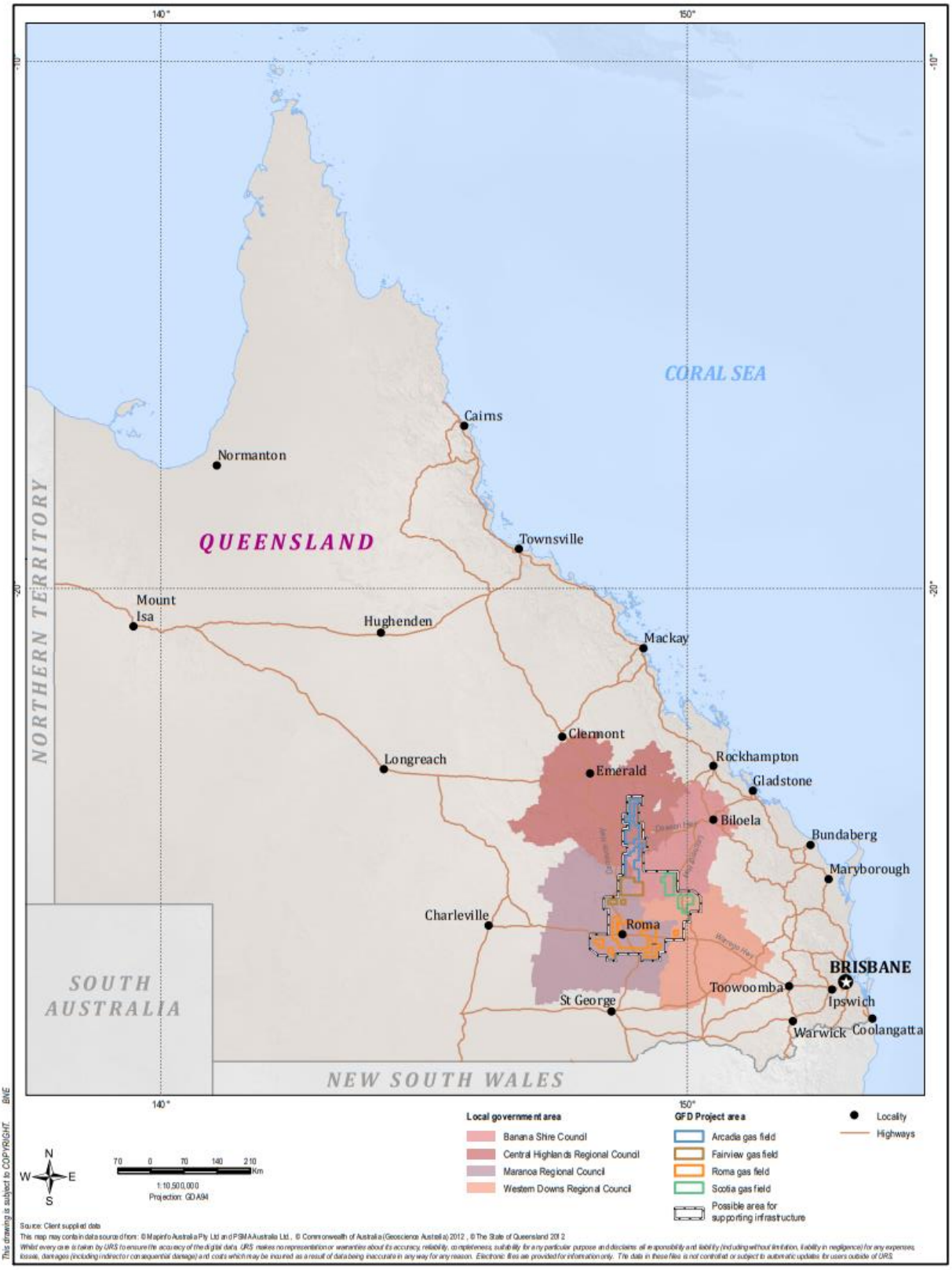
(d) Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the works, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works. All limitations of liability shall apply for the benefit of the employees, agents and representatives of Engeny to the same extent that they apply for the benefit of Engeny.

(e) This document is for the use of the party to whom it is addressed and for no other persons. No responsibility is accepted to any third party for the whole or part of the contents of this Report.

(f) If any claim or demand is made by any person against Engeny on the basis of detriment sustained or alleged to have been sustained as a result of reliance upon the Report or information therein, Engeny will rely upon this provision as a defence to any such claim or demand.

(g) This Report does not provide legal advice.

APPENDIX A: GFD PROJECT EIS FIGURES



Santos GLNG Project

GFD PROJECT EIS

GFD PROJECT LOCATION

URS | INTRODUCTION | Figure: 1-1

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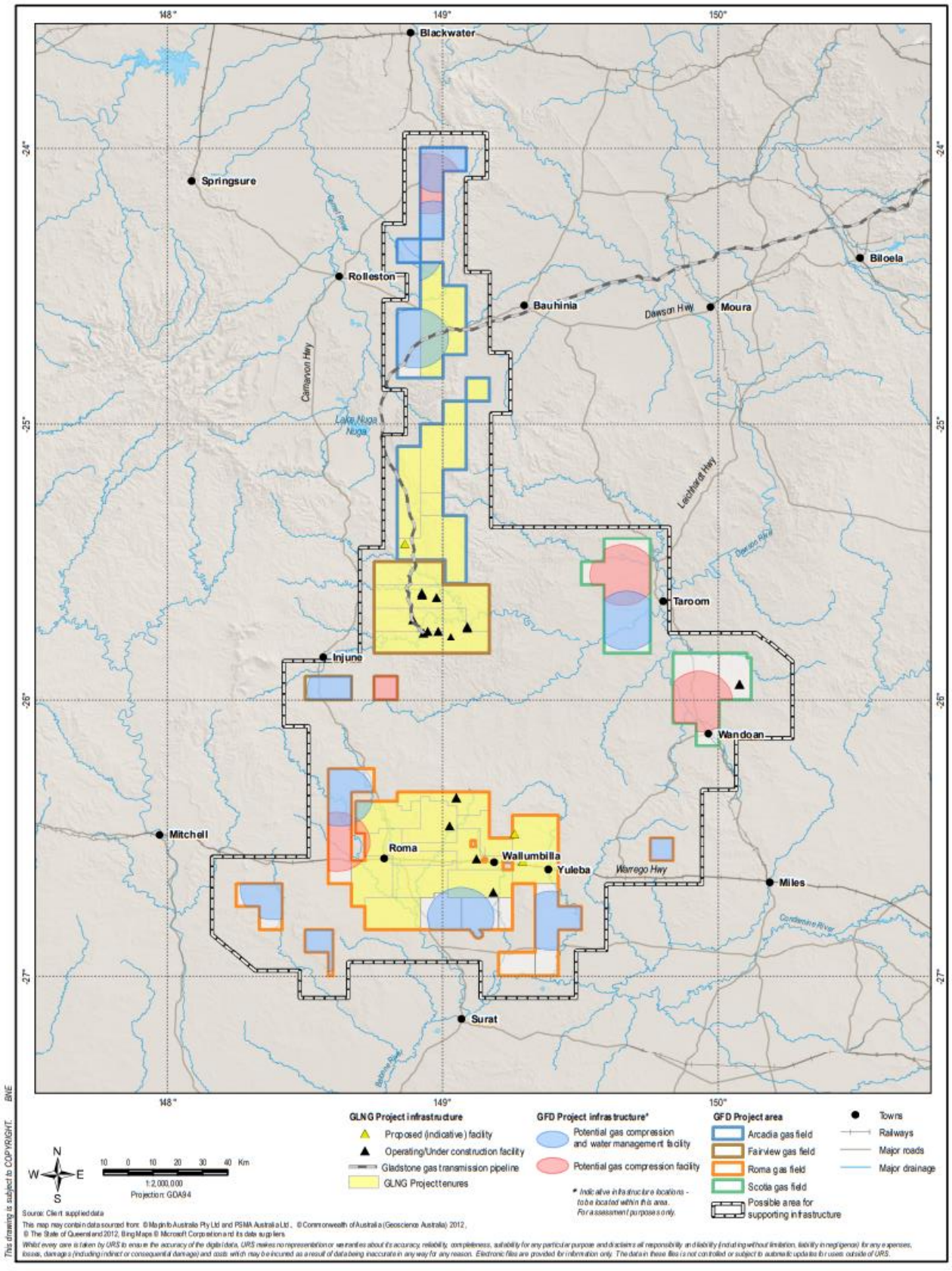

Santos GLNG Project

GFD PROJECT EIS

GFD PROJECT AREA AND PRIMARY INFRASTRUCTURE

URS | INTRODUCTION | Figure: 1-2

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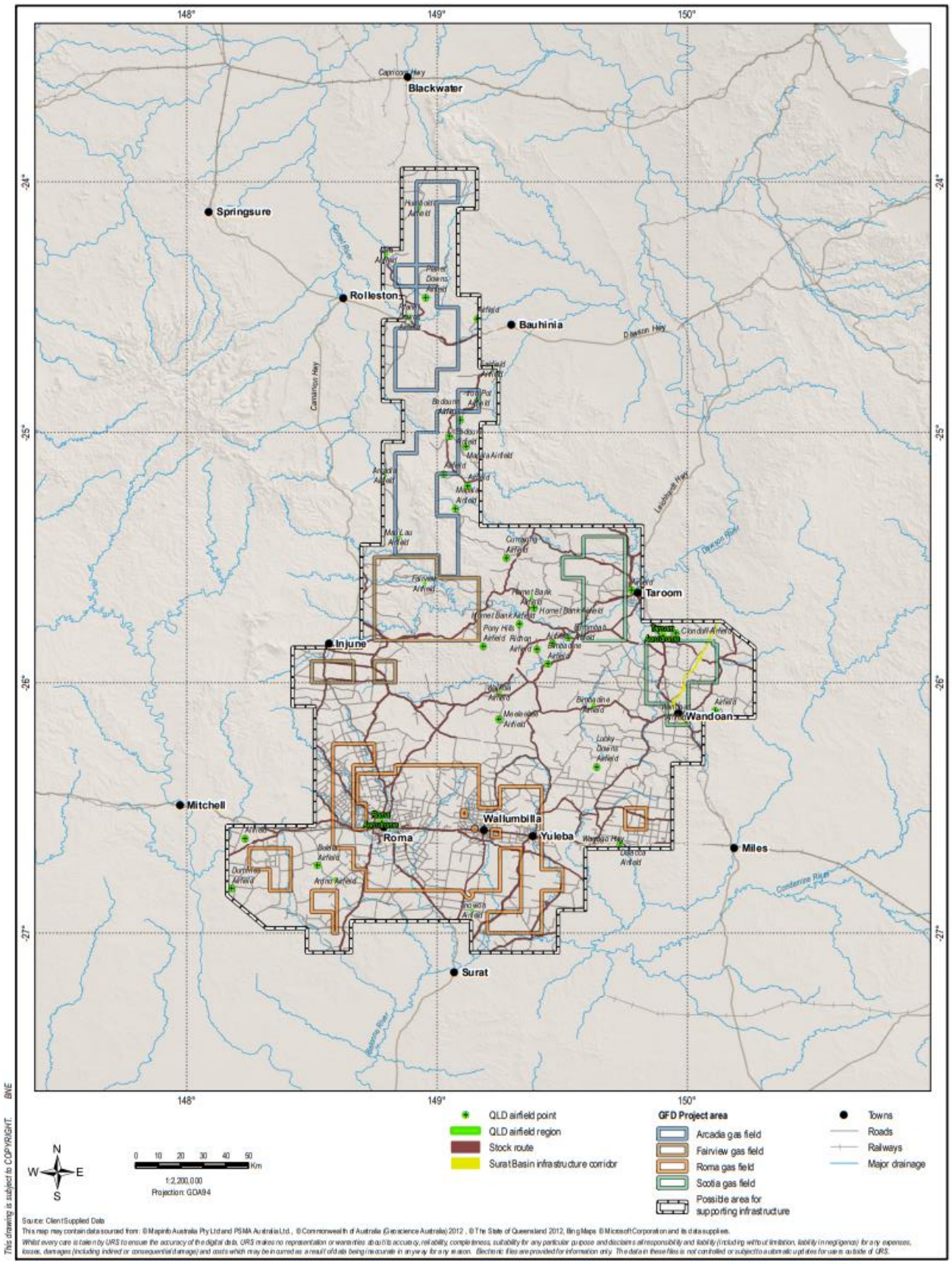

Santos GLNG Project

GFD PROJECT EIS

TRANSPORT INFRASTRUCTURE IN THE GFD PROJECT AREA

URS

LAND USE AND TENURE

Figure: **8-7**

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APPENDIX B: EA

Permit

Environmental Protection Act 1994

Environmental authority EPPG03515915

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EPPG03515915

Environmental authority takes effect on 5 November 2021.

The anniversary date of this environmental authority remains as 03 March each year.

Environmental authority holder(s)

Name(s)	Registered address
SANTOS CSG PTY LTD	Ground Floor, Santos Centre 60 Flinders Street ADELAIDE SA 5000
KGLNG E&P Pty Ltd	Level 11, 28 The Esplanade PERTH WA 6000
Total E&P Australia II	BGC Centre, Level 13, 28 The Esplanade PERTH WA 6000
PAPL (UPSTREAM II) PTY LIMITED	Level 12, 60 Carrington St SYDNEY NSW 2000
Total E&P Australia	BGC Centre Level 13, 28 The Esplanade PERTH WA 6000

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 - 08 - A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL1088 PL176
Schedule 3 - 03 - A petroleum activity that is likely to have a significant impact on a category A or B Environmentally Sensitive Area	PL1088 PL176

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any

ABN 46 640 294 485

inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.
An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.
A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days)

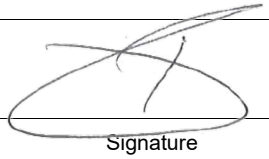
that is causing, or is reasonably likely to cause, serious or material environmental harm.
For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority - on the nominated day; or
b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
c) otherwise on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.
If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.
The anniversary day of this environmental authority is the same day each year as the original take effect date unless you apply to change the anniversary day. The payment of the annual fee will be due each year on this day. An annual return will be due each year on 01 April.
If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.



Signature

5 November 2021

Date

Tristan Roberts
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

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Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Conditions of environmental authority

SCHEDULE A – GENERAL CONDITIONS

A1 This environmental authority authorises the carrying out of the following **resource activity(ies)**:

1) the petroleum activities listed in *Schedule A, Table 1 – Scale and Intensity for the Activities* to the extent they are carried out in accordance with the activity's corresponding scale and intensity;
2) the following specified environmentally relevant activities:
    1. Fuel Burning – using fuel burning equipment that is capable of burning at least 500 kg of fuel in an hour;
    2. Waste Disposal – operating a facility for disposing of, in a year, 50,000 t to 100,000 t of regulated waste and any, or any of the combination of general waste, limited regulated waste and no more than 5t of untreated clinical waste (if the facility is in a scheduled area);
    3. Sewage Treatment - Operating sewage treatment works, other than no release works;
    4. Chemical storage – store more than 500m^3 of class C1 or C2 combustible liquids under AS1940 or dangerous goods class 3 subsection (1)(c)
    5. Another activity where, for the specified relevant activities listed in (i) – (iii) above, Schedule 2 of the Environmental Protection Regulation 2008 (the Regulation) provides exemption for the activity, but only to the extent of the circumstances stated in Schedule 2 of the Regulation;
    6. Stimulation activities; and
3) incidental activities that are not otherwise specified relevant activities.

Schedule A, Table 1 – Scale and Intensity for the Activities

Infrastructure	**Total Scale of Petroleum Activities and Infrastructure**		**Intensity (ha) (combined area)**
	Activities authorised prior to 27 February 2017	**Gas Field Development Project activities (additional)**	
Exploration, appraisal and development wells	152	350	753
Compressor facility(ies)	1	1	60
Sewage treatment plant(s) that discharge treated effluent to an infiltration trench or through an irrigation scheme, or to land for dust suppression, construction or operational purposes (21 to 450EP)	10	0	N/A – included in the disturbance of accommodation
Accommodation	10	0	16
Water treatment facilities	1	0	NA- within the footprint of compressor stations

A2 The resources in condition (A1) are authorised subject to the conditions of this environmental authority.

A3 This environmental authority authorises a relevant act[1] to occur only to the extent that:
(a) the relevant act is an ordinary consequence of carrying out the resource activities authorised by this environmental authority in accordance with its conditions; or
(b) the relevant act is specifically authorised by the conditions of this environmental authority and carrying out an activity which results in the relevant act does not contravene the conditions of this authority.

Prevent or Minimise Likelihood of Environmental Harm

A4 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Monitoring

A5 All monitoring required must be undertaken by a suitably qualified person.

A6 If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.

A7 All laboratory analyses and tests required must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.

A8 Notwithstanding condition (A7), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.

A9 Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:
(a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – Environmental Protection (Water and Wetlan Biodiversity) Policy 2019
(b) for groundwater, Groundwater Sampling and Analysis – A Field Guide (2009:27 GeoCat #6890.1)
(c) for noise, the Environmental Protection Regulation 2019
(d) for air, the Queensland Air Quality Sampling Manual and/or Australian Standard 4323.1:1995 Stationary source emissions method 1: Selection of sampling positions, as appropriate for the relevant measurement
(e) for soil, the Guidelines for Surveying Soil and Land Resources, 2nd edition (McKenzie et al. 2008), and/or the Australian Soil and Land Survey Handbook, 3rd edition (National Committee on Soil and Terrain, 2009)
(f) for dust, Australian Standard AS3580.

Contingency procedures for emergency environmental incidents

A10 Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to:

(a) A clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.

[1] See section 493A of the Environmental Protection Act 1994

(b) Consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.
(c) Response procedures to be implemented to prevent or minimise the risks of environmental harm occurring.
(d) The practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.
(e) Procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.
(f) Training of staff to enable them to effectively respond.
(g) Procedures to notify the administering authority, local government and any potentially impacted landholder.

Maintenance of plant and equipment

A11 All plant and equipment must be maintained and operated in their proper and effective condition.

A12 The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:

(a) regulated dams and low consequence dams
(b) exploration, appraisal and development wells
(c) water treatment facilities
(d) sewage treatment facilities
(e) specifically authorised discharge points to air and waters
(f) any chemical storage facility associated with the environmentally relevant activity of chemical storage
(g) field compressor stations
(h) central compressor stations
(i) gas processing facilities; and
(j) pipeline compressor stations.

A13 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Complaints

A14 Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.

Documentation

A15 A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:

(a) relevant material, including current published guidelines (where available) have been considered in the written document
(b) the content of the written document is accurate and true; and
(c) the document meets the requirements of the relevant conditions of the environmental authority.

A16 All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.

A17 All documents required to be developed under this environmental authority must be kept for five (5) years.

A18 All documents required to be prepared, held or kept under this environmental authority must be provided to the administering authority upon written request within the requested timeframe.

A19 A record of all complaints must be kept including the date, complainant's details, source, reason for the complaint, description of investigations and actions undertaken in resolving the complaint.

Third Party Audit

A20 A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.

A21 Notwithstanding condition (A23), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

A22 An audit report must be prepared and certified by the third party auditor presenting the findings of each audit carried out.

A23 Any recommendations arising from the audit report must be acted upon by:
(a) investigating any non-compliance issues identified; and
(b) as soon as reasonably practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.

A24 A written response must be attached to the audit report detailing the actions taken or to be taken on stated dates:
(a) by the holder to ensure compliance with this environmental authority; and
(b) to prevent a recurrence of any non-compliance issues identified.

A25 The audit report required by condition (A25) and the written response to the audit report required by condition (A27) must be submitted with the subsequent annual return.

SCHEDULE B – WATER

B1 Contaminants must not be directly or indirectly released to any waters except as permitted under this environmental authority.

B2 The extraction of groundwater as part of the petroleum activities from underground aquifers must not directly or indirectly cause environmental harm to any watercourse or wetland.

Works in watercourses and wetlands

B3 Only construction or maintenance of linear infrastructure is permitted in or within a general ecologically significant wetland or in a watercourse.

B4 The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the bed and banks of a watercourse or within a general ecological significant wetland must be conducted in accordance with the following order of preference:
(a) conducting works in times when there is no water present;
(b) conducting works in times of no flow;
(c) conducting works in times of flow but in a way that does not impede low flow.

B5 The construction and maintenance of linear infrastructure authorised under condition (B3) must comply with the water quality limits specified in Schedule B, Table 1 – Water release limits for Construction or Maintenance of Linear infrastructure.

Schedule B, Table 1 – Water Release limits for Construction or Maintenance of Linear Infrastructure.

Water Quality Parameters	Units	Water Quality Limits
Turbidity	NTU	For a general ecologically significant wetland, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within 50m downstream of the construction or maintenance activity.
		For a general ecologically significant wetland, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	No visible sheen

B6 Monitoring must be undertaken at a reasonable frequency to ensure compliance with condition (B5).

B7 A register must be kept of all linear infrastructure construction and maintenance activities in a wetland of other environmental value and watercourses, which must include:
(a) location of the activity (e.g. GPS coordinates (GDA94) and watercourse name)

(b) estimated flow rate or surface water at the time of the activity
(c) duration of work
(d) results of impact monitoring carried out under condition (B6).

B8 Petroleum activities must occur outside a wetland of high ecological significance.

B9 Petroleum activities must not negatively impact a wetland of high ecological significance.

B10 Linear infrastructure activities, other than linear infrastructure construction and/or maintenance activities, must not change the existing surface water hydrological regime of any general ecologically significant wetland.

B11 The construction and/or maintenance of linear infrastructure in any general ecologically significant wetland must not:
(a) prohibit the flow of surface water in or out of the wetland;
(b) impact surface water quality in the wetland unless specifically authorised by this environmental authority;
(c) drain the wetland;
(d) fill the wetland;
(e) impact bank stability; or
(f) result in the clearing of riparian vegetation outside of the required footprint.

Floodplains

B12 Where the petroleum activity is carried out on floodplains the petroleum activity must be carried out in a way that does not:
(a) concentrate flood flows in a way that will or may cause or threaten an adverse environmental impact; or
(b) divert flood flows from natural drainage paths and alter flow distribution; or
(c) increase the local duration of floods; or
(d) increase the risk of detaining flood flows.

Seepage monitoring program

B13 A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants by 27 May 2017.

B14 The seepage monitoring program required by condition (B13) must include but not necessarily be limited to:
(a) identification of the containment facilities for which seepage will be monitored
(b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities as provided for in condition (B15).
(c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities
(d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts
(e) installation of seepage monitoring bores that:
(i) are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact)
(ii) provide for the early detection of negative impacts prior to reaching groundwater

dependent ecosystems, landholder's active groundwater bores, or water supply bores

(iii) provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)

(f) monitoring of groundwater at each background and seepage monitoring bore at least quarterly for the trigger parameters identified in condition (B15)

(g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (B15) and (B14)(c) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination

(h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and

(i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

B15 Seepage monitoring bores identified in (B14)(b) must be monitored quarterly for the trigger parameter(s) specified in Schedule B – Table 2 Seepage Monitoring Trigger Parameters.

Schedule B, Table 2 – Seepage Monitoring Trigger Parameters

Parameter	Units	Untreated Coal Seam Water	Permeate	Brine
Static Water Level	m	monitor	monitor	monitor
pH	pH units	monitor	monitor	monitor
EC	µS/cm	monitor	monitor	monitor
Major Anions (sulphate, chloride)	mg/L	monitor	-	-
Major Cations (calcium, magnesium, sodium and potassium)	mg/L	monitor	-	-

Seepage monitoring bore drill log

B16 A bore drill log must be completed for each seepage monitoring bore in condition (B14) which must include:

(a) bore identification reference and geographical coordinate location

(b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details

(c) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters

(d) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and

(e) target formation of the bore.

Well testing

B17 Subject to condition (B18) and condition (B19), the injection of CSG water or better quality groundwater is authorised in wells that are not exploration, appraisal or development wells, for the purposes of hydraulic testing, where such hydraulic tests are undertaken for no more than two (2) consecutive days.

B18 The maximum volume of CSG water or better quality groundwater injected for the purposes of hydraulic testing identified in condition (B17) must not exceed 1ML per hydraulic test.

B19 Written notification detailing the type and location (GPS coordinates) of any hydraulic testing undertaken in accordance with condition (B17) must be provided to the administering authority at least 10 business days prior to the commencement of the hydraulic test.

SCHEDULE C – LAND

Release of contaminants to land

C1 Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.

Top soil management

C2 Top soil must be managed in a manner that preserves its biological and chemical properties.

C3 By 27 April 2017, the identification of management of soil must be undertaken in accordance with the Soil Management Plan as amended from time to time.

C4 A copy of the Soil Management Plan must be made available to any potentially affected landholder upon request by that landholder.

Erosion and sediment control

C5 For activities involving significant disturbance to land, control measures that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to:

(a) preferentially divert stormwater around significantly disturbed land, or allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities;
(b) minimise soil erosion resulting from wind, rain, and flowing water;
(c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water;
(d) minimise work-related soil erosion and sediment runoff; and
(e) minimise negative impacts to land or properties adjacent to the activities (including roads).

Land management

C6 Land that has been significantly disturbed by the pipeline activities must be managed to ensure that gully erosion or subsidence do not occur on that land.

Chemical storage

C7 Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipeline operation and maintenance

C8 Contaminants authorised to be released to land under conditions (C9), (C11), and (C17) must be carried out in a manner that ensures:

(a) vegetation is not damaged;
(b) soil quality is not adversely impacted;
(c) there is no surface ponding or runoff beyond the designated release area;
(d) there is no aerosols or odours;
(e) deep drainage below the root zone of any vegetation is minimised;
(f) the quality of shallow aquifers is not adversely affected.

Pipeline wastewater

C9 Contaminants that are hydrostatic test water from pipelines and contaminants from low point drains, may be released to land in accordance with condition (C8).

C10 Produced water may be re-used in:

(a) drilling and well hole activities; or
(b) stimulation activities.

C11 Produced water may be released to land for the following purposes:
(a) dust suppression;
(b) construction and operational purposes for the petroleum activity authorised by this environmental authority; and
(c) irrigation

C12 Produced water irrigated to land must:
(a) not exceed the release limits specified in Schedule C, Table 1a— Irrigation water quality monitoring; and
(b) be monitored at the frequency and for the quality characteristics at the monitoring point specified in Schedule C, Table 1a - Irrigation water quality monitoring; or
(c) the process under (C13) has been completed.

C13 Produced water for irrigation which does not meet criteria in condition (C12) (a) and (b) may be used for irrigation provided a report has been completed which:
(a) determines soil structure, stability and productive capacity will be maintained or improved;
(b) determines there are no toxic effects to crops;
(c) determines yields and produce quality are maintained or improved;
(d) states water quality criteria, which has been determined in accordance with the assessment procedures outlined in Schedule C, Table 1b—Assessment procedures for water quality criteria; and
(e) includes a water monitoring program to ensure that condition (C13) (a)(b) and (c) are being achieved.

Schedule C, Table 1a— Irrigation water quality monitoring

Quality Characteristic	Release Limit	Limit Type	Frequency	Monitoring Point
Electrical conductivity (EC)	<950us/cm3	95th percentile over a one-year period	Fortnightly	At a location following final treatment and prior to release.
Sodium adsorption ratio (SAR) for heavy soils	≤6			
SAR for light soils	≤12			
pH	6.0-8.5			
Aluminium	20mg/L	Maximum	Bi-annually	
Arsenic	2.0mg/L			
Boron	Refer to table 9.2.18 of ANZECC	Refer to Table 9.2.18 of ANZECC		
Cadmium	0.05mg/L	Maximum		
Chromium	1mg/L			
Cobalt	0.1mg/L			

Copper	5mg/L			
Fluoride	2mg/L			
Iron	10mg/L			
Lithium	2.5 mg/L			
Lead	5 mg/L			
Manganese	10 mg/L			
Mercury	0.002 mg/L			
Molybdenum	0.05mg/L			
Nickel	2 mg/L			
Zinc	5 mg/L			

Schedule C, Table 1b—Assessment procedures for water quality criteria

Water quality criteria	Assessment procedure
electrical conductivity sodium adsorption ratio pH	Salinity Management Handbook, with reference to Chapter 11; and/or Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapter 4 and Volume 3 Chapter 9. The assessment should consider: • soil properties within the root zone to be irrigated (e.g. clay content, cation exchange capacity, exchangeable sodium percentage) • water quality of the proposed resource (e.g. salinity, sodicity) • climate conditions (e.g. rainfall) • leaching fractions • average root zone salinity (calculated) • crop salt tolerance (e.g. impact threshold and yield decline) management practices and objectives (e.g. irrigation application rate, amelioration techniques) • broader landscape issues (e.g. land use, depth to groundwater) • any additional modelling and tests undertaken to support the varied water quality parameters.
heavy metals	Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapters 3 and 4 and Volume 3 Chapter 9. The assessment should aim to derive site specific trigger values (e.g. cumulative contaminant loading limit) based on the methodology provided in the above mentioned procedure.

C14 Produced water may be used for domestic or stock purposes provided the water quality complies with the criteria specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000).

C15 Produced water may be transferred to a third party to be used for the following purposes, subject to condition (C16):

(a) dust suppression;
(b) construction and operational purposes; or
(c) domestic or stock purposes provided the water quality complies with criteria specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000).

C16 If the responsibility of produced water is given or transferred to a third party in accordance with condition (C15), the holder of the environmental authority must ensure:
(a) the responsibility of the produced water is given or transferred in accordance with a written agreement (third party agreement);
(b) the third party is made aware of the General Environmental Duty under section 319 of the Environmental Protection Act 1994.

Sewage treatment works

C17 Greywater or treated sewage effluent from a treatment system with a daily peak design capacity of up to 450 EP may be:
(a) released to land by sub-surface or spray irrigation provided it is to a fenced and signed contaminant release area that is:
(i) a minimum distance of 50 metres from any watercourse, wetland or protected area; and
(ii) a minimum distance of 100 metres from any potable water supply or stock drinking water supply; and
(iii) kept vegetated with groundcover that is not a declared plant pest species; or
(b) used for dust suppression, construction or operational purposes subject to condition (C24).

C18 When circumstances prevent the irrigation of treated sewage effluent to land, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Sewage treatment works between 100 EP and 450 EP

C19 Prior to construction of a sewage treatment works with a daily peak design capacity of greater than 100EP, the minimum area of land and location to be utilised for irrigation of treated sewage effluent, excluding any necessary buffer zones, must be nominated.

C20 All nominated locations and minimum areas of land in condition (C19) for sewage treatment works with a daily peak design capacity of greater than 100EP, must be determined using the Model for Effluent Disposal using Land Irrigation (MEDLI) program or recognised equivalent and use model inputs representative of the activity and release location including but not limited to effluent quality, soil and vegetation types, and climatic conditions.

C21 Treated sewage effluent must only be released to the nominated locations and minimum areas of land determined by the MEDLI program or recognised equivalent identified in condition (C20).

C22 Treated sewage effluent released to land must comply, at the monitoring point(s), with each of the release limits specified in Schedule C, Table 2 – Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP for each quality characteristic.

C23 Treated sewage effluent released to land must be monitored at the frequency and for the quality characteristics specified in Schedule C, Table 2 – Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP for each quality characteristic.

Schedule C, Table 2 – Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP

Quality Characteristic	Monitoring Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical oxygen demand (BOD)	Release pipe from sewage treatment works	Maximum	20 mg/L	Quarterly
E. coli		80th percentile based on at least 5 samples with not less than 30 minutes between samples	1000 cfu per 100 mL	
		Maximum	10,000 cfu per 100 mL	
pH		Range	6.0–8.5	Monthly
Dissolved Oxygen		Minimum	2 mg/L	
Electrical Conductivity		Monitor only		

C24 Treated sewage effluent use for the purposes of dust suppression, construction and operational purposes Treated sewage effluent may only be used for dust suppression, construction and operational purposes provided that:

(a) the treated sewage effluent has not been stored in a dam or tank prior to use;

(b) on local government controlled roads, written approval from the relevant Local Government has been given to the holder of this environmental authority; and

(c) the treated sewage effluent quality:

(i) is monitored at the location and frequency specified in Schedule C, Table 3 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes; and

(ii) meets the release limits for each quality characteristic specified in Schedule C, Table 3 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes.

Schedule C, Table 3 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes

Quality Characteristic	Sampling and *In situ* Measurement Point Location	Limit type	Release Limit	Frequency
pH	Treated sewage effluent storage	Range	6.0 to 8.5	Weekly[1] until 12 months of monitoring demonstrates no exceedances of the release limits. Monthly monitoring can occur thereafter.
5-day Biochemical Oxygen Demand (BOD)		Median	20 mg/L	
Electrical Conductivity		Maximum	1600 uS/cm	
Turbidity		95%ile (max)	2 (5) NTU	

Total Suspended Solids		Median	5 mg/L	
E. coli		Median	<10 cfu per 100 mL	Weekly

SCHEDULE D – BIODIVERSITY

Confirming biodiversity values

D1 Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground environmentally sensitive areas and wetlands at that location must be undertaken by a suitably qualified person.

D2 A suitably qualified person must develop and certify a methodology so that condition (D1) can be complied with and which is appropriate to confirm on-the-ground environmentally sensitive areas and wetlands.

D3 Where areas mapped as environmentally sensitive areas and wetlands differ from those confirmed under conditions (D1) and (D2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground values.

D4 All documentation survey information photographs, field data or any material associated with the field validation requirements in (D1) must be maintained for the life of the environmental authority to demonstrate to the administering authority that surveys were conducted in a manner consistent with requirements contained in (D2).

D5 The location of the petroleum activity must be selected in accordance with the following site planning principles:

(a) maximise the use of areas of pre-existing disturbance;
(b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of native vegetation or other areas of ecological value;
(c) minimise disturbance to land that may result in land degradation;
(d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
(e) in order of preference, avoid then minimise clearing of native mature trees.

Disturbance to land – Environmentally sensitive areas

D6 Petroleum activities must be carried out in accordance with Schedule D, Table 1 – Petroleum Activities in Environmentally Sensitive Areas, Schedule D, Table 2 – Authorised Disturbance and any other relevant conditions of this environmental authority.

Schedule D, Table 1 – Petroleum Activities in Environmentally Sensitive Areas

ESA Category	Within the ESA	Primary Protection zone of the ESA	Secondary protection zone of the ESA
Category A ESAs	No petroleum activities permitted	Only low impact petroleum activities permitted.	Limited petroleum activities permitted subject to condition (D10). Limited impact camps permitted subject condition (D10). Limited impact petroleum activities permitted subject to condition (D10).

Category B ESAs excluding 'Endangered' Regional Ecosystems	Only low impact petroleum activities permitted.	Limited petroleum activities permitted subject to condition (D10). Limited impact camps permitted subject condition (D10). Limited impact petroleum activities permitted subject to condition (D10).	N/A
Category C ESAs that are Nature Refuges, Koala Habitat and /or Declared Catchment Areas	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (D10). Limited impact camps permitted subject to conditions (D7) and (D10). Limited impact petroleum activities permitted subject to condition (D10).	N/A
Category B ESAs that are 'Endangered' Regional Ecosystems	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A

Category C ESAs that are Essential Habitat, Essential Regrowth Habitat and/or 'Of Concern' Regional Ecosystems	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to conditions (D7) and (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A
Category C ESAs that are Regional Parks (Resource Use Area)	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A
Category C ESAs that are State Forests and/or Timber Reserves	Limited petroleum activities permitted subject to condition (D11) Petroleum activities that are extraction activities and screening activities permitted. Limited impact camps permitted. Limited impact petroleum activities permitted subject to conditions (D8) and (D11)	N/A	N/A

Note: Approvals may be required under the *Forestry Act 1959* where the petroleum activity is proposed to be carried out in ESAs that are State Forests or Timber Reserves.

Schedule D, Table 2 — Authorised Petroleum Activities and Disturbances

Authorised Activity	Authorised Activity section	Location of Development (GDA94)		Size of Development		ESA
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
Multiple Well Pad	Scotia 38/39 Well Pad	- 25.973932	150.036166	NA	1.332	Category B (Endangered RE) Primary
Multi Well Pad	Daldowie 9/10 Well Pad	- 25.954416	150.052777	NA	1.4	Category B (Endangered RE) Primary
Accommodation Camp	Scotia CF1 Camp	-25.935281	150.050921	NA	0.014	Category B (Endangered RE) Primary
Accommodation Camp	Scotia Avalon Camp	- 25.931914	150.080687	NA	0.329	Category B (Endangered RE) Primary
Single Well Pad and Manifold	Scotia 6 Well Pad	- 25.929136	150.080371	NA	1.197	Category B (Endangered RE) Primary
Camp Pad	Scotia 45 Camp	- 25.844107	150.074773	NA	1.025	Category B (Of Concern RE) Primary

D7 Limited impact camps must not be located within a primary protection zone of Category C ESA (Essential Habitat) or Category C ESA (Nature Refuges).

D8 Limited impact petroleum activities must not be located within areas that contain commercial species.

D9 Despite condition (D6) decommissioning petroleum activities are authorised within all ESAs other than Category A ESAs, and within all ESA protection zones when conducted in accordance with the land disturbance planning principles provided in condition (D5).

D10 Limited petroleum activities, limited impact camps or limited impact petroleum activities located within a primary protection zone or secondary protection zone of an environmentally sensitive area in accordance with Schedule E, Table 1 — Petroleum Activities in Environmentally Sensitive Areas must not negatively affect the adjacent environmentally sensitive area.

D11 Prior to carrying out limited petroleum activities or limited impact petroleum activities undertaken within environmentally sensitive areas in accordance with Schedule D, Table 1 - Petroleum Activities in Environmentally Sensitive Areas, it must be demonstrated, in the following order of preference that:

(a) no reasonable or practicable alternative exists for carrying out the limited petroleum activities within the environmentally sensitive area;

(b) the limited petroleum activities are preferentially located in pre-existing areas of clearing or significant disturbance;

(c) clearance widths for linear infrastructure is minimised to the maximum extent possible, taking into account the following matters:

(i) safe vehicle movement;

(ii) drainage devices installed are of a type that is appropriate for the track type and location;

(iii) erosion and sediment control measures installed are in accordance condition (B2); and

(iv) power line stays have been preferentially located within the pipeline right of way where possible.

(d) the maximum clearance widths specified in Schedule D, Table 3 - Authorised Disturbance for Linear Infrastructure are not exceeded

Schedule D, Table 3 - Authorised Disturbance for Linear Infrastructure

Type of Linear Infrastructure	Clearance width (m)
A. Access track(s) not associated with a pipeline(s), communication lines(s) or power line(s)	
single carriage access tracks	18
dual carriage access tracks	21
single or dual carriage access track and associated turnaround bay	35
B. Access track(s) associated with a pipeline(s), communication line(s) or power line(s):	
single carriage access tracks with a single pipeline, communication line or power line	24
dual carriage access track with a single pipeline, communication line or power line.	27
single or dual carriage access track and associated turnaround bay with a single pipeline, communication line or power line.	41
additional clearing for any additional parallel pipeline, communication line or power line associated with (B)(a), (b) or (c)	7[1]
C. Additional clearing for take-off drains, power line stays or turnaround bays or other work	
Additional clearing for power line stays associated with (B)	10
additional clearing for take-off drains associated with (A) or (B)	10

[1] Maximum total disturbance for (B) is 62m

Maximum Disturbance

D12 Disturbance to ecological receptors listed in Schedule D, Table 4 - Maximum disturbance limits to ecological receptors, must not exceed the relevant maximum disturbance limits.

Schedule D, Table 4 - Maximum disturbance limits to ecological receptors

Ecological receptor	GFD project maximum disturbance area (ha)
Endangered vegetation (REs and high value regrowth) (biodiversity status)	19.5
Of-concern vegetation (REs and high value regrowth) (biodiversity status)	25.1
Essential habitat	0
Wetlands (general ecological significance)	0
Resource reserves	0
State forest and timber reserves	0

Offset Delivery

D13 After a decision under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and three (3) months prior to any construction activities, the proponent must submit the Offset Plan to the administering authority.

The Offset Plan must consider offsets for any significant residual impacts to the following ecological receptors:

(i) regional ecosystems listed as endangered (biodiversity status)
(ii) regional ecosystems listed as of concern (biodiversity status)
(iii) essential habitat
(iv) wetlands of general ecological significance.

The Offset Plan must**:**

(a) detail how the specific offset requirements conditioned by the Commonwealth Minister for the Environment in any approval for the project under the EPBC Act will be delivered

(b) detail proposed offsets to address any significant residual impacts for the ecological receptors at condition (D13) (i)-(iv)

(c) include, but not necessarily be limited to:
  (i) a detailed description of the land to which the plan relates, the values affected and the extent and likely timing of impact on each value
  (ii) evidence that values impacted can be offset
  (iii) the method for delivering the offset, including consideration of land-based offsets, direct benefit management plans, offset transfers and/or offset payments and other tenure activities

(d) ensure a legally binding mechanism to protect and manage offset areas

(e) include a staging plan to demonstrate how offsets will be delivered and managed over the life of a project

(f) consider existing, proposed and future offsets prepared and/or planned under the existing environmental authorities pertaining to the project area.

SCHEDULE E – WASTE

Brine and Salt management

E1 Following the completion of the petroleum activity(ies), any residual brine and / or solid salt present in any dam must be removed and transported to a facility that can lawfully reuse, recycle or dispose of such waste under the *Environmental Protection Act 1994*.

General Waste Managment

E2 Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.

E3 Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by conditions (E4), (E5), (E8), (C9), (C11)and (C17) to be disposed of or used on site.

E4 Unless otherwise authorised by the conditions of this EA to be released to land, Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material, or drilling fluids stored in sumps, must be contained in either:

(a) an above ground container; or
(b) a structure which contains the wetting front.

E5 Green waste may be used onsite for either rehabilitation or sediment and erosion control, or both.

E6 Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.

Residual Drilling Materials

E7 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.

E8 Residual drilling material can only be disposed of on-site:

(a) by mix-bury-cover method if the residual drilling material meets the approved quality criteria; or
(b) if it is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

E9 Records must be kept to demonstrate compliance with condition (E7) and condition (E8).

SCHEDULE F – ACOUSTIC

F1 Notwithstanding condition (A17), emission of noise from the petroleum activity at levels less than those specified in Schedule F, Table 1—Noise nuisance limits are not considered to be environmental nuisance.

Schedule F, Table 1 – Noise nuisance limits

Time period	Metric	*Short term noise event*	*Medium term noise event*	*Long term noise event*
7:00am—6:00pm	$L_{Aeq,adj,15\ min}$	45 dBA	43 dBA	40 dBA
6:00pm—10:00pm	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
10:00pm—6:00am	$L_{Aeq,adj,15\ min}$	28 dBA	28 dBA	28 dBA
	Max $L_{pA,\ 15\ mins}$	55 dBA	55 dBA	55 dBA
6:00am—7:00am	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA

The noise limits in Table 1 have been set based on the following deemed background noise levels (LABG):
7:00am - 6:00 pm: 35 dBA
6:00pm - 10:00 pm: 30 dBA
10:00pm - 6:00 am: 25 dBA
6:00am - 7:00 am: 30 dBA

F2 If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in Schedule F, Table 2—Adjustments to be added to noise levels at sensitive receptors are to be added to the measured noise level(s) to derive LAeq, adj, 15 min.

Schedule F, Table 2—Adjustments to be added to noise levels at sensitive receptors

Noise characteristic	Adjustment to noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is detectable	+ 2 to + 5 dBA

F3 Notwithstanding condition (F1), emission of any low frequency noise must not exceed either (F3(a)) and (F3(b)), or (F3(c)) and (F3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority:

(a) 60 dB(C) measured outside the sensitive receptor; and
(b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
(c) 50 dB(Z) measured inside the sensitive receptor; and
(d) the difference between the internal A-weighted and Z-weighted (Max LpZ, 15 min) noise levels is no greater than 15 dB.

F4 A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.

F5 Blasting operations must be designed to not exceed an airblast overpressure level of 120dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.

F6 Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.

SCHEDULE G – AIR

Venting and flaring

G1 Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (G1(a)) and (G1(b)) and (G1(c)), or with (G1(d)):

(a) an automatic ignition system is used, and

(b) a flame is visible at all times while the waste gas is being flared, and

(c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or

(d) it uses an enclosed flare.

Fuel burning and combustion facilities

G2 Contaminants emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards.

Release of Contaminants to the Atmosphere

G3 Fuel burning or combustion equipment must:

(a) not be operated unless it is listed in Schedule G, Table 1 – Authorised Releases of Contaminants to Air from Point Sources;

(b) not exceed the release limits specified in Schedule G, Table 1 – Authorised Releases of Contaminants to Air from Point Sources;

(c) be monitored for the release limits at the release point locations and at the monitoring frequency specified in Schedule G, Table 1 – Authorised Releases of Contaminants to Air from Point Sources; and

(d) be monitored when emissions are expected to be at maximum rates.

Schedule G, Table 1 – Authorised Release of Contaminants to Air from Point Sources

Facility	Release Point Locations	Contaminant Release	Release Limits			Monitoring Frequency
			Min Release Height (m)	Min Efflux Velocity (m/sec)	Max Release Limit (g/s)	
Scotia Plant	Compressor 1 (K201)	Oxides of Nitrogen	7	17	2	At least one release point must be monitored per year on a rotational basis, with all release points monitored at least once in a 3 year period.
	Compressor 2 (K202)	Oxides of Nitrogen	7	17	2	
	Compressor 3 (K203)	Oxides of Nitrogen	7	17	2	

Compressors 4	Oxides of Nitrogen	7	17	2
Compressors 5	Oxides of Nitrogen	7	17	2
Compressors 6	Oxides of Nitrogen	7	17	2
Compressors 7	Oxides of Nitrogen	7	17	2
Compressors 8	Oxides of Nitrogen	7	17	2
Compressors 9	Oxides of Nitrogen	7	17	2
Power generator 1	Oxides of Nitrogen	7.5	17	2
Power generator 2	Oxides of Nitrogen	7.5	17	2
Power generator 3	Oxides of Nitrogen	7.5	17	2
Power generator 4	Oxides of Nitrogen	7.5	17	2
Power generator 5	Oxides of Nitrogen	7.5	17	2

	Power generator 6	Oxides of Nitrogen	7.5	17	2	

G4 Despite condition (G3), the following fuel burning or combustion equipment is authorised to operate:
(a) triethylene glycol (TEG) gas dehydration units
(b) back-up generators

SCHEDULE H – REGULATED STRUCTURES

General

H1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933) at the following times:
(a) following the design and prior to construction of the structure, if it is not an existing structure; or
(b) prior to any change in its purpose or the nature of its stored contents.

H2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

H3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933).

Transfer Arrangements

H4 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

SCHEDULE I – DRILLING AND STIMULATION

Drilling activities

I1 Oil based or synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).

I2 Drilling activities must not result in the connection of the target gas producing formation and another aquifer.

I3 Practices and procedures must be in place to detect, as soon as practicable, any fractures that have or may result in the connection of a target gas producing formation and another aquifer as a result of drilling activities.

Stimulation activities

I4 Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the reporting limit.

I5 Stimulation activities must not negatively affect water quality, other than that within the stimulation impact zone of the target gas producing formation.

I6 Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.

I7 The internal and external mechanical integrity of the well system prior to and during well stimulation must be ensured such that there is:

(a) no significant leakage in the casing, tubing, or packer; and
(b) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.

I8 Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target gas producing formation and another aquifer.

Stimulation risk asessment

I9 Prior to undertaking well stimulation activities, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.

I10 The stimulation risk assessment must be carried out for every well to be stimulated prior to stimulation activities being carried out at that well and address issues at a relevant geospatial scale such that changes to features and attributes are adequately described and must include, but not necessarily be limited to:

(a) a process description of the stimulation activity to be applied, including equipment and a comparison to best international practice;
(b) provide details of where, when and how often stimulation is to be undertaken on the tenures covered by this environmental authority;
(c) a geological model of the field to be stimulated including geological names, descriptions and depths of the target gas producing formation(s);
(d) naturally occurring geological faults;
(e) seismic history of the region (e.g. earth tremors, earthquakes);
(f) proximity of overlying and underlying aquifers;

(g) description of the depths that aquifers with environmental values occur, both above and below the target gas producing formation.
(h) identification and proximity of landholders' active groundwater bores in the area where stimulation activities are to be carried out;
(i) the environmental values of groundwater in the area;
(j) an assessment of the appropriate limits of reporting for all water quality indicators relevant to stimulation monitoring in order to accurately assess the risks to environmental values of groundwater;
(k) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
(l) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers;
(m) a description of the well mechanical integrity testing program; process control and assessment techniques to be applied for determining extent of stimulation activities (e.g. microseismic measurements, modelling etc);
(n) practices and procedures to ensure that the stimulation activities are designed to be contained within the target gas producing formation;
(o) groundwater transmissivity, flow rate, hydraulic conductivity and direction(s) of flow;
(p) a description of the chemicals used in stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation;
(q) a mass balance estimating the concentrations and absolute masses of chemicals that will be reacted, returned to the surface or left in the target gas producing formation subsequent to stimulation;
(r) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation including:
    (i) toxicological and ecotoxicological information of chemicals used;
    (ii) information on the persistence and bioaccumulation potential of the chemicals used;
    (iii) identification of the stimulation fluid chemicals of potential concern derived from the risk assessment;
(s) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in stimulation activities;
(t) if used, identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities
(u) an environmental hazard assessment of leaving stimulation chemicals in the target gas producing formation for extended periods subsequent to stimulation;
(v) human health exposure pathways to operators and the regional population;
(w) risk characterisation of environmental impacts based on the environmental hazard assessment;
(x) potential impacts to landholder bores as a result of stimulation activities;
(y) the determination of the likelihood of causing interconnectivity and/or negative water quality as a result of stimulation activities undertaken in close proximity or each other; and
(z) potential environmental or health impacts which may result from stimulation activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

Water Quality Baseline Monitoring

I11 Prior to undertaking any stimulation activity, a baseline bore assessment must be undertaken of the water quality of:
(a) all landholders' active groundwater bores (subject to access being permitted by the landholder) that are spatially within a two (2) kilometre horizontal radius from the location of the stimulation initiation point within the target gas producing formation; and

(b) all active landholders' groundwater bores (subject to access being permitted by the landholder) in any aquifer that is within 200 metres above or below the target gas producing formation and is spatially located with a two (2) kilometre radius from the location of the stimulation initiation point; and
(c) any other bore that could potentially be adversely impacted by the stimulation activity(ies) in accordance with the findings of the risk assessment required by conditions (I9) and (I10).

I12 Prior to undertaking stimulation activities at a well, there must have sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include, as a minimum, the results of analyses for the parameters in condition (I13).

I13 Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to:
(a) pH
(b) electrical conductivity [uS/m]
(c) turbidity [NTU]
(d) total dissolved solids [mg/L]
(e) temperature [ºC]
(f) dissolved oxygen [mg/L]
(g) dissolved gases (methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L]
(h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO3) [mg/L]
(i) sodium adsorption ratio (SAR)
(j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L]
(k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]
(l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [ug/L]
(m) total petroleum hydrocarbons [ug/L]
(n) BTEX (as benzene, toluene, ethylbenzene, ortho-xylene, para- and meta-xylene, and total xylene) [ug/L]
(o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [ug/L]
(p) sodium hypochlorite [mg/L]
(q) sodium hydroxide [mg/L]
(r) formaldehyde [mg/L]
(s) ethanol [mg/L]; and
(t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].

Stimulation Impact Monitoring Program

I14 A Stimulation Impact Monitoring Program must be developed prior to the carrying out of stimulation activities which must be able to detect adverse impacts to water quality from stimulation activities and must consider the findings of the risk assessment required by conditions (I9) and (I10) that relate to stimulation activities and must include, as a minimum, monitoring of:
(a) the stimulation fluids to be used in stimulation activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used; and
(b) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and
(c) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150 per cent of the volume used in stimulation activities has been extracted from the stimulated well; and

(d) all bores in accordance with condition (I11) at the following minimum frequency:
  (i) monthly for the first six (6) months subsequent to the stimulation activities being undertaken; then
  (ii) annually for the first five (5) years subsequent to the stimulation activities being undertaken or until analytes and physico-chemical parameters listed in condition (I13) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.

I15 The Stimulation Impact Monitoring Program must provide for monitoring of:
(a) analytes and physico-chemical parameters relevant to baseline bore and well assessments to enable data referencing and comparison including, but not necessarily being limited to the analytes and physico-chemical parameters in condition (I13); and
(b) any other analyte or physico-chemical parameters that will enable detection of adverse water quality impacts and the inter-connection with a non-target aquifer as a result of stimulation activities including chemical compounds that are actually or potentially formed by chemical reactions with each other or coal seam materials during stimulation activities.

I16 The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholders upon request by that landholder.

SCHEDULE J – REHABILITATION

Existing Petroleum Activities

J1 Condition (J3) only applies to petroleum activities which commenced before 27 October 2016.

J2 Condition (J1) applies subject to:
- (a) the holder of this environmental authority keeping an inventory of all existing petroleum activities which commenced before 27 October 2016; and
- (b) the holder of this environmental authority providing the inventory to the administering authority upon written request within the requested timeframe

J3 Rehabilitation of disturbed areas must take place progressively as works are staged and new areas are disturbed.

Remaining Dams

J4 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Rehabilitation Planning

J5 Conditions (J6) - (J13) relating to rehabilitation only apply to petroleum activities which commenced after 27 October 2016.

J6 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
- (b) procedures to be undertaken for rehabilitation that will
  - (i) achieve the requirements of conditions (J11) to (J12) inclusive; and
  - (ii) provide for appropriate monitoring and maintenance.

Transitional Rehabilitation

J7 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated;
- (b) the areas are:
  - (i) non-polluting
  - (ii) a stable landform
  - (iii) re-profiled to contours consistent with the surrounding landform
- (c) surface drainage lines are re-established;
- (d) top soil is reinstated; and
- (e) either:
  - (i) groundcover, that is not a declared plant pest species, is growing; or
  - (ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Pipeline Activities

J8 Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.

J9 Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.

J10 Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:
- (a) a stable landform
- (b) re-profiled to a level consistent with surrounding soils
- (c) re-profiled to original contours and established drainage lines; and
- (d) vegetated with groundcover which is not a declared plant pest species, and which is
- (e) established and growing.

Final Rehabilitation Acceptance Criteria

J11 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:
- (a) greater than or equal to 70 per cent of native ground cover species richness
- (b) greater than or equal to the total per cent ground cover
- (c) less than or equal to the per cent species richness of declared plant pest species
- (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then:
  - (i) at least one Regional Ecosystem(s) from the same broad vegetation group, as demonstrated by the predominant species in the ecologically dominant layer, must be present; and
  - (ii) the Regional Ecosystem present in (J11)(d)(i) must possess an equivalent or higher conservation value (biodiversity status) than the Regional Ecosystem(s) in either the adjacent land or pre-disturbed land.

Final Rehabilitation Acceptance Criteria in Environmentally Sensitive Areas

J12 Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (J6) and (J7)) must be met:
- (a) greater than or equal to 70% of native ground cover species richness
- (b) greater than or equal to the total per cent ground cover
- (c) less than or equal to the per cent species richness of declared plant pest species
- (d) greater than or equal to 50% of organic litter cover
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the predisturbance regional ecosystem(s) are present.

Continuing Conditions

J13 Conditions (J7), (J11) and (J12) continue to apply after this environmental authority has ended or ceased to have effect.

SCHEDULE K – SOCIAL

K1 The administering authority must be notified through the Pollution Hotline as soon as reasonably practicable, but within 48 hours after becoming aware of:
(a) any unauthorised significant disturbance to land; or
(b) any unauthorised release of contaminants greater than:
- (i) 200 L of hydrocarbons; or
- (ii) 200 L of stimulation additives; or
- (iii) 500 L of stimulation fluids; or
- (iv) 1 000 L of brine; or
- (v) 5 000 L of coal seam gas water; or
- (vi) 10 000 L of sewage effluent;
- (vii) 100,000 L of irrigation-quality coal seam gas water, released inside a designated irrigation area authorised by condition (C13)(c).

(c) a potential or actual loss of structural or hydraulic integrity of a dam; or
(d) any incident where there is a potential or actual loss of well integrity (e.g. when the annulus pressure during stimulation increases by more than 3.5 MPa from the pressure immediately preceding stimulation); or
(e) any detection of restricted stimulation fluids from stimulation fluid monitoring; or
(f) any analyses result from baseline bore, well or stimulation impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource; or
(g) any analyses result from groundwater monitoring that exceeds trigger action investigation levels, if provided in this environmental authority.

K2 The notification of emergencies or incidents as required by condition (K1) must include but not be limited to the following information:
(a) the environmental authority number and name of the holder;
(b) the tenure type and number where the emergency or incident occurred;
(c) the name and telephone number of the designated contact person;
(d) the location of the emergency or incident (GDA94);
(e) the date and time that the emergency or incident occurred;
(f) the date and time the holder of this environmental authority became aware of the emergency or incident;
(g) details of the nature of the event and the circumstances in which it occurred;
(h) the estimated quantity and type of any contaminants involved in the incident;
(j) the actual or potential suspected cause of the emergency or incident;
(k) a description of the land use at the site of the emergency or incident (e.g. grazing, pasture, forest etc.) and/or the name of any relevant waters and other environmentally sensitive features;
(l) a description of the possible impacts from the emergency or incident;
(m) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
(n) any sampling conducted or proposed, relevant to the emergency or incident;
(o) landholder details and details of landholder consultation;
(p) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
(q) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority

K3 Within 10 business days following the initial notification under conditions (K1) and (K2) unless a longer time is agreed to by the administering authority, a written report must be

provided to the administering authority, including the following (where relevant to the emergency or incident):

(a) the root cause of the emergency or incident;
(b) the confirmed quantities and types of any contaminants involved in the incident;
(c) results and interpretation of any analysis of samples taken at the time of the emergency or incident (including the analysis results of any impact monitoring);
(d) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;
(e) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
(f) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
(g) actions and / or procedural changes to prevent a recurrence of the emergency or incident.

Schedule L - Definitions

Note: Terms which are defined for schedules are bolded at the beginning of each schedule and/or within schedule.

“adjacent land use(s)” means the ecosystem function adjacent to an area of significant disturbance, or where there is no ecosystem function, the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.

“administering authority” means:

(a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the Environmental Protection Act 1994—the local government; or
(b) for all other matters—the Chief Executive of the Department of Environment and Heritage Protection; or
(c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.

“alternative arrangement” means a written agreement about the way in which a particular environmental nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant nuisance impact.

“analogue site” means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation, vegetation community attributes and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.

“analytes” means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.

“annual return” means the return required by the annual notice (under section 316 of the Environment Protection Act 1994) for the section 86(2) licence that applied to the development approval.

“appraisal well” means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.

“approved quality criteria” for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards:

Part A In all cases:

Parameter	Maximum concentration
pH	6-10.5 (range)
Electrical Conductivity	20dS/m (20,000µS/cm)
Chloride*	8000mg/L

*Chloride analysis is only required if an additive containing chloride was used in the drilling process. The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing.

Part B If any of the following metals are a component of the drilling fluids, then for that metal:

Parameter	Maximum concentration
Arsenic	20mg/kg
Selenium	5mg/kg
Boron	100mg/kg
Cadmium	3mg/kg
Chromium	400mg/kg
Copper	100mg/kg
Lead	600mg/kg

The limits in Part B and Part C refer to the post soil/by-product mix. Part C If a hydrocarbon sheen is visible, the following hydrocarbon fractions:

TPH	Maximum concentration
C6-C10	170mg/kg
C10-C16	150mg/kg
C16-C34	1300mg/kg
C34-C40	5600mg/kg
Total Polycyclic Aromatic Hydrocarbons (PAHs)	20mg/kg
Phenols (halogenated)	1mg/kg
Phenols (non-halogenated)	60mg/kg
Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes (including otho, para and meta xylenes) and styrene)	7mg/kg
Benzene	1mg/kg

“areas of pre-existing disturbance” means areas where environmental values have been negatively impacted as a result of anthropogenic activity and these impacts are still evident. Areas of predisturbance may include areas where legal clearing, logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or pest species are present which have inhibited re-colonisation of native regrowth, or where there is existing infrastructure (regardless of whether the infrastructure is associated with the authorised petroleum activities). The term ‘areas of pre-disturbance’ does not include areas that have been impacted by wildfire/s, controlled burning, flood or natural vegetation die-back.

“associated water” means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.

“Australian Standard 3580” means any of the following publications:

(a) AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter—Gravimetric method.
(b) AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet— Gravimetric method
(c) AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter— PM10 low volume sampler—Gravimetric sampler.

“Australian Standard 2187” means Australian Standard 2187.0:1998 Explosives—Storage, transport and use, Part 0, Australian Standard 2187.1:1998 Explosives—Storage, transport and use Part 1 and Australian

Standard 2187.2:2006 Explosives—Storage and use, Part 2 or any updated versions that becomes available from time to time.

“Australian Standard 4323” means Australian Standard 4323.1:1995 Stationary source emissions method 1: Selection of sampling positions.

“background noise level” means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90 per cent of the measurement time period T of not less than 15 minutes, using Fast response.

“bed and banks” for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.

“being or intended to be utilised by the landholder or overlapping tenure holder” for significantly disturbed land, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use of the land such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

“bore” means a water observation bore or a water supply bore that is either sub-artesian or artesian.

“brine” means saline water with a total dissolved solid concentration greater than 40 000 mg/l.

“BTEX” means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.

“bund or bunded” in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
“business day” has the meaning in the Acts Interpretation Act 1954 and means a day that is not—

(a) a Saturday or Sunday; or
(b) a public holiday, special holiday or bank holiday in the place in which any relevant act is to be or may be done.

“Category A Environmentally Sensitive Area” means any area listed in Schedule 12, part 1, section 1 of the Environmental Protection Regulation 2008.

“Category B Environmentally Sensitive Area” means any area listed in Schedule 12, part 1, section 2 of the Environmental Protection Regulation 2019.

"Category C Environmentally Sensitive Area" means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the Nature Conservation (Koala) Conservation Plan 2006;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Regional parks (resource use area) under the *Nature Conservation Act 1992*;
- An area validated as "Essential Habitat" from ground-truthing surveys in accordance with the
- Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable
- under the *Nature Conservation Act 1992*;
- Of Concern Regional Ecosystems that are remnant vegetation identified in the database called 'RE description database' containing Regional Ecosystem numbers and descriptions.

"certification or certified by a suitably qualified and experienced person" in relation to a design plan, 'as constructed' drawings or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what is being certified and the precise nature of that certification;
- the relevant legislative, regulatory and technical criteria on which the certification has been based;
- the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

"certified or certification" in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating:

- the person's qualifications and experience relevant to the function
- that the person has not knowingly included false, misleading or incomplete information in the document
- that the person has not knowingly failed to reveal any relevant information or document to the administering authority
- that the document addresses the relevant matters for the function and is factually correct; and
- that the opinions expressed in the document are honestly and reasonably held.

"clearing" for vegetation:

(a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but
(b) does not include destroying standing vegetation by stock, or lopping a tree.

"closed-loop systems" means using waste on site in a way that does not release waste or contaminants in the waste to the environment.

"coal seam gas water" means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.

"commercial species" means species as listed in parts 1, 2 and 3 of Schedule 6 of the Vegetation Management Regulation 2012, which are above the diameters / sizes specified in this Schedule for each listed species.

"control measure" has the meaning in section 47 of the Environmental Protection Regulation 2019 and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.

“construction” in relation to a dam includes building a new dam and modifying or lifting an existing dam but does not include investigations and testing necessary for the purposes of preparing a design plan.

“contaminant” can be:
- a gas, liquid or solid; or
- an odour; or
- an organism (whether alive or dead), including a virus; or
- energy including noise, heat radioactivity and electromagnetic
- radiation; or
- a combination of contaminants.

“contaminated land” means land contaminated by a hazardous contaminant.

“daily peak design capacity” for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the Environmental Protection Regulation 2019 as the higher equivalent person (EP) for the works calculated using each of the formulae found in the definition for EP.

“dam” means a land-based structure or a void that is designed to contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does not mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

“declared plant pest species” has the meaning in the Land Protection (Pest and Stock Route Management) Regulation 2003 and is a plant declared to be a declared pest under section 36 (Declaring Pests by Regulation) or section 37(2) (Declaring Pest under Emergency Pest Notice) of that Act and includes reproductive material of the plant.

“declared pest species” has the meaning in the Land Protection (Pest and Stock Route Management) Regulation 2003 and is a live animal or plant declared to be a declared pest under section 36 (Declaring Pests by Regulation) or section 37(2) (Declaring Pest under Emergency Pest Notice) of that Act and includes reproductive material of the animal or plant.

“design plan” is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

“development well” means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

“document” has the meaning in the Acts Interpretation Act 1954 and means:
(a) any paper or other material on which there is writing; and
(b) any paper or other material on which there are marks; and
(c) figures, symbols or perforations having a meaning for a person qualified to interpret them; and
(d) any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).

“ecologically dominant layer” has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means the layer making the greatest contribution to the overall biomass of the site and the vegetation community (NLWRA 2001). This is also referred to as the ecologically dominant stratum or the predominant canopy in woody ecosystems.

“ecosystem function” means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of the vegetation community.

“enclosed flare” means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.

“environmental harm” has the meaning in section 14 of the Environmental Protection Act 1994 and means any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.

Environmental harm may be caused by an activity—

- whether the harm is a direct or indirect result of the activity; or
- whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

“environmental nuisance” has the meaning in section 15 of the Environmental Protection Act 1994 and means unreasonable interference or likely interference with an environmental value caused by—

- aerosols, fumes, light, noise, odour, particles or smoke; or
- an unhealthy, offensive or unsightly condition because of contamination; or
- another way prescribed by regulation.

“equivalent person” or “EP” has the meaning under section 3 of the Planning Guidelines For Water Supply and Sewerage, 2005, published by the Queensland Government. It is calculated in accordance with Schedule 2, Section 63(4) of the Environmental Protection Regulation 2008 where:

(a) EP = V/200 where V is the volume, in litres, of the average dry weather flow of sewage that can be treated at the works in a day; or
(b) EP = M/2.5 where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.

“exploration well” means 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 does not include an appraisal or development well.

“field validation surveys” means vegetation assessments undertaken in accordance with the most current version of the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland.

“flare pits” has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and means containment area where any hydrocarbon that is discovered in an over-

pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.

“flare precipitant” means waste fluids which result from the operation of a flare.

“floodplains” has the meaning in the Water Act 2000 and means an area of reasonably flat land adjacent to a watercourse that—
(a) is covered from time to time by floodwater overflowing from the watercourse; and
(b) does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and
(c) has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the watercourse.

“fuel burning or combustion facility” means a permanent fuel burning or combustion equipment which in isolation, or combined in operation, or which are interconnected, is, or are capable of burning more than 500 kg of fuel in an hour.

“GDA” means Geocentric Datum of Australia.

“general ecologically significant wetland” otherwise known as “wetlands of other environmental value”, is a wetland that meets the definition of a wetland and that is shown as a general ecologically significant wetland or “wetlands of other environmental value” on the map of referable wetlands.

“Great Artesian Basin (GAB) spring” means an area protected under the Environment Protection and Biodiversity Conservation Act 1999 because it is considered to be a Matter of National Environmental Significance and identified as a:
A. community of native species dependent on natural discharge of groundwater from the Great Artesian Basin; or
B. Great Artesian Basin spring; or
C. Great Artesian Basin discharge spring wetland.
A GAB spring includes a spring vent, spring complex or watercourse spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows.
Note: The Australian Government’s Protected Matters Search Tool should be used to get an indication of whether the area of interest may contain an MNES spring.
Note: The GAB springs dataset can be requested from the Queensland Government Herbarium

“greywater” means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.

“groundwater dependent ecosystems (GDE)” means ecosystems which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services.
For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as “unknown”.

“growing” means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

“high value regrowth” vegetation means any of the following:
- an endangered regional ecosystem;
- an of concern regional ecosystem;

- a least concern regional ecosystem; and
- have not been cleared since 31 December 1989; and
- is shown on a regrowth vegetation map.

“hydraulic fracturing” means a technique used to create cracks in underground coal seams to increase the flow and recovery of gas or oil out of a well. It involves pumping a fluid, comprised largely of water and sand, under pressure, into a coal seam. This action fractures the coal seam which provides a pathway that increases the ability for gas to flow through the coal.

“hydraulic performance” means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

“hydraulic testing” means the testing of a geological formation to evaluate the hydrogeological characteristics of the formation.

“impulsive (for noise)” means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.

“incidental activity” for this environmental authority means an activity that is not a specified relevant activity and is necessary to carry out the activities listed in Schedule A, Table 1 – Scale and Intensity for the Activities.

“infrastructure” means plant or works including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads and tracks, water storage dams, evaporation or storage ponds and tanks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activity(ies) including temporary structures or structures of an industrial or technical nature, including, for example, mobile and temporary camps. Infrastructure does not include other facilities required for the long term management of the impact of those petroleum activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

“inventory” in relation to existing petroleum activities means:
- relevant shapefiles which clearly show the location of infrastructure; and
- metadata for the relevant shapefiles which includes the infrastructure ID, latitude and longitude, and date of disturbance for the activity.

“LA 90, adj, 15mins” means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.

“LAeq,adj, 15mins” means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.

“land degradation” has the meaning in the Vegetation Management Act 1999 and means the following:
(a) soil erosion
(b) rising water tables
(c) the expression of salinity

(d) mass movement by gravity of soil or rock
(e) stream bank instability
(f) a process that results in declining water quality.

"landholders' active groundwater bores" means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the Water Act 2000.

"levee" means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

"limited impact camps" mean accommodation camps that:
(a) are temporary (no more than 6 months);
(b) are located within pre-existing areas of clearing or significant disturbance;
(c) are up to 2 ha or located within well sites; and
(d) may involve sewage treatment works that are no release works or release works that involve an irrigation release within pre-existing areas of clearing or significant disturbance.

"limited impact petroleum activities" means petroleum activities that are located within areas that are not a regional ecosystem and:
(a) are single well sites (includes observation, pilot, injection and production wells) greater than 1.25 ha; or
(b) are multi-well sites greater than 3 ha; and
(c) may involve construction of new access tracks that are required as part of the construction or servicing a petroleum activity that can be lawfully carried out within an ESA or its protection zone; and
(d) may involve upgrading or maintenance of existing roads or tracks; and
(e) may include power and communication lines; and
(f) may include gas gathering lines from a well site to the initial compression facility; and
(g) may include water gathering lines from a well site to the initial water storage or dam.

"limited petroleum activities" mean any low impact petroleum activity, and:
(a) single well sites (includes observation, pilot, injection and production wells) up to 1 ha and associated infrastructure (water pumps and generators, sumps, flare pits or dams) located on the well site or up to 1.25 ha if the well pad includes the use of a tank (minimum 1ML) for above ground fluid storage,
(b) multi-well sites up to an additional (in addition to single well site above) 0.25 ha per additional well and associated infrastructure (water pumps and generators, sumps, flare pits, dams or tanks) located on the well site to a maximum of 3 ha,
(c) construction of new access tracks that are required as part of the construction or servicing a petroleum activity that can be lawfully carried out within an ESA or its protection zone,
(d) upgrading or maintenance of existing roads or tracks,
(e) power and communication lines,
(f) gas gathering lines from a well site to the initial compression facility,
(g) water gathering lines from a well site to the initial water storage or dam,
(h) camps within well site that may involve sewage treatment works that are a no release works.

"linear infrastructure" means powerlines, pipelines, flowlines, roads and access tracks.

"long term noise event" means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.

"lopping" a tree, means cutting or pruning its branches, but does not include —
- removing its trunk; and
- cutting or pruning its branches so severely that it is likely to die.

"low flow" means flow up to the one month average recurrence interval.

"low hazard dam" means any dam in the low hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

"low impact petroleum activities" means petroleum activities which do not result in the clearing of native vegetation, earthworks or excavation work that cause either, a significant disruption to the soil profile or permanent damage to vegetation that cannot be easily rehabilitated immediately after the activity is completed. Examples of such activities include but are not necessarily limited to:
(a) chipholes
(b) coreholes
(c) geophysical surveys
(d) seismic surveys
(e) soil surveys
(f) topographic surveys
(g) cadastral surveys
(h) ecological surveys
(i) installation of environmental monitoring equipment (including surface water)

"map of referrable wetlands" has the meaning in Schedule 12 of the Environmental Protection Regulation 2008 and means the 'Map of referable wetlands', a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D.

"Max LpA, 15 min" means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

"Max LpZ, 15 min" means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

"medium term noise event" is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.

"methodology" means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.

"mix-bury-cover method" means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology:
(a) the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10– 8m/s) or subsoil with a clay content of greater than 20%; and

(b) the residual solids is mixed with subsoil in the sump and cover; and
(c) the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and
(d) a minimum of one metre of clean subsoil must be placed over the subsoil and residual
(e) solids mixture; and
(f) topsoil is replaced.

"month" has the meaning in the Acts Interpretation Act 1954 and means a calendar month and is a period starting at the beginning of any day of one (1) of the 12 named months and ending—
(a) immediately before the beginning of the corresponding day of the next named month; or
(b) if there is no such corresponding day—at the end of the next named month.

"NATA accreditation" means accreditation by the National Association of Testing Authorities Australia.

"pest" means species:
- declared under the Land Protection (Pest and Stock route Management) Act 2002;
- declared under Local Government model local laws; and
- which may become invasive in the future.

"pipeline waste water" means hydrostatic testing water, flush water or water from low point drains.

"pre-disturbed land use" means the function or use of the land as documented prior to significant disturbance occurring at that location.

"predominant species" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a species that contributes most to the overall above-ground biomass of a particular stratum.

"primary protection zone" means an area within a 200 metre buffer from the boundary of any Category A, B or C Environmentally Sensitive Area.

"produced water" has the meaning in Section 15A of the Petroleum and Gas (Production and Safety) Act 2004 and means CSG water or associated water for a petroleum tenure.

"protected area" means any area listed in Part 4, Section 14 of the Nature Conservation Act 1992.

"regional ecosystem(s)" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a vegetation community in a bioregion that is consistently associated with a particular combination geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystems Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.

"regrowth vegetation map" means a map certified by the chief executive as the regrowth vegetation map for the State and showing for the State:
- areas of regrowth vegetation, identified on the map as high-value regrowth vegetation, that—
  - are any of the following:
    - an endangered regional ecosystem;
    - an of concern regional ecosystem;
    - a least concern regional ecosystem; and
  - have not been cleared since 31 December 1989; and
- particular watercourses in the Burdekin, Mackay Whitsunday and Wet Tropics catchments,

identified on the map as regrowth watercourses; and
- areas the chief executive decides under section 20AI of the Vegetation Management Act 1999 to show on the map as high value regrowth vegetation.

“regulated structure” is defined in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (2013). “The term regulated structures includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity. Structures may be assessed using this Manual as being in one of three consequence categories: low, significant or high. Where categorised as a significant or high consequence, the structure is referred to as a regulated structure.”

“rehabilitation or rehabilitated” means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.

“reinstate or reinstatement” for pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines (2013).

“reporting limit” means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as “less than” the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L– 0.02 ug/L.

“residual drilling material” means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

“resource activity(ies)” has the meaning in section 107(d) of the Environmental Protection Act 1994.

“restoration” means the replacement of structural habitat complexity, ecosystem processes, services and function from a disturbed or degraded site to that of a pre-determined or analogue site. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.

“restricted stimulation fluids” has the meaning in section 206 of the Environmental Protection Act 1994 and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation—
(1) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene
(2) chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

“revegetation or revegetating or revegetate” means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.

“secondary protection zone” in relation to a Category A, B or C Environmentally Sensitive Area means an area within an 100 metre buffer from the boundary of a primary protection zone.

"sensitive place" means:
(a) a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel)
(b) a library, childcare centre, kindergarten, school, university or other educational institution
(c) a medical centre, surgery or hospital
(d) a protected area
(e) a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment
(f) a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads
(g) for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

"sensitive receptor" is defined in Schedule 2 of the Environmental Protection (Noise) Policy 2008, and means an area or place where noise is measured.

"short term noise event" is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

"significantly disturbed or significant disturbance or significant disturbance to land or areas" has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if—
- it is contaminated land; or
- it has been disturbed and human intervention is needed to rehabilitate it—
    (a) to a condition required under the relevant environmental authority; or
    (b) if the environmental authority does not require the land to be rehabilitated to a particular condition—to the condition it was in immediately before the disturbance.

"site" means the relevant petroleum activity(ies) to which the environmental authority relates.

"species richness" means the number of different species in a given area.

"specified relevant activities" for this environmental activity means an activity that:
- but for being carried out as a resource activity, would otherwise be an activity prescribed under section 19 of the Environmental Protection Act 1994 as an environmentally relevant activity; or
- stimulation activities; or
- extracting material other than by dredging.

"spillway" means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.

"stable" has the meaning in Schedule 5 of the Environmental Protection Regulation 2008 and, for a site, means the rehabilitation and restoration of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.

"stimulation" means a technique used to increase the permeability of a natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. In includes hydraulic fracturing / hydrofraccing, fracture acidizing and the use of proppant treatments.

“stimulation fluid” means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.
“stimulation impact zone” means a 100m maximum radial distance from the stimulation target location within a gas producing formation.

“structure” for the purposes of Schedule H means a dam or levee.

“suitably qualified person” means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis to performance relative to the subject matters using the relevant protocols, standards, methods or literature.

“suitably qualified and experienced person” in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what has been assessed and the precise nature of that assessment;
- the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

“suitably qualified third party” means a person who:
(a) has qualifications and experience relevant to performing the function including but not limited to:
    (i). a bachelor’s degree in science or engineering; and
    (ii) 3 years’ experience in undertaking soil contamination assessments; and
(b) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2008; and
(c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.

“sump” means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.

“synthetic based drilling mud” means a mud where the base fluid is a synthetic oil, consisting of chemical compounds which are artificially made or synthesised by chemically modifying petroleum components or other raw materials rather than the whole crude oil.

“system design plan” means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

“third party auditor” means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of the petroleum activity(ies) covered by this environmental authority.

“top soil” means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.

“total density of coarse woody material” means the total length of logs on the ground greater than or equal to 10cm diameter per hectare and number of logs on the ground greater than or equal to 10cm diameter per hectare.

“transmissivity” means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.

“valid complaint” means all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.

“void” means any man-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).

“waste and resource management hierarchy” has the meaning provided in section 9 of the Waste Reduction and Recycling Act 2011 and is the following precepts, listed in the preferred order in which waste and resource management options should be considered—
(a) AVOID unnecessary resource consumption
(b) REDUCE waste generation and disposal
(c) RE-USE waste resources without further manufacturing
(d) RECYCLE waste resources to make the same or different products
(e) RECOVER waste resources, including the recovery of energy
(f) TREAT waste before disposal, including reducing the hazardous nature of waste
(g) DISPOSE of waste only if there is no viable alternative.

“waste and resource management principles” has the meaning provided in section 4(2)(b) of the Waste Reduction and Recycling Act 2011 and means the:
(a) polluter pays principle
(b) user pays principle
(c) proximity principle
(d) product stewardship principle.

“waste fluids” has the meaning in section 13 of the Environmental Protection Act 1994 in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.

“watercourse” has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means:
1) a river, creek or stream in which water flows permanently or intermittently—
    (a) in a natural channel, whether artificially improved or not; or
    (b) in an artificial channel that has changed the course of the watercourse.
2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

“waters” includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

“well infrastructure” means infrastructure required for the construction and completion of a well including but not limited to cellar pits, dams and drill sumps.

"well integrity" means the ability of a well to contain the substances flowing through it.

"well site" means a maximum area of land disturbance for the purposes of constructing, installing and operating an exploration, appraisal or development well or such wells as part of a multi-well arrangement and includes well lease infrastructure.

"wetland" for the purpose of this environmental authority, wetland means:

- areas shown on the Map of referable wetlands which is a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D of the Environmental Protection Regulation 2008; and
- areas defined under the Queensland Wetlands Program as permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres, and possess one or more of the following attributes:
    - at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
    - the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
    - the substratum is not soil and is saturated with water, or covered by water at some time.

The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a Great Artesian Basin Spring or a subterranean wetland that is a cave or aquifer.

"wetland of high ecological significance" otherwise known as "high conservation value wetland", is a wetland that meets the definition of a wetland and that is shown as a wetland of high ecological significance or high conservation value wetland on the map of referable wetlands.

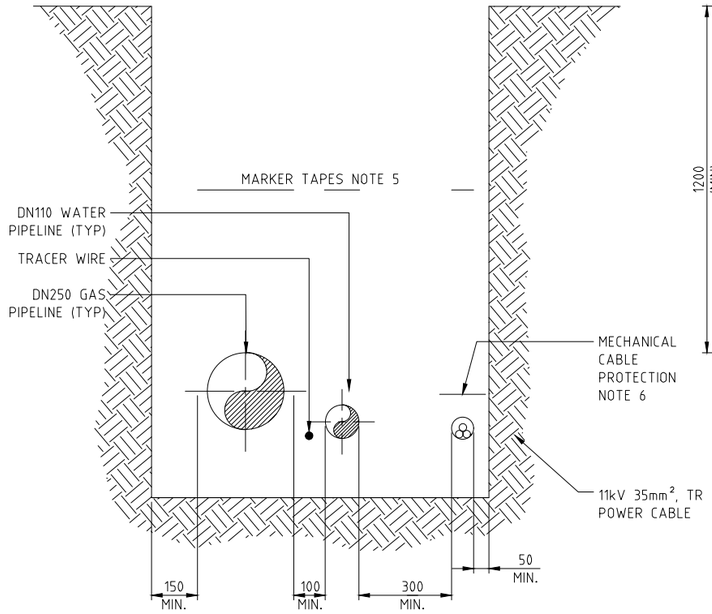
"year" means a period of 12 months.

"80th percentile" in relation to release limits means that not more than one (1) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

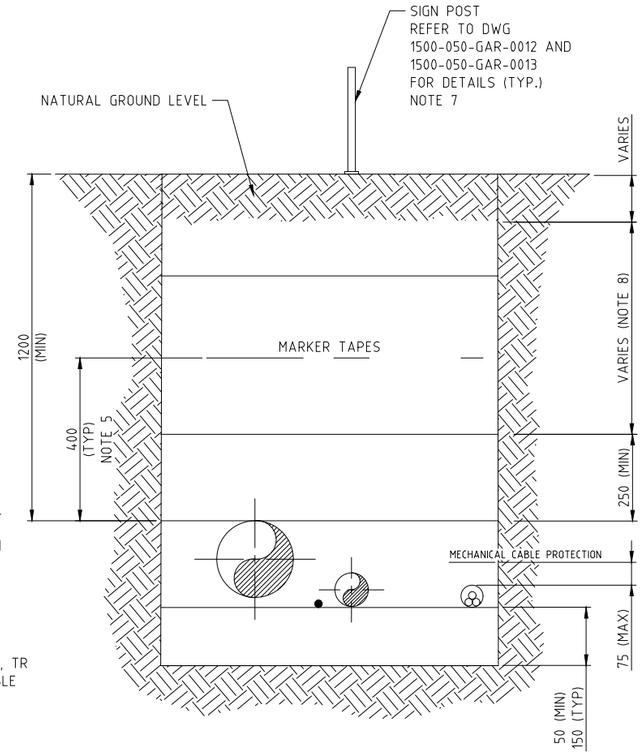
- the consecutive samples are taken over a five (5) month period; and
- the consecutive samples are taken at approximately equal periods.

END OF ENVIRONMENTAL AUTHORITY

APPENDIX C: SERVICE LAYOUT



TRENCH LAYOUT
(RAILWAY EASEMENT)
NOTE 3



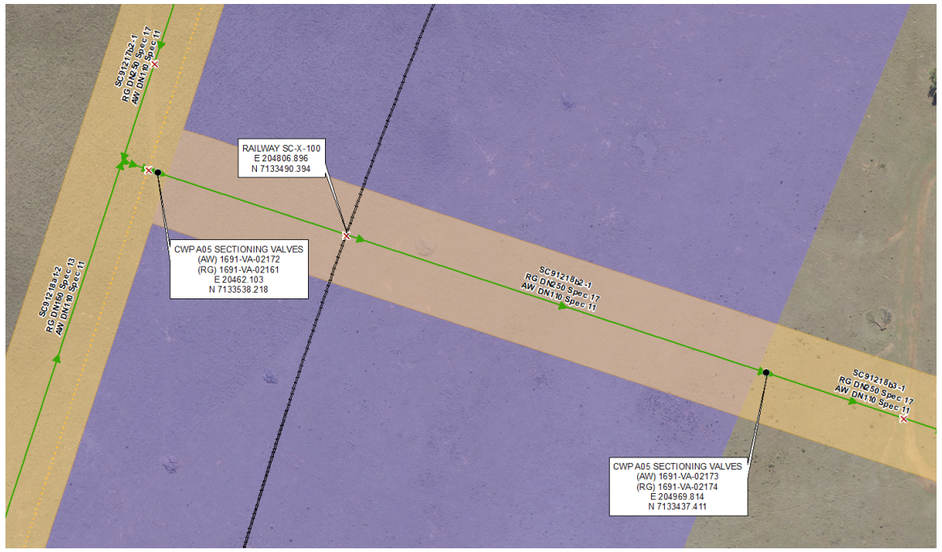
TRENCH BACKFILL REQUIREMENTS
(RAILWAY EASEMENT)

LAYER	MATERIAL	REF NOTE
TOP SOIL	ORIGINAL MATERIAL OR IMPORTED MATERIAL OF EQUAL QUALITY	10
BACKFILL	RESTORE TO ORIGINAL CONDITION USING EXCAVATED MATERIAL WITH: - ROCK TO 150mm - CLAY TO 100mm ROCK BACKFILL SHALL ONLY BE USED WHERE THERE IS SUFFICIENT SOFT SPOIL TO FILL THE VOIDS BETWEEN THE ROCK PIECES.	9
PADDING PADDING	MATERIALS EXCAVATED FROM TRENCH, FREE OF ROCKS OR STONES THAT MAY DAMAGE THE PIPE OR CABLES AND COMPLYING TO THE BELOW: SIZE (mm) / % PASSING 20 / 100 13.2 / 88 4.75 / 75 2.6 / 50 0.6 / 30 NO VOIDS ARE TO BE LEFT UNDER OR AROUND THE PIPE.	9
BEDDING	MATERIAL AS ABOVE. SAND BAGS TO BE USED AS REQUIRED TO PREVENT DAMAGE TO PIPES AND CABLES, SUCH AS WHEN INSTALLED IN A ROCK CUT.	9

NOTES:

1. ALL DIMENSIONS IN mm.
2. PIPELINE CONSTRUCTION INCLUDING TRENCHING INSTALLATION, BACKFILL AND COMPACTION TO COMPLY WITH APGA CODE OF PRACTICE AND SANTOS EXCAVATION PROCEDURES SMS-HSS-0S02-PD02.
3. ARRANGEMENT SHOWN IS TYPICAL, ALTERNATE TRENCH ARRANGEMENTS MAY BE INSTALLED, PROVIDED THEY MEET THE SEPARATION REQUIREMENTS SPECIFIED IN 1500-040-SEC-0001.
4. ORDER OF PREFERENCE FOR INCREASED SEPARATION DISTANCE BETWEEN SERVICES:
   - POWER CABLE AND OTHER SERVICES
   - PIPELINE AND TRENCH WALL
   - PIPELINES
5. MARKER TAPE DESIGN SHALL COMPLY WITH AS 2648 REQUIREMENTS, TO BE INSTALLED AT:
   - NO LESS THAN 400mm ABOVE THE PIPE/CABLE TO A MAXIMUM OF 900mm ABOVE THE PIPE/CABLE.
   - NO LESS THAN 300mm BELOW GRADE.
6. MECHANICAL CABLE PROTECTION COMPLYING WITH AS 4702 SHALL BE PLACED NOT MORE THAN 75mm ABOVE THE CABLES. IT SHALL NOT BE LESS THAN 150mm WIDE AND SHALL OVERLAP THE CABLES BY A MINIMUM OF 40mm ON EACH SIDE.
7. MARKER SIGNS ARE TO BE INSTALLED AT INTERVALS COMPLYING WITH APGA CODE OF PRACTICE.
8. DEPTH OF BACKFILL TO BE SITE DETERMINED BASED ON DEPTH OF TOP SOIL AND DEPTH OF COVER.
9. BACKFILL SHALL BE PLACED AND COMPACTED IN SUCH A WAY THAT ENSURES NO DAMAGE IS DONE TO THE PIPES OR CABLES AND NO VOIDS ARE LEFT AROUND THE PIPE.
10. BACKFILL SHALL BE COMPACTED MECHANICALLY OR BY 3 PASSES OF A 5 TONNE VEHICLE, ROLLING TO A DENSITY THAT ACHIEVES SETTLEMENT IN THE TRENCH THAT DOES NOT RESULT IN THE SURFACE OVER THE TRENCH SUBSIDING.
11. POWER CABLE TO BE DE-ENERGISED WHEN EXCAVATING OR UNDERTAKING WORKS ON ANY SERVICE WITHIN THE TRENCH.
12. GATHERING NETWORK CONSTRUCTION TO BE UNDERTAKEN PRIOR TO CONSTRUCTION OF THE PROPOSED RAILWAY CROSSING
13. THE PIPELINE SHALL BE INSTALLED LEVEL AND STRAIGHT ACROSS THE RAILWAY EASEMENT SHOWN. CROSSING ANGLE TO BE AS PER ALIGNMENT SHEETS AND AT 90 DEGREES +/- 5 DEGREES.
14. METHOD OF CONSTRUCTION FOR THE PROPOSED RAILWAY CROSSING SHALL BE OPEN TRENCH AS PER SANTOS APPROVED PROCEDURES.
15. THE PURPOSE OF THIS DRAWING IS ONLY TO SHOW THE EXTENT OF THE CROSSING BETWEEN THE GATHERING AND PROPOSED RAILWAY EASEMENT. IT IS NOT ENGINEERED AS A PROPER RAILWAY CROSSING. THE GATHERING SECTION THAT FALLS WITHIN THE BOUNDS OF THE RAILWAY EASEMENT SHALL BE BUILT IN ACCORDANCE WITH AS4799 AND QUEENSLAND RAIL'S STANDARDS SHOULD THE RAILWAY BE APPROVED.

NORTH



PLAN VIEW
NTS

No	DATE	DRN	CHKD	ENG	SANTOS Q.A.	PROJ NO.	RE NAME	RE NO.	RE COMPANY	DESCRIPTION
0	25/05/23	FYF	LJM	GZU		600018861	G.UJVARI	10116	FYFE	ISSUED FOR INFORMATION

REVISIONS

DRG No.	SUBJECT
1691-050-PKP-0059	BRANCH A05-A PIPELINE KEY PLAN
1691-061-SLD-0031	SINGLE LINE DIAGRAM - FEEDER 1

REFERENCE DRAWINGS

DRN:	FYF	SANTOS Q.A.:	
DATE:	25/05/23	PROJ NO.:	600018861
SCALE:	NTS	RE NAME:	G.UJVARI
CHKD:	LJM	RE NO.:	10116
ENG:	GZU	RE COMPANY:	FYFE

A.B.N. 12 131 271 648

AREA 1691 - SCOTIA FIELDS
SBIC SDA CROSSING - AVALON
SERVICE LAYOUT DRAWING
OPEN TRENCH - SC91-218B2 PROPOSED RAILWAY CROSSING

Santos GLNG

DRAWING No. 1691-040-LAY-0003 REV 0

AUTOCAD

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