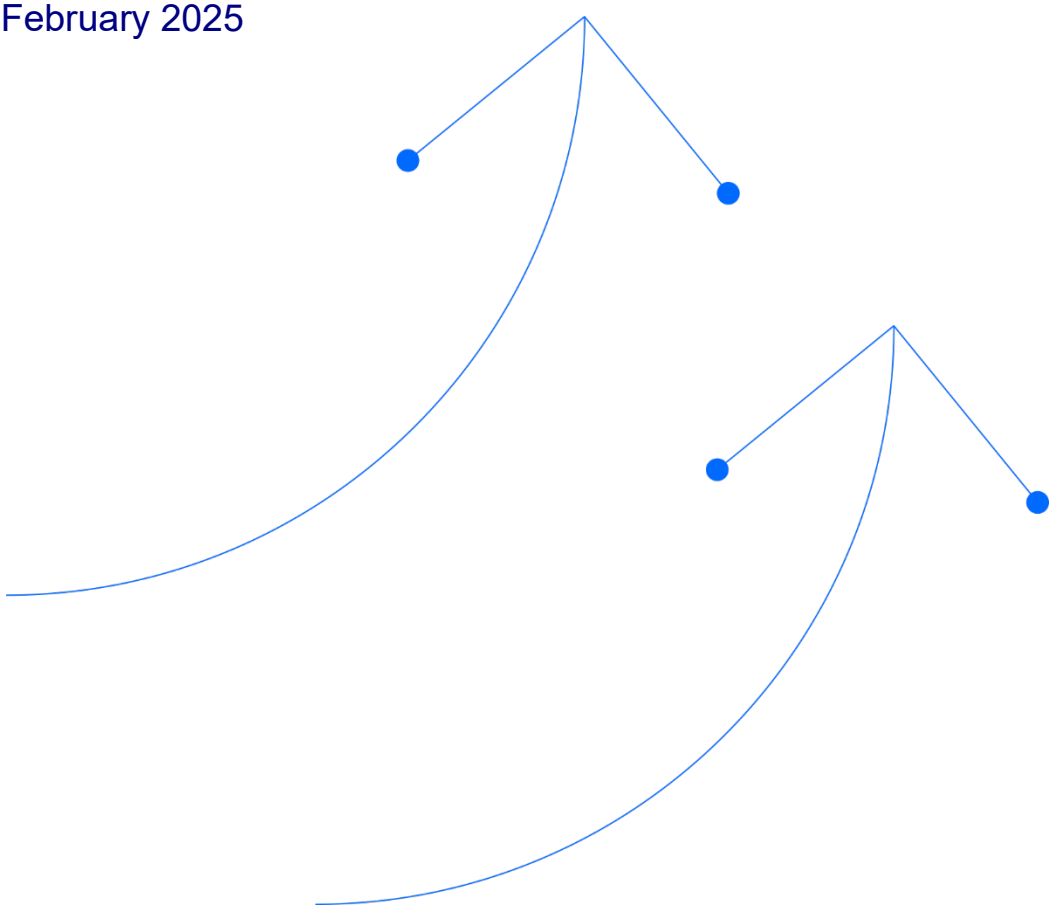
Santos

NARRABRI GAS PROJECT – POLLUTION INCIDENT RESPONSE MANAGEMENT PLAN

February 2025



Date	Revision	Reason for Issue	Author	Checked	Approved
31 October 2022	0A	For approval	Onward Consulting	DG	TD
07 March 2024	0B	Update Appendix H – PIRMP testing	Onward Consulting	JT	TD
20 February 2025	0C	Update Appendix H – PIRMP testing Update – Santos Onshore Emergency Response Plan	Onward Consulting	JT	DG

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Document review history

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

Review Date	Reason for review	Reviewed by	Revision required (Y/N)
07/03/2024	Update Appendix H to include details of PIRMP testing	Onward Consulting	Y
02/05/2024	Update Appendix H to include details of PIRMP testing Updates to Santos Onshore Emergency Response Plan.	Onward Consulting	Y

Acronyms and abbreviations

Acronym	Description
AHD	Australian Height Datum
CCC	Community Consultative Committee
CMT	Crisis Management Team
CoC	Conditions of consent for the NGP SSD 6456
CSG	coal seam gas
DCCEEW Water Group	The Water Group within NSW Department of Climate Change, Energy, the Environment and Water
D&C	drilling and completions
DPE	NSW Department of Planning and Environment (now DCCEEW Water Group)
DPE Water	The former Water Group within DPE
DPHI	NSW Department of Planning, Housing and Infrastructure
DPIE	The former NSW Department of Planning, Industry and Environment
DSEP	Dam Safety Emergency Plan
EIS	environmental impact statement
EMP	environmental management plan
EMS	Environmental Management Strategy
EOC	Emergency Operations Centre
EPA	The NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPL	environment protection licence under the POEO Act
ERC	Emergency Response Coordinator
ERP	Upstream Onshore Emergency Response Plan
ERT	Emergency Response Team
FCNSW	Forestry Corporation of NSW
FRT	Field Response Team
GIS	geographical information systems
ha	hectare
IEA	Independent Environmental Audit
HDPE	high density polyethylene
HSE	health, safety and environment

Acronym	Description
HSER	health, safety, environment and risk
IMP	Incident Management Plan
IMS	Incident Management System
IMT	Incident Management Team
m	metre
m^2	square metre
m^3	cubic metre
ML	megalitre
mm	millimetre
NGP	Narrabri Gas Project
NP&W Act	National Parks and Wildlife Act 1974 (NSW)
NRAR	Natural Resources Access Regulator
OSC	On-Scene Commander
PAL	petroleum assessment lease under the PO Act
PEL	petroleum exploration licence under the PO Act
PIRMP	Pollution Incident Response Management Plan (this document)
PO Act	Petroleum (Onshore) Act 1991 (NSW)
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
POEO Regulation	Protection of the Environment Operations (General) Regulation 2022
PPE	personal protective equipment
PPL	petroleum production lease under the PO Act
PPLA	petroleum production lease application under the PO Act
QIMS	Queensland Incident Management System
RFS	The NSW Rural Fire Service
SitRep	Emergency Situation Report Form
SSD	State Significant Development
SDS	safety data sheets
SMS	Santos Management System
WMP	Water Management Plan
WBTP	water and brine treatment plant

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1. Introduction

1.1. Purpose

Santos is committed to being the safest gas company wherever it has a presence and preventing harm to people and the environment. The Santos Environment, Health and Safety Policy, provided in Appendix A, sets out the actions Santos will take to ensure we meet our environment, health and safety commitment.

This Pollution Incident Response Management Plan (**PIRMP** or **the Plan**) helps to achieve the above commitment by:

1. identifying pollution risks and the actions to minimise and manage those risks
2. having clear and effective procedures to notify:
   - internal personnel required to respond to the emergency situation
   - people/community potentially impacted by the emergency situation and
   - authorities such as Environment Protection Authority (**EPA**), Fire and Rescue NSW, NSW Health, and Local Councils
3. having personnel trained and exercised in this Plan.

This PIRMP has been developed to address:

1. part 5.7A of the *Protection of the Environment Operations Act 1997* (**POEO Act**) which requires holders of an environment protection licence (**EPL**) issued by the NSW Environment Protection Authority (**EPA**) to prepare, keep, test, and implement a PIRMP
2. relevant conditions of consent (**CoC**) of State Significant Development (**SSD**) 6456, which Santos NSW (Eastern) Pty Ltd (**Santos**) obtained for the development of the Narrabri Gas Project (NGP) (the Project) on 30 September 2020
3. part 3A of the Protection of the Environment Operations (General) Regulation 2022 (**the POEO Regulation**) and
4. EPA's Guideline: Pollution Incident Response Management Plans (2022) (**PIRMP Guideline**).

1.1.1. Pollution incident definition

A "pollution incident" means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur.

It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise.

A pollution incident is required to be notified if there is a risk of 'material harm to the environment', which is defined in Section 147 of the POEO Act as:

> *(a) harm to the environment is material if:*
>
> (i) *it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or*
>
> *it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and*
>
> *(b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.*

1.2. Scope

In NSW, all coal seam gas (**CSG**) exploration, assessment and/or production activities are required to hold an EPL under the POEO Act. Santos holds several EPLs for its coal seam gas operations in tenures within the Gunnedah Basin area:

- EPL 20350: CSG activities in Petroleum Exploration Licence (**PEL**) 238, Petroleum Assessment Lease (**PAL**) 2 and Petroleum Production Lease (**PPL**) 3. Santos has submitted petroleum production licence applications (PPLAs) to cover the NGP SSD 6456 area
- EPL 20351: CSG activities in PEL 1 and PEL 12
- EPL 20352: CSG activities in PEL 456 and
- EPL 20378: Fluid treatment facility at the Narrabri Operations Centre.

The development of this PIRMP also addresses the consent conditions of SSD-6456 for the Narrabri Gas Project.

This PIRMP applies to all of Santos' licenced CSG exploration, assessment and production activities in NSW for which an EPL has been issued, inclusive of the Narrabri Gas Project, as well as other supporting facilities which are not scheduled activities under the POEO Act, including the Narrabri Operations Centre and the Wilga Park Power Station collectively called the Santos NSW Operations.

Facilities covered by this PIRMP include:

1. Administration/support centres
    a. Narrabri Operations Centre and
    b. Community Office in Maitland Street.
2. Storage/treatment facilities
    a. Leewood produced water and brine water ponds
    b. Leewood water treatment plant including a 5 ML treated water storage tank
    c. Leewood irrigation area (centre pivot)
    d. Tintsfield produced water ponds and flare
    e. Bibblewindi water transfer facility (5 ML tank)
    f. Bibblewindi compressor facility and flare and
    g. Wilga Park Power Station.
3. Gas field facilities
    a. water storage facilities (pilot sites and pipelines)
    b. water and gas gathering systems (i.e. pipelines) and
    c. well pads.
4. Mobile facilities
    a. drilling and Completions Operations – during a drilling/completions campaign.

The Santos WebGIS provides the most up to date source for infrastructure locations.

1.3. Consultation

This PIRMP has been prepared by a suitably qualified and experienced person in consultation with:

- Water group within the then NSW Department of Planning and Environment, now the water group within the NSW Department of Climate Change, Energy, the Environment and Water (**DCCEEW Water Group**)
- NSW Environment Protection Authority (**EPA**) and
- Water Technical Advisory Group (**WTAG**).

No comments were received from the Natural Resources Access Regulator (**NRAR**) [on behalf of DCCEEW Water Group] on the draft PIRMP (Revision C) and the attachments, and no comments were received from the EPA.

The comments provided by the WTAG predominantly focussed on the main hazards register, and leak detection. The comments also identified a number of discrepancies and opportunities for improvement, in both the PIRMP and the Dam Safety Emergency Plan (**DSEP**), provided as Attachment 1.

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

1.4. Document structure

The structure of the PIRMP is as follows:

Section 1	Provides an introduction to the Project and defines the purpose of the PIRMP and how it will be conveyed
Section 2	Provides the details regarding pollution incident response, and identifies Santos' responsibilities and management measures to minimise harm to Santos employees, the environment and the community
Section 3	Details pollution incident communication and training, and outlines the requirements and contacts detail needed by employees, contractors and/or staff working within Santos
Section 4	Provides details regarding the pollution incident response plan and provides details on the main environmental hazards associated with the NSW Operational area.
Section 5	Details the actions required for incidents and non-compliances related to the management of pollution incident responses
Section 6	Provides the details regarding the auditing, review and revision of the PIRMP
Section 7	References
Section 8	Glossary
Appendix A	Santos Environment, Health and Safety Policy
Appendix B	Consultation records
Appendix C	Consent conditions relevant to the Plan
Appendix D	Incident Response Procedures Emergency
Appendix E	Notifications - Responsible Persons, Notification to Authorities and Other Persons
Appendix F	Incident Notification Checklist, to be used for all incidents to document the agency notification
Appendix G	Emergency Situation Report (**SitRep**) form, to be used for reporting the details of the actual incident and the planning of the immediate incident response
Appendix H	Record of PIRMP testing
Appendix I	Facility maps
Appendix J	Pollutant inventory
Attachment 1	NGP Dam Safety Emergency Plan

Table 1.1 provides the details where the requirements of the PIRMP Guideline are addressed in this document.

Table 1.1 Section references to the PIRMP Guideline requirements

EPA PIRMP guideline (2022) requirement	POEO Regulation clause*	Section reference
Description and likelihood of hazards	72 (1)(a) and (1)(b)	4.2
Pre-emptive actions	72 (1)(c)	4.4
Inventory of pollutants	72 (1)(d) and (1)(e)	4.3
Safety equipment	72 (1)(f)	4.5
Contact details	72 (1)(g) and (1)(h)	3.1, Appendix E
Communicating with neighbours and the community	72 (1)(i)	3.4
Minimising harm to people on the premises	72 (1)(j)	2.3
Maps	72 (1)(k)	4.1, Appendix I
Actions to be taken during or immediately after a pollution incident	72 (1)(l)	2.4
Staff training	72 (1)(m)	3.6
Testing and updating the PIRMP	72 (1)(n), (o) and (p)	3.6, 5, 6

* Protection of the Environment Operations (General) Regulation 2022

1.5. Reference documents

This document makes reference to the Upstream Onshore Emergency Response Plan (**ERP**) and the Queensland Incident Management System (**QIMS**) Incident Management Plan (**IMP**) (**QIMS IMP**) for incident management. Current versions of these documents are available on the Santos intranet.

In the event of a failure of the Leewood ponds, the NGP Dam Safety Emergency Plan (**DSEP**) (document number 0041-150-PLA-0014), included in Attachment 1, would be invoked.

The relationship between the various plans is presented in Figure 1.1. The key stand-alone difference with the PIRMP and all other plans is the planning for the timely notifications of relevant stakeholders, particularly neighbours to the NSW Operations.

Other external references important to the implementation of the PIRMP include:

- SMS-HSS_OS05-PD01 Crisis Incident Management and Emergency Response Procedure – available on Santos Intranet
- SMS-HSS-OS07-PD01 – Incident Reporting, Investigation and Learning – available on Santos Intranet
- Santos WebGIS (for up-to-date NGP assets and facilities) – available on Santos Intranet

- EHS Toolbox – Emergency Response Module – available on Santos Intranet
- EHS Toolbox – Incident Management System – available on Santos Intranet
- Santos Community Database – up-to-date stakeholder information
- Narrabri Gas Project, Phase 1, Water Management Plan (WMP) – available on Santos NGP website
- Narrabri Gas Project, Phase 1, Environmental Management Strategy - available on Santos NGP website
- ChemAlert – Available on Santos Intranet
- Safety Data Sheets – available on-site and in ChemAlert and
- Santos Risk Matrix – SMS-LRG_OS01-TP02 – available on Santos Intranet.

1.6. Distribution

This is the full version of the PIRMP and is maintained at the premises to which the relevant licences relate and is readily available to the persons responsible for implementing the Plan and to an authorised officer of the EPA or Department of Planning, Housing and Infrastructure (**DPHI**) on request. A copy of the approved PIRMP is available to all Santos personnel via the Santos intranet. In accordance with CoC D13, a copy can also be found on the NGP website[1] for the duration of the NSW Operations. All copies of the PIRMP will be kept up to date.

In accordance with specific licence, approval or code of practice conditions, a copy of this PIRMP is available at the Santos Operations Centre located at 300 Yarrie Lake Road in Narrabri. This is where operational and field staff commence and finish each working day.

Note that any printed copies of the PIRMP are uncontrolled, unless explicitly stated.

[1] For privacy and security purposes, the public version of this Plan, as available on the NGP website, does not contain the personal contact details or phone numbers of Santos', contractors', agencies', authorities' and organisations' personnel.

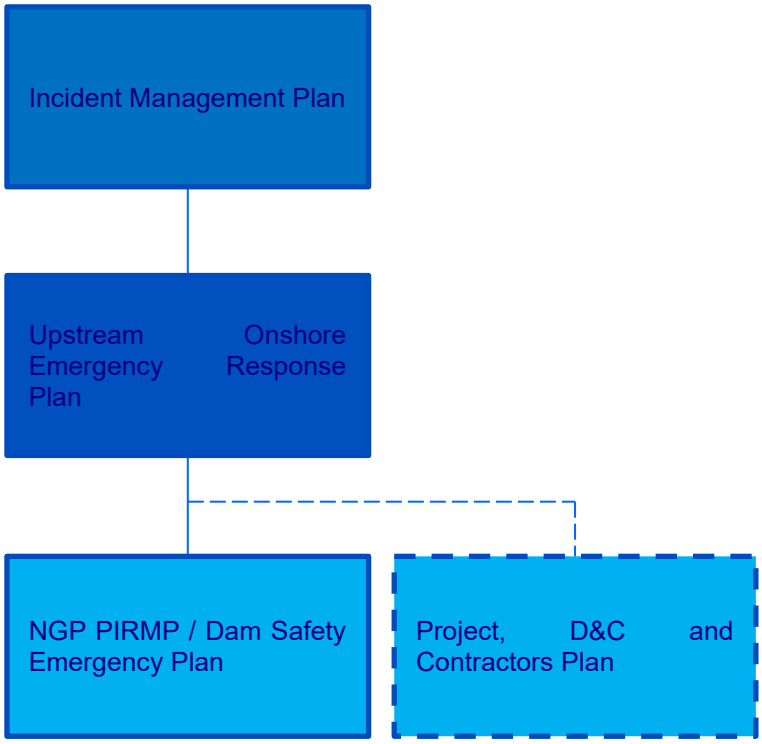

Figure 1.1 The relationship between the ERP, IMP and other supporting plans

2. Pollution incident response

2.1. Responsibilities during a pollution incident

The Santos emergency response framework consists of:

- Emergency Response Team (**ERT**) (field response and emergency response)
- Incident Management Team (**IMT**) and
- Crisis Management Team (**CMT**).

In accordance with the ERP, all emergencies are escalated to the relevant level of response as shown in Figure 2.1. Emergencies will escalate to the IMT and/or to the CMT depending on the type and severity of incident.

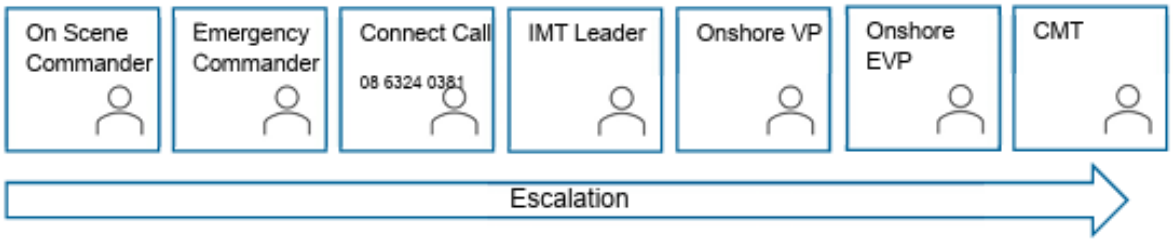

Figure 2.1 Emergency level of response

The structure of the ERT is detailed in Figure 2.2. The ERT are the primary on-scene response team. The ERT will:

- mobilise to respond to a pollution incident at Santos NSW Operations, including the storage/treatment facilities and mobile sites that are the subject of this PIRMP and
- implement the PIRMP for a pollution incident.

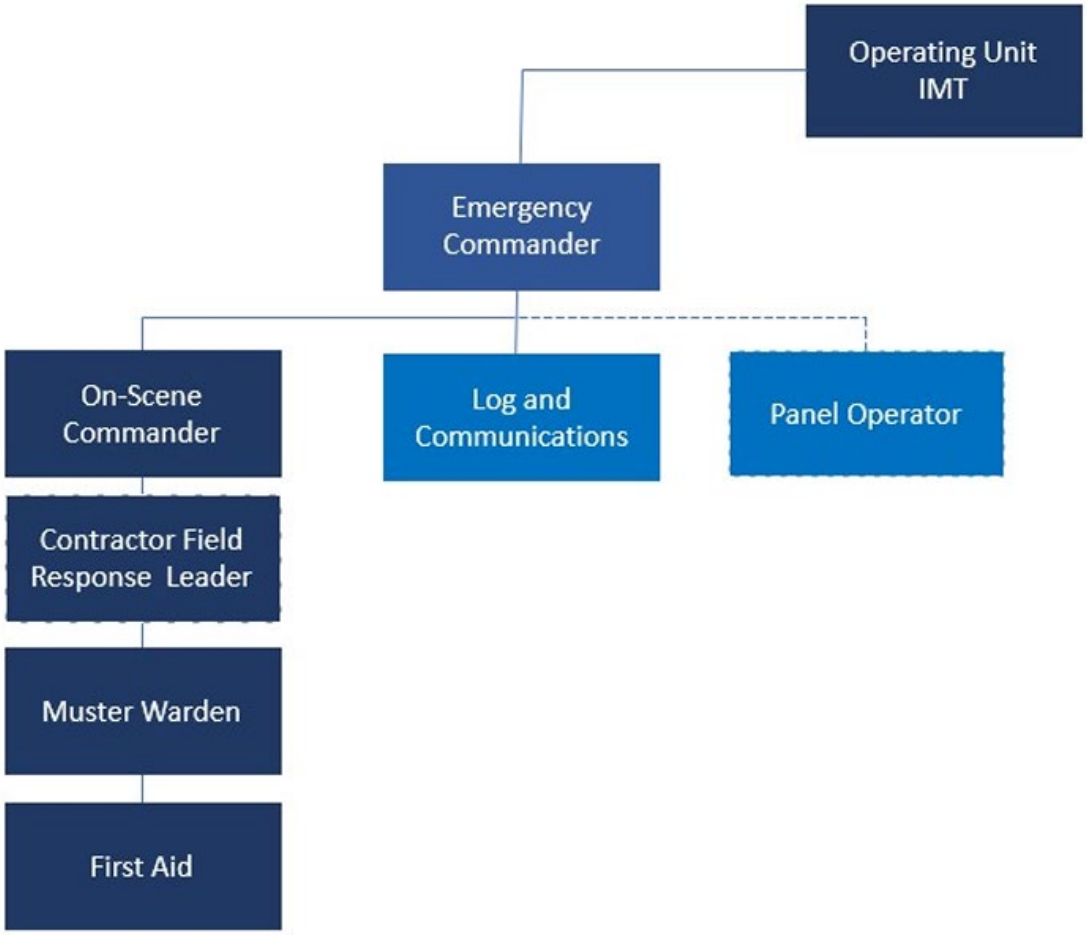

Figure 2.2 Structure of Emergency Response Team

NOTE: The Emergency Commander will call on additional resources to support the emergency situation.

2.2. Santos emergency response responsibilities

Duty Cards describing the responsibilities are available for each of the ERT roles. This minimises confusion, and to ensure that all essential emergency response activities are carried out and that operations resume as quickly as possible after the conclusion of the emergency.

A particular “role” is not a fixed set of prescribed rules or duties allocated to a specific level of position, title or person. Rather, they are designed as a pro-active checklist of flexible suggestions or prompts, nominated to the best incumbent, capable of assuming the “role”. The checklists can cater for an escalation or change in the severity of any emergency.

The “role” prompts are not designed to cater for every specific, likely or prescribed emergency occasion, nor is it intended for every prompt to be used sequentially, but only as appropriate to the emergency and response required at the time. They are simply suggestions to consider during any, or all, emergencies that assist to move the response along effectively.

Depending on the emergency type, severity and timeframe, the ERC may enlist other individuals to assist the ERT, relief ERT members, undertake specific tasks or even scale back the full activation of the ERT to a monitoring function only. Additional functions may include a Recovery Officer to coordinate the activities which follow the immediate response.

2.2.1. Emergency Response Team

Table 2.1 outlines the responsibilities of the ERT.

Table 2.1 Emergency Response Team responsibilities

Role	Responsibilities
Emergency Commander	• directs emergency response activities, considering: – onshore common emergency scenarios; and – Incident Action Plans. • provides support and direction to the On-Scene Commander and establishes regular situational report updates • notifies the Onshore IMT Lead: – emergency situation – ERT has been established, where required – what external support services have been contacted and their expected time of arrival – emergency escalation is or is not likely – request for support from the IMT and – establishes regular situational report updates. • establishes regular "Time Outs" with Log and Communication role (and Panel Operator where established) • develops a local recovery plan post emergency to recover operations • implements recovery actions identified by IMT and • participates in after action reviews, post incident debriefs, and incident investigations as required.
Log and Communications Officer	• maintain a log of event as a record of response activities • upload log to EHS Toolbox Emergency Response Record; and • on behalf of the Emergency Commander affect and receive notifications, as required.
Panel Operator	Panel Operators will form part of the Emergency Response Team when the emergency involves process plant and equipment: • engaged by the Emergency Commander and assist in the response • manage production plant operations as directed by the Emergency Commander; and • communicate process equipment status to the Emergency Commander.

Role	Responsibilities
On-Scene Commander	On Scene Commander is fulfilled by the relevant Team Leader, Construction Supervisor, Operating Company Representative (**OCR**), Operations Support or their delegate: • undertakes command and leads field response reporting to the Emergency Commander • maintains responder safety in accordance with the Santos response philosophy • ensures all field and affected area personnel are accounted for (evacuation and muster) • ensures first aid is provided • considers tactical response in accordance with Emergency Checklists and Incident Action Plans • where warranted, mobilises emergency services to assist with the emergency • establishes and secures exclusion zone and forward command post • establishes a staging area when required • continuously monitors emergency for potential to escalate • scene preservation and • acknowledgement of handover of scene to regulatory authority where required.
Contractor Field Response Leader	The Contractor Field Response Leader is normally the: • Rig Manager/Tool Pusher (or equivalent Senior site Contractor Representative) located at the affected wellsite for Drilling and Completions and • Construction/Development Supervisor for the construction activity. The Contractor Field Response Leader will ensure there are personnel to fulfil the following roles: • Muster warden and • First Aid.
Muster Warden	• appointed by and reports to the On Scene Commander • accounts for all personnel on-site during the emergency response • reports muster status to the On Scene Commander • coordinates movement of mustered personnel to safe locations during the emergency and • account for Operations personnel and emergency services accessing the emergency scene, when safe to do so.
First Aid Officer	• appointed by and reports to the On Scene Commander • ensures first aid is provided to injured personnel and • ensures additional medical emergency services (internal and external) are mobilised to support the injured personnel.

2.3. Management measures to minimise harm to site personnel

Physical and managerial management measures have been developed and implemented by Santos to minimise the potential harm to Santos employees and the community resulting from a pollution incident. Physical measures such as alarms and emergency response equipment, including appropriate personal protective equipment (**PPE**) have been installed and provided at active work sites.

Santos has developed a number of management plans and procedures to respond to emergencies and incidents, including the ERP and QIMS IMP. All documents, including this PIRMP, have been developed to meet both legislative and safety obligations and all approval, licencing and consent requirements associated with operations.

All site staff, contractors and visitors are inducted when first attending a site and advised of emergency procedures, warning alarms (where applicable), minimum mandatory PPE and each site's muster location. The Induction communicates the requirement to report all hazards and incidents which would enable early activation of the PIRMP and the ERP.

Santos has designated emergency response roles as detailed in Section 2.2. The designated staff members have been advised of the requirements relating to their respective roles and also trained in emergency response through desk-top and simulated emergency situations. Santos staff training packages are regularly updated to include response and notification requirements for the PIRMP and associated pollution incidents. Further details relating to staff training and testing of the PIRMP are provided in Section 3.6.

2.3.1. Santos Approach

Santos' approach to emergencies is focused on the safety of personnel and removing personnel from an emergency situation. An example of this approach is in relation to fires. Personnel can attempt to extinguish a fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers or small hose systems. Anything greater than this, we do not attempt to extinguish. We will:

- utilise fixed systems where they exist and
- implement preventative measures such as wetting down areas, removing fuel loads etc outside of the emergency location and with the approval of the relevant Santos Line Leader or On Scene Commander.

Preventative measures will only be implemented with the approval of the relevant Santos Line Leader or On Scene Commander.

2.3.2. Principles and Philosophy

All emergencies are managed in accordance with the following principles and philosophies:

- Emergency Shutdown (ESD), evacuate, activate fixed systems
- provide first aid and request additional medical support as appropriate
- muster and account for personnel in the affected area
- mobilise emergency services and
- the People, Environment, Assets, Recovery (**PEAR**) model (Table 2.2).

Table 2.2 PEAR emergency management

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

NOTE: All Santos employees and Contractors have the authority to shut down or cease processing and production in order to follow the Santos emergency principles and philosophy.

2.4. Actions to be taken during and immediately after a pollution incident

Pollution incidents could comprise an emergency, as such may require an emergency response. The actions outlined in this section are in accordance with the ERP.

2.4.1. Immediate actions at the scene

For process safety emergencies (e.g. loss of containment / fire):

- evacuate the area

- activate emergency shutdown devices and
- raise the alarm.

For all other emergencies:

- make the area safe (if safe to do so) and
- raise the alarm and alert others in the area if able and without putting self at risk.

2.4.2. Raise the alarm

Prefix any emergency call with “emergency emergency”. Follow the procedures outlined in Table 2.3.

Table 2.3 Procedures to raise the alarm

Method	Description
Radio	• local site radio.
Phone	• direct to Santos Supervisor; or if external party • 1300 926 177.
Fixed Alarm	• fixed fire or ESD • facility muster alarms
Other	Long pressing the in-vehicle monitoring system (IVMS) duress alarm in vehicles.

2.4.3. Relay Information

Information to be relayed when raising the alarm is outlined Table 2.4.

Table 2.4 Information to relay when raising the alarm

Information	Detail
Incident description (type of incident examples):	• loss of containment: gas, oil, water, chemical or other • fire • vehicle and • medical.
Incident location	• the nearest facility, equipment, vessel, road and crossroad etc and • distance from landmark or identifiable equipment.
Are there any injuries? if yes, details of injuries	• who is injured (names of personnel, Santos or contractor.)? • how many people are injured? • what are the injuries? • what first aid is being provided? • what emergency services have been called? • what further medical assistance is required?
Incident size and potential	• area • height • volume and • how could this impact personnel, public, environment, assets?
Current status	• has the source been stopped or contained? • is it under control?

Information	Detail
	• is it spreading? if yes, what direction? n/s/e/w? • are personnel evacuating to muster location?
Emergency call made by and time:	• name, company name, and contact details? • time emergency detected and time of call.
Emergency support services:	• emergency services support in NSW – dial 000 • Santos CSG also uses the services of an external call centre, the call centre provides the following services: • receives emergency and general inquiry calls from both external and internal callers and directs to the relevant Santos team leader • logs, monitors, and escalates (as required) journey management and lone worker calls to the relevant supervisor or Santos team leader and • receives and escalates IVMs duress alerts to the relevant supervisor or Santos team leader.

Incident response procedures

Santos staff will follow the incident response procedures detailing the actions to be taken after a pollution incident to reduce or control any pollution. The incident response procedures are to be followed where there is no threat to the safety of site personnel responding to the incident. Procedures for the following pollution incidents are located in Appendix D.

- chemical and produced water spills/gas release situation checklist
- fire/explosion situation checklist
- pipeline integrity compromised checklist
- dam collapse (refer to the Dam Safety Emergency Plan (**DSEP**) Attachment 1) and
- severe weather event.

2.4.4. Incident classification and notification

All spill incidents will be reported and managed in accordance with the incident notification requirements of:

- CoC D6
- section 148 of the POEO Act
- SMS-HSS_OS05-PD01 Crisis Incident Management and Emergency Response Procedure and
- SMS-HSS-OS07-PD01 – Incident Reporting, Investigation and Learning

Verbal notification will be used as the first form of notification followed up by written detailed notification to ensure adequate details are provided.

The Santos onshore environment team will determine any potential external notification triggers. External notifications are the responsibility of the Manager Onshore HSER.

2.4.5. Pollution incident clean-up

Procedures for the clean-up of pollution incidents will largely depend on the type and extent of the pollution incident. Clean-up procedures will take into account the following:

- type of pollutant
- extent and area of pollution impact
- medium in which pollution has occurred (land, air, water, or any combination)
- requirements for specialist advice in relation to the removal and remediation of the pollution

- potential additional environmental impacts by the proposed clean-up processes and
- costs to remove the polluted material to a waste facility licensed to accept the waste.

The On Scene Commander, in conjunction with the Emergency Response Coordinator and Environmental Adviser, will determine the method of clean-up. External consultants may be engaged to provide advice where required.

2.4.6. Spill Response Overview

Actions to be taken when managing a spill incident are outlined in Table 2.5.

Table 2.5 Spill response roles and actions

Role	Action
Person reporting the incident	• ensure the spill has been stopped and has been contained safely (if safe to do so) • follow PIRMP and NGP Emergency Response Management Plan if the spill is uncontrolled or is released offsite • immediately notify Narrabri Operations Team Leader and Environment Adviser. If possible, provide: – pictures of the spill and affected or impacted area, equipment and/or infrastructure and – record the impacted area (in m^2) and volume released (in m^3)).
Narrabri Operations Team Leader	• implement PIRMP including standing up ERT as required by the incident • discuss incident with Environment Adviser to: – confirm external and internal notification requirements – arrange sampling of site – arrange clean up – confirm external and internal notification requirements with Area Manager and Manager Onshore HSER and – initiate IMS entry into EHS Toolbox.
Area Manager	• support ERT • confirm classification with Manager Onshore HSER and • initiate investigation as per SMS-HSS-OS07-PD01 Incident Reporting, Investigation and Learning.
Manager Onshore HSER	• carry out or delegate to Environment Adviser, external notifications as per the EPAs Protocol for industry notification of pollution incidents.

2.4.7. Environmental Considerations

Environmental monitoring will be conducted in response to an environmental emergency. The specific aspects of the environmental monitoring activities, including suitable monitoring locations, will vary depending on the nature of the incident and will be determined at the time of the incident. Typical monitoring that will be required is outlined in Table 2.6.

Table 2.6 Typical environmental monitoring

Step	Information
1	Visual and olfactory inspections to determine the nature and extent of impacts and ongoing response actions.
2	Vapour monitoring associated with the release of gases and petroleum hydrocarbon and / or chemical vapours to atmosphere;
3	Field measurements of pH and conductivity in released waters, waters contained within temporary containment structures or tanks and receiving waters; and / or
4	Laboratory measurements to identify constituents of concern in affected media where required (e.g., waters, soils).

Further sampling and analysis may be conducted during the post-incident investigative process, assessment and, if required, remediation activities. This will include the implementation of environment monitoring programs where contaminants have been released to land or water, to determine the extent of any environmental impact. Programs will include upstream, downstream and impact site monitoring for releases to waters and a detailed soil monitoring program for releases to land.

3. Pollution incident communication and training

3.1. Immediate incident notification to relevant authorities

Depending on the location and nature of the incident, Santos is required to immediately notify all or some of the following regulatory authorities where a pollution incident has occurred or is likely to occur are listed below.

DPHI	compliance@planning.nsw.gov.au
EPA	Environment Line 131 555
Resources Regulator	1300 814 609
Narrabri Shire Council	02 6799 6866
Fire & Rescue NSW	call 000 in an emergency or otherwise, 02 6792 3667
NSW Health	02 6274 8000
SafeWork NSW	131 050

Santos is required to report all pollution incidents to the relevant authorities immediately the incident is identified and determined to meet the threshold of 'Material Environmental Harm'.

'Immediately' has its ordinary dictionary meaning of promptly and without delay.

Contact details for all regulatory authorities are available in Appendix E.

The Emergency Incident Notification Checklist should be used to document the agency notification. As per CoC D6, DPHI and any other relevant agencies are to be notified via the Major Projects Portal immediately after Santos becomes aware of the incident. This notice must describe the location and nature of the incident.

The information required to be provided as part of the notification process includes:

- time, date, nature, duration and location of the incident
- location of the place where pollution is occurring or is likely to occur
- nature, the estimated quantity or volume and the concentration of any pollutants involved, if known
- circumstances in which the incident occurred (including the cause of the incident, if known)
- action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution, if known and
- other information prescribed by the regulations, as is identified on the notification checklist.

Lack of any of the above information should not prevent immediate notification.

The Emergency Situation Report (**SitRep**) form should be used to document additional information as it becomes available. The Situation Report and Emergency Incident Notification Checklist are to be updated as required and used to document any information updates made to the relevant agencies. These records are to be uploaded to the IMS in EHS Toolbox at the conclusion of the incident.

The Emergency Incident Notification Checklist and the Situation Report are attached as Appendix F and Appendix G respectively.

3.2. Full report to relevant authorities

For incidents notified above, a full report is to be provided to regulatory authorities (including DPHI, NSW, Resources Regulator where relevant), within 7 days of the incident.

3.3. Internal notifications

Internal notifications will be carried out as per this PIRMP and SMS-HSS-OS07-PD01 Incident Reporting, Investigation and Learning.

The NGP Emergency Contact List can be found in Appendix E. It can also be accessed via the Santos intranet.

Section 10.4 of the DSEP also contains an emergency contact list for external parties relevant to a dam safety incident.

3.4. Communicating with neighbours and the community

During an emergency situation it may be necessary to communicate with external stakeholders regarding the type and scale of the emergency, the possible cause, its effects and consequences, the likely duration, potential impacts and any action required to be taken.

All information that is communicated to other external stakeholders must be authorised by the ERC and/or the IMT. The ERT Operations Officer will be responsible for co-ordinating the notification and update of information to neighbours and local stakeholders.

Relevant stakeholders that may require notification include:

- neighbours, local landowners, and community representatives
- Santos employees and family members
- customers and producers
- FCNSW
- the media and
- insurers and lawyers.

All information that is communicated to external stakeholders must be authorised by the ERC and/or the IMT. The ERT Operations Officer will be responsible for co-ordinating the notification and update of information to neighbours and local stakeholders.

The method of communication to the community will depend on the nature and extent of the incident. The Community Database details the preferred communication for each stakeholder.

Neighbours will generally be communicated with by phone / message (phone numbers provided in Santos Community Database) and the broader local community will be communicated with via local media (e.g. radio, newspaper, social media).

Should landholders not be able to be reached and/or contact details are unknown, locations will be doorknocked as required.

Notification of the community is to be undertaken in consultation with the Government and local authorities. It is imperative that all communications with the media be properly authorised by NSW Santos management. For this reason, the ERT should refer all media communication issues to the Government and Public Affairs team or the IMT Communications Group if the IMT has been activated.

Contact details for other stakeholders for each asset covered by the PIRMP are provided in the Santos Community Database for this purpose.

3.5. Information to be provided to the community

Advice provided to the community will depend on the type and extent of the pollution incident. The advice will outline what has occurred, when and how they may be affected. Any immediate actions to be taken to reduce or prevent any risk to the community will be clearly established.

The following examples for the type of advice are provided as a guide:

- uncontrolled emission of air pollutant (gas emission) per determined risk:
  - advice to take appropriate actions (e.g. close windows and doors, turn off air conditioning equipment and stay indoors).
- uncontrolled release of contaminated water into a waterway per determined risk:
  - advice to take appropriate action such as do not access or use affected waters for a specified duration, including users of the State Forest.

Decisions to notify neighbours and the local community will be made in consultation with regulatory authorities based on an initial risk assessment (for example, considering the type of pollutant, concentration of emission, prevailing wind and height of the emission).

Notification of the community and media is to be undertaken in consultation with the Government and Public Affairs team and local authorities.

3.6. Staff training and testing of the PIRMP

Personnel shall be trained in line with the Santos Training Standard to effectively fulfil their roles and responsibilities. Training personnel and exercising the PIRMP may be in the form of simulated emergencies, practical drills, desktop exercises, resources and equipment checks, or other exercises designed to systematically include all personnel likely to be involved.

Emergency exercises will be conducted to:

- verify that the emergency plans provide adequate coverage across the range of incident categories
- test the effectiveness of the PIRMP
- validate the competency and response times of key emergency response personnel, including knowledge of individual roles and responsibilities
- assess the capability to respond to an emergency
- reinforce prior training
- identify opportunities for improvement to the PIRMP
- provide confidence to participants around emergency decision-making and
- verify adequacy of communication channels, both internally and externally.

Santos will conduct an annual exercise incorporating aspects of this PIRMP, which could initiate the activation of the ERP. The PIRMP will also be deemed to be exercised if an actual emergency occurs and components of the PIRMP are activated. In the event of an actual emergency, the PIRMP will be reviewed and updated accordingly.

Outcomes of emergency exercises such as opportunities for improvement and their actions and exercise participants will be recorded in the ‘Emergency Response’ module of the EHS Toolbox. A record of PIRMP testing will also be maintained in Appendix H.

4. Pollution incident response planning

4.1. Pollution incident response maps

Details of potential pollutants and safety equipment are provided in site plans for each fixed facility. The following site plans are available for NSW Operations on the Santos intranet and are attached as Appendix I.

- Narrabri Operations Centre
- Wilga Park Power Station
- Leewood Ponds
- Bibblewindi Ponds
- Tintsfield Ponds
- Bibblewindi compressor facility, and flare and
- Well pads.

Progressive erosion and sediment controls plans are developed for each well pad prior to site disturbance. These are stored in Santos records management system.

Site plans have also been developed for each gas well pad for both construction and operation. Refer to each facility's site plan.

4.2. Main hazards NSW operations

A site-wide hazard assessment was undertaken at Santos to identify the main hazards on the site that pose a risk of causing actual or potential material harm to the environment and/or to human health. The main hazards identified have been detailed in Table 4.1.

Section 4 of the WMP provides further details regarding the risks of the potential issues and their impacts to surface water, groundwater and water-related environmental values associated with the NSW Operations, and a copy of the Santos Risk Matrix.

Table 4.1 Main NGP environmental and human health hazards

Facility	Hazard	Description	Likelihood of causing harm		Consequence	Management measure	Circumstances that may increase the likelihood of causing environmental harm
Narrabri Operation Centre	Dangerous goods/ Hazardous substance spill/leak	Leak/spill of dangerous goods and/or hazardous chemicals	Environment	Low	Localised contamination of the ground surface	• bunded dangerous goods cabinets • chemical spill kits • scheduled inspections of storage area • training of employees in the storage and handling and hazardous substances • on-site SDS register • personal protective equipment	Improper chemical/dangerous goods handling
			Health	Medium	Long term disablement or impairment		
Wilga Park Power Station	Dangerous goods/ Hazardous substance spill/leak	Leak/spill of dangerous goods and/or hazardous chemicals	Environment	Low	Localised contamination of the ground surface	• bunded dangerous goods cabinets • chemical spill kits • scheduled inspections of storage area • training of employees in the storage and handling and hazardous substances • on-site register of SDSs • ChemAlert for access to SDSs • personal protective equipment	Improper chemical/dangerous goods handling
			Health	Medium	Long term disablement or impairment		
Wilga Park Power Station	Uncontrolled air emissions	Uncontrolled emission of methane from site infrastructure	Environment	Low	Uncontrolled emission of methane into the atmosphere	• alarm systems on plant infrastructure • scheduled inspections of plant and equipment • use of portable gas detectors • personal protective equipment • evacuation procedure	Plant failure
			Health	Medium	Temporary disablement or impairment		
Wilga Park Power Station	Man-made fire	Fire caused directly or indirectly by site activities	Environment	Medium	Flora and fauna loss. Damage to infrastructure	• hot work permits • mobile fire-fighting trailer • training for staff to prevent accidental ignition, have fire breaks and fire extinguishers located throughout the Site • evacuation procedures	Undertaking hot works during dry/hot weather Plant Failure
			Health	High	Loss of life		
Wilga Park Power Station	Fuel (Distillate) leak/spill	Leak/spill of diesel from the storage tanks	Low		Localised contamination of the ground surface	• bunded fuel storage area. • spill kits • alarm systems on plant infrastructure • scheduled inspections of storage area.	Improper fuel refuelling/storage
Wilga Park Power Station	Bush fire	Natural occurring bushfire burning surrounding vegetation and materials	Environment	Medium	Flora and fauna loss. Damage to infrastructure	• severe weather warnings to be communicated to site staff	Storm events / lightning

Facility	Hazard	Description	Likelihood of causing harm		Consequence	Management measure	Circumstances that may increase the likelihood of causing environmental harm
			Health	High	Loss of life	• have fire breaks and fire extinguishers located throughout the Site • mobile fire-fighting trailer • evacuation procedures	
Well pads under construction	Sediment-laden runoff from topsoil stockpiles	Sediment-laden runoff caused by erosion of the topsoil stockpiles	Low		Sediment-laden runoff into the surrounding environment and potentially waterways	• environmental controls around stockpiles. • scheduled site inspections	Storm events/ heavy rainfall
Well pads under construction	Spill/leak of drilling muds	Sediment-laden runoff onto the site surrounding the well head/storage containers	Low		Localised contamination of the ground surface surrounding the well head/storage containers	• spill kits • scheduled site inspections	Failure of well head during drilling Failure of storage tanks
Well pads under construction	Dangerous goods/ Hazardous substance spill/leak	Leak/spill of dangerous goods and/or hazardous chemicals	Environment	Low	Localised contamination of the ground surface or potentially waterways Flora and fauna loss	• bunded dangerous goods cabinets • chemical spill kits • scheduled inspections of storage area. • on-site register of SDSs • training of employees in the storage and handling and hazardous substances • personal protective equipment	Improper chemical/dangerous goods handling
			Health	Medium	Long term disablement or impairment		
Well pads under construction	Fuel (Distillate) leak/spill	Leak/spill of diesel during onsite refuelling operations	Low		Localised contamination of the ground surface or potentially waterways Flora and fauna loss	• bunded portable fuel storage containers • spill kits • use of spill mats under refill point • maintain distance from waterways	Improper fuel refuelling/storage
Well pads under construction	Bush fire	Natural occurring bushfire burning surrounding vegetation and materials	Environment	Medium	Flora and fauna loss. Damage to infrastructure	• severe weather warnings to be communicated to site staff • have fire breaks and fire extinguishers located throughout the site • mobile fire-fighting trailer at active pilot sites • evacuation procedures	Storm events / lightning
			Health	High	Loss of life		
Well pads under construction	Flooding	Natural flooding of waterways onto construction sites	Low		Potential localised contamination of waterways	• severe weather warnings to be communicated to site staff • flood mapping • removal of all non-permanent infrastructure, including removal of hazardous materials.	Major storm events
Operational well pads	Uncontrolled air emissions	Uncontrolled emission of methane from site infrastructure	Environment	Low	Uncontrolled emission of methane into the atmosphere	• alarm systems on plant infrastructure • use of portable gas detectors • scheduled inspections / maintenance of plant and equipment	Plant failure
			Health	Medium	Temporary disablement or impairment		

Facility	Hazard	Description	Likelihood of causing harm		Consequence	Management measure	Circumstances that may increase the likelihood of causing environmental harm
						• personal protective equipment • evacuation procedure	
Operational well pads	Produced water pipeline failure	Uncontrolled discharge of produced water from pipeline	Medium		Uncontrolled discharge of produced water into the environment (land and potentially water ways) Flora and fauna loss	• alarm systems on plant infrastructure • scheduled site inspections	Plant failure
Operational well pads	Fuel (Distillate) leak/spill	Leak/spill of diesel	Low		Localised contamination of the ground surface or potentially waterways Flora and fauna loss	• bunded fuel storage containers • maintain distance from waterways • scheduled site inspections	Equipment failure
Operational well pads	Flooding	Natural flooding of waterways onto operational sites	Low		Potential localised contamination of waterways	• severe weather warnings to be communicated to site staff • flood mapping • removal of any hazardous materials. • well shut-in procedure	Major storm events
Leewood, and Tintsfield brine and produced water ponds	Movement within the pond embankment structure	Deterioration/cracks/settlement or mounding at toe of embankment	Medium		Discharge of brine/produced water causing pollution to land and potentially waterways	• regular inspections • drain pond or transfer water until embankment is remediated.	Major storm events
Leewood, and Tintsfield brine and produced water ponds	Overtopping of ponds	The capacity of the pond is exceeded due to a rain event or blockage	Environment	Medium	Overtopping of pond causing pollution to land and potentially waterways. Flora and fauna loss	• regular inspections; Implementation of TARP • unblock spillway and drawdown pond • evacuation procedure	Major storm events
			Health	Medium	Loss of life		
Leewood, and Tintsfield brine and produced water ponds	Defects in pond liners	Large volume of seepage water continuously pumped from sumps. Floating geomembrane liner.	Medium		Discharge of brine/produced water causing pollution to land and potentially waterways	• regular inspections • regular monitoring of seepage detection bores; Scheduled maintenance of pond liners.	Major storm events
Leewood, and Tintsfield brine and produced water ponds	Piping and tunnelling erosion	Sediment laden seepage from embankment surface with visible flow and possible sediment fans on the downstream slope or toe area of the embankment	Low		Discharge of sediment-laden water causing pollution of waterways	• regular inspections • scheduled maintenance of pond liners • drain pond, inspect liner for defects and remediate embankment	Major storm events
Leewood, and Tintsfield brine and produced water ponds	Bush fire	Natural occurring bushfire burning surrounding vegetation and materials	Environment	Medium	Flora and fauna loss. Damage to infrastructure	• severe weather warnings to be communicated to site staff • have fire breaks located throughout the site • mobile fire-fighting trailer • evacuation plan	Storm events/lightning
			Health	High	Loss of life		
Leewood, and Tintsfield brine and	Man-made fire	Fire caused directly or indirectly by site activities	Environment	Medium	Flora and fauna loss Damage to infrastructure	• training for staff to prevent accidental ignition, have fire	Improper fuel refuelling/storage Storm events

Facility	Hazard	Description	Likelihood of causing harm		Consequence	Management measure	Circumstances that may increase the likelihood of causing environmental harm
produced water ponds			Health	High	Loss of life	breaks and located throughout the Site • mobile fire-fighting trailer • evacuation plan	

4.3. Inventory of pollutants

A number of potential pollutants are stored, used, treated and disposed of at the various operational sites. These include product, fuels, chemicals, oils, lubricants, wastewater, sewerage water, sediment-laden storm water and waste materials. All dangerous goods and hazardous substances at each facility are recorded on ChemAlert, and summarised in Appendix J.

Safety data sheets (**SDS**) for all hazardous chemicals are available via ChemAlert. A list of potential pollutants is detailed in Table 4.2.

Table 4.2 Potential pollutants at Santos NSW operation facilities

Facility	Pollutant
Wilga Park Power Station	Methane (uncontrolled discharge)
	Hazardous chemicals
Narrabri Operation Centre	Hazardous chemicals
Bibblewindi	Hazardous chemicals
Produced water pipeline	Produced water
Leewood, and Tintsfield brine and produced water ponds	Brine water Produced water
	Sediment-laden runoff
Leewood water and brine treatment plant (**WBTP**)	Hazardous chemicals
Wells under construction	Methane (uncontrolled discharge)
	Hazardous chemicals
	Sediment laden runoff
Operational wells	Methane (uncontrolled discharge)

4.4. Pre-emptive actions to minimise risks

The following general pre-emptive actions are undertaken by Santos for its NSW operations in order to prevent or minimise risks to human health and/or the environment:

- training in the handling of chemicals / hazardous materials
- appropriate personal protective equipment (**PPE**) available on-site to further reduce safety risk (e.g. hearing protection, gloves, safety glasses
- provision, training and use of spill containment kits and fire extinguishers
- installation of telemetered alarms on key infrastructure containing liquids with a potential to release to the environment (e.g. Bibblewindi produced water balance tank, wastewater tanks, well-heads). Alarms are a mix of being audible or triggering a notification to an operator for action when pre-set trigger limits / levels are reached.
- bunding of bulk chemical, fuel, oil and lubricant storage containers
- installation of safety showers and eye-wash facilities
- isolation valves on well infrastructure
- regular and routine condition assessments of key infrastructure, based on preventative maintenance regimes, and integrity and reliability management documentation
- regular and routine environmental inspections across the sites, based on environmental risk

- internal and external audits assessing environmental compliance of the site, adequacy of safety management systems and safety equipment; and
- undertaking emergency response training exercises to ensure staff are ready to respond in the case of an incident.

4.5. Safety equipment at facilities

Safety equipment available at the various NSW operations facilities and construction sites are listed in Table 4.3.

Table 4.3 Safety equipment at Santos NSW operations

Facility	Item
Wilga Park	Dry chemical portable fire extinguishers throughout the building
Wilga Park	Dry chemical portable fire extinguishers (50kg)
Wilga Park	Portable gas detectors
Wilga Park	Mobile firefighting trailer
Wilga Park	First aid equipment in the kitchen and workshop
Wilga Park	Plant fire detection and alarm
Wilga Park	Vehicle mounted UHF and VHF radio
Wilga Park	First aid kit (vehicle units)
Wilga Park	Portable handheld fire extinguisher
Wilga Park	Spill kits
Bibblewindi	Dry chemical portable fire extinguishers throughout the building
Bibblewindi	Dry chemical portable fire extinguishers (50kg)
Bibblewindi	Portable gas detectors
Bibblewindi	Mobile firefighting trailer
Bibblewindi	First aid equipment in the kitchen and workshop
Bibblewindi	Plant fire detection and alarm
Bibblewindi	Vehicle mounted UHF and VHF radio
Bibblewindi	First aid kit (vehicle units)
Bibblewindi	Portable handheld fire extinguisher
Bibblewindi	Spill kits
Leewood	First aid kit, safety shower and eye-wash
Leewood	Dry chemical portable fire extinguishers throughout the building
Leewood	Dry chemical portable fire extinguishers (50kg)
Leewood	Water portable fire extinguishers

Facility	Item
Leewood	Vehicle mounted UHF and VHF radio and base station
Leewood	Portable Gas detectors
Leewood	Mobile firefighting trailer
Leewood	First aid kit (vehicle units)
Leewood	Spill kits
Narrabri Operation Centre	Dry chemical portable fire extinguishers throughout the building
Narrabri Operation Centre	Dry chemical portable fire extinguishers (50kg)
Narrabri Operation Centre	Portable Gas detectors
Narrabri Operation Centre	Mobile firefighting trailer
Narrabri Operation Centre	First aid equipment in the kitchen and workshop, including a defibrillator
Narrabri Operation Centre	Plant fire detection and alarm
Narrabri Operations Centre	Spill kits
Wells under construction	First aid kit
Wells under construction	Trauma first aid pack
Wells under construction	Handheld fire extinguishers (9 kg Dry power and 2 kg dry powder)
Wells under construction	Portable gas detector
Wells under construction	Spill kits
At each active pilot set	Mobile firefighting trailer

5. Incidents, non-compliances and complaints

5.1. Incidents and non-compliances

Incident reporting and non-compliance notification will be in accordance with CoC D6 and D7 respectively, as described in section 6 of the Environment Management Strategy (EMS). Santos will notify DPHI and any other relevant agency via the Major Projects Portal immediately after becoming aware of an incident associated with the execution of this PIRMP. Santos will also immediately notify the EPA of any resulting environmental harm by telephoning the Environment Line Service on 131 555, as required by Condition R2 of the EPL.

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

Where incidents or non-compliances associated with this PIRMP are identified, Santos will:

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

5.2. Complaint management

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

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

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

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

6. Review, audit and revision

6.1. Annual monitoring of performance

In accordance with CoC D8, by the end of March each year, Santos will submit an Annual Review of the environmental performance of the NSW Operations to DPHI. This review will evaluate and report on compliance with the performance measures, criteria and operating conditions of SSD 6456 and to ensure that all implementation is consistent with all relevant management plans and procedures, including this PIRMP. Santos will identify potential non-compliances, analyse the causes of these potential non-compliances and describe the measures that will be implemented to ensure compliance in the future.

Santos also submits an Annual Return for EPL 20350 to NSW EPA as a condition of the EPL. The Annual Return includes details on the status of this PIRMP and when it was last tested. A statement of compliance regarding the PIRMP will be included in the Annual Return as required by Condition R1.1 of EPL 20350.

6.2. Independent environmental audit

In accordance with CoC D9 and D10, within one year of commencement of Phase 1 and every 3 years thereafter, Santos will facilitate an independent environmental audit (**IEA**) to ensure compliance with the following:

- implementation consistent with the PIRMP
- conditions of all relevant approvals, permits and licences
- relevant State and Commonwealth legislation
- management plans, protocols and procedures and
- any annual compliance review obligations for the period.

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

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

6.3. Revision of the PIRMP

As required by CoC D4, Santos will review the suitability of existing strategies, plans and programs required under this consent, within 2 months of:

a. the submission of an incident report

b. the submission of an Annual Review

c. the submission of an Independent Environmental Audit

d. the submission of a Field Development Plan

e. the submission of a Groundwater Model Update and

f. the approval of any modification of the conditions of SSD 6456.

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

In view of the various conditions requiring annual reviews, suitability assessments and performance evaluations, Santos will review and, if necessary, update the PIRMP in at least the following circumstances:

- in accordance with any direction from the NSW EPA or the Minister administering the *Petroleum (Onshore) Act 1991* (NSW) (**PO Act**)

- due to any significant change to the intent of the operations as covered under this document. If there is ambiguity in relation to whether there is a significant change, Santos must consult with the Secretary to determine whether the PIRMP must be reviewed and
- otherwise at intervals of no longer than 1 year.

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

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

In accordance with CoC B42, Santos will implement the WMP (which includes this PIRMP, and the attached DSEP) once it has been approved by the Planning Secretary.

Further details on the reporting, evaluation and review of the PIRMP and all management plans required under the consent is provided in section 8 of the EMS.

6.4. Improvement measures

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

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

- regular internal audits of the pollution incident response process and implementation
- modifications to the PIRMP to reflect changing site conditions and
- regular monitoring and site inspections.

The protocol for review is set out by CoC D4, D5 and D8, which have been addressed in Sections 6.1 and 6.3 above.

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

References

EPA (2022). Guideline: Pollution Incident Response Management Plans. Helping environment protection licence holders comply with their PIRMP obligations. NSW Environment Protection Authority.

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

Glossary

Term	Definition[2]
Council	Narrabri Shire Council
Department	NSW Department of Planning, Housing and Infrastructure (DPHI)
EIS	The Environmental Impact Statement titled Narrabri Gas Project Environmental Impact Statement, dated 31 January 2017, submitted with the development application, including the response to submissions and supplementary response to submissions, and the additional information provided to the Department in support of the application
Gas compression facility	A facility that houses multiple compressor units, either nodal or hub compressors or a mixture of both used to increase the pressure of gas for the purpose of transmission; may be collocated with a gas treatment facility and/or water management facility
Gas field infrastructure	All Project-related infrastructure, excluding the Leewood facility, Bibblewindi facility and the road upgrades required under SSD 6456
Gas well	Pilot wells and production wells
Gathering lines	Pipelines used to transfer gas and produced water from wells
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm, and which may or may not be or cause a non-compliance
Linear infrastructure	Project related infrastructure of a linear nature including gas and water gathering lines, gas and water pipelines, access tracks, power lines, communication lines and other service lines
Major facilities	Leewood facility and Bibblewindi facility
Material harm	Material harm to the environment is defined in section 147 of the POEO Act
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Project
Mitigation	Activities associated with reducing the impacts of the development
NSW Operations	Santos' licenced CSG exploration, assessment and production activities in NSW for which an EPL has been issued, as well as other supporting facilities which are not scheduled activities under the POEO Act, including the Narrabri Operations Centre and the Wilga Park Power Station
Petroleum Assessment Lease 2 (PAL 2)	A PAL is required to hold the exclusive right to prospect for petroleum and to assess any petroleum deposit over a specified area of land in NSW. A lease allows the holder to maintain a title over a potential area, without having to commit to further exploration. The holder can, however, continue prospecting

[2] The majority of the definitions are as provided in the consent for SSD 6456.

Term	Definition[2]
	operations and to recover petroleum in the course of assessing the viability of commercial mining. PAL 2 is held by Santos NSW Pty Ltd.
Petroleum Exploration Licence 238 (PEL 238)	Before exploring for minerals or petroleum in NSW, an explorer must first obtain a Petroleum Exploration Licence (PEL) under the Petroleum (Onshore) Act 1991. An exploration licence gives the licence holder exclusive rights to explore for petroleum or specific minerals within a designated area, but it does not permit mining, nor does it guarantee a mining or production lease will be granted. PEL 238 is held by Santos NSW Pty Ltd.
Petroleum Production Lease 3 (PPL 3)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. PPL 3 is held by the following titleholders: Santos QNT Pty Ltd Santos NSW (Hillgrove) Pty Ltd and Santos NSW (Eastern) Pty Ltd.
Petroleum production lease application (PPLA)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. Development consent under the Environmental Planning and Assessment Act 1979 must be in place before a petroleum production lease can be granted. Santos, on behalf of its joint venture partner lodged four petroleum production lease applications under the PO Act in May 2014 for the Project area, being PPLAs 13, 14, 15 and 16. The ownership of the application is now held by Santos NSW Pty Ltd.
Pilot well	A well for gas and water extraction, for the purpose of exploration, appraisal and assessment of the gas field potential
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
Pollution incident	Has the same meaning as in the POEO Act
Produced water	Any form of groundwater that is actively extracted from a borehole, well or excavation, excluding incidental groundwater mixed with drilling fluids
Production well	A well for gas and water extraction, for the purpose of commercial gas production and/or use
Project area	The area of approximately 95,000 hectares that encompasses the Project
Project footprint	The area of surface expression being about 1,000 hectares occupied by the infrastructure components of the Narrabri Gas Project
Project-related infrastructure	All infrastructure and other structures associated with the development. This includes linear infrastructure and non-linear infrastructure, surface infrastructure and subsurface infrastructure, major facilities, wells and well pads and other gas field infrastructure
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Unacceptable risk	The level of risk at which mitigation actions are deemed to be warranted.
Well	Pilot wells and production wells

Appendix A - Santos Environment, Health and Safety Policy

Santos

Environment, Health and Safety

Policy

Our Commitment

Santos is committed to being the safest gas company wherever we have a presence and preventing harm to people and the environment

Our Actions

We will:

1. Integrate environment, health and safety management requirements into the way we work
2. Comply with all relevant environmental, health and safety laws and continuously improve our management systems
3. Include environmental, health and safety considerations in business planning, decision making and asset management processes
4. Identify, control and monitor risks that have the potential for harm to people and the environment, so far as is reasonably practicable
5. Report, investigate and learn from our incidents
6. Consult and communicate with, and promote the participation of all workers to maintain a strong environment, health and safety culture
7. Empower our people, regardless of position, to "Stop the Job" when they feel it necessary to prevent harm to themselves, others or the environment
8. Work proactively and collaboratively with our stakeholders and the communities in which we operate
9. Set, measure, review and monitor objectives and targets to demonstrate proactive processes are in place to reduce the risk of harm to people and the environment
10. Report publicly on our environmental, health and safety performance

Governance

The Environment Health Safety and Sustainability Committee is responsible for reviewing the effectiveness of this policy.

This policy will be reviewed at appropriate intervals and revised when necessary to keep it current.

Kevin Gallagher

Managing Director and CEO

Document Owner:	David Banks, Chief Operating Officer		
Approved by:	The Board		
Date Approved:	15 August 2022	Version:	3

Appendix B - Consultation records

Santos

Management Plan Consultation Feedback Form

DOCUMENT TITLE:	**Pollution Incident Response Management Plan**
STAKEHOLDER:	NSW Environment Protection Authority
CONSULTATION RELEASE DATE:	**3 August 2021**
COMMENTS DUE DATE:	**11 October 2021**

General Feedback	
Key Issues	No significant issues identified
Suggestions for improvement	NIL

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

Pollution Incident Response Management Plan / Dam Safety Emergency Plan – WTAG comments received on Revision C (draft)

Comments received from Randall Cox, Jack Warnock and Michael Williams

Item	Section #	Section heading	Existing text	Comment	Final response
PIRMP					
1	All	Acronyms	(Section 1.2.2) Santos facilities comprise a number of drilling & completions operations (both operational and under construction) throughout the Project area, and its other facilities within NSW	[Jack Warnock] A general observation is that many acronyms are used, however not all are listed in the Acronyms and Abbreviations list or as a footer on the appropriate page. An example is in Figure 1.1 (page 6): What does D&C mean? Another is in 2.4.2 NGP Spill Response Guide: What does HSER Onshore Manager mean?	D&C is drilling and completions. It has been added to the list of abbreviations and acronyms, and the text has been amended as follows: Santos facilities comprise a number of drilling and completions *(D&C)* operations (both operational and under construction) throughout the Project area, and its other facilities within NSW. The acronym 'HSER' is health, safety, environment and rehabilitation.
2	1.1	Purpose	No specific text reference	[Michael Williams] Can WTAG be informed of location on construction details of planned infrastructure in scope of Phase 1?	Exact scope and associated locations for Phase 1 are still being developed and will not be available until completion and approval of the Field Development Plan. A preliminary list of likely locations is being generated, to be included in the WMP.
3	4	Main hazards NSW operations	Table 4.1	[Jack Warnock] Should the Leewood irrigation area be included in this Table? This would particularly apply to stormwater runoff from the irrigation area (viz: sediment, nutrients and pesticides)	The application of amended treated water to the irrigation area is not regarded as an environmentally hazardous activity. The Trigger Action Response Plan in Table D2 of the Irrigation Management Plan identifies the appropriate actions in the case of stormwater runoff from the irrigation area.
4	4.2	Main hazards NSW operations	Table 4.1	[Michael Williams] Can sections of the pipeline be isolated when a leak is detected? This may be covered in Table 8.1 of the Produced Water Management Plan but is not explicit.	Isolation is fundamental to water reticulation design. The water pipelines and well infrastructure have shut-off and isolation valves to isolate sections of a pipe. Isolation valves are referred to in section 4.4. Table 8.1 pf the Produced Water Management Plan also lists the mitigation measures in the event of a loss detection.
5	4.2	Main hazards NSW operations	Table 4.1	[Michael Williams] How was the 'Likelihood of causing environmental harm' categories assessed? Is there a matrix of impacts at local and regional scale? Reference Section 4 or Table 4.3 in WSP (Overarching).	A site-wide hazard assessment was undertaken with appropriate Santos personnel and industry specialists to identify the main hazards on the site that pose a risk of causing actual or potential material harm to the environment. The text has been amended to include a reference to the WMP section 4 as follows: Section 4 of the Water Management Plan provides further details regarding the risks of the potential issues and their impacts to surface water, groundwater and water-related environmental values associated with the Project, and a copy of the Santos Risk Matrix.
DSEP					
6	1.2	Purpose and scope of the DSEP – Phase 1	No specific text reference	[Jack Warnock] Page 2: second sentence; delete "This" (duplicated)	The correction has been made, and text has been amended.
7	2	Roles and responsibilities	No specific text reference	[Jack Warnock] Second paragraph. What does NMP mean? It is not listed in the Acronyms and Abbreviations list.	The correction has been made. NMP should be DSEP.
8	3.4	Development consent SSD 6456	No specific text reference	[Jack Warnock] Reference is made to consent condition A23. Are the paragraphs labelled (m), (n), (o) and (p) correctly labelled?	The correction has been made to (a) to (d) - this was a numbering error.

Item	Section #	Section heading	Existing text	Comment	Final response
9	5.2	Monitoring and warning systems	This freeboard is normally set to contain the rainfall volume produced by a 72-hour storm of a certain AEP.	[Jack Warnock] In the second paragraph "AEP" is used without explanation or being listed in the Acronyms and Abbreviations list	AEP is 'annual exceedance probability'. It has been added to the list of abbreviations and acronyms, and the text has been amended as follows: This freeboard is normally set to contain the rainfall volume produced by a 72-hour storm of a certain *annual exceedance probability* (**AEP**).
10	7	Emergency categories	No specific text reference	[Jack Warnock] Reference is made to water release via the spillway(s). These spillways need to be designed so there is no risk of erosion of the embankment during such a release. Erosion could seriously impact the stability of the embankment.	The Leewood ponds, including all spillways and embankments, are designed and managed in accordance with the requirements under the *Dams Safety Act 2015*.
11	7	Emergency categories	No specific text reference	[Jack Warnock] In Table A1 there is no reference to the risk of vegetation growing on the outside of the embankments of the ponds used to store water. If inappropriate vegetation is grown on the external embankments there is a risk of drying out the core and exposing embankments to collapse and/or failure.	The Leewood ponds, including all spillways and embankments, are designed and managed in accordance with the requirements under the *Dams Safety Act 2015*. Further, as the ponds are fully (HDPE) lined, the embankments do not act as a barrier to flow. As such, vegetation makes the embankment more stable, rather than drying out the core and exposing embankments to collapse and/or failure.
12	10	Emergency contacts	No specific text reference	[Jack Warnock] In Table 10.1 contact details of neighbours are detailed. Should these details be redacted in these DRAFT documents?	This has been considered for draft documents. All contacts will be redacted for final documents that are placed on the Santos webpage.
13	11	Preventative actions	No specific text reference	[Jack Warnock] Are there any plans to provide additional water storage capacity at Leewood, especially when it is not possible to utilise the treated water on the irrigation area because of high levels of soil moisture as a result of rainfall?	As detailed in the Produced Water Management Plan (section 7), together with the use of treated produced water for drilling/completions, dust control, construction and irrigation, there will be sufficient capacity to capture all produced water and brine during Phase 1. If there is any unforeseen operational issue regarding storage capacity, wells will be shut in.
14	Appendix B	Leewood ponds characteristics	No specific text reference	[Jack Warnock] Is there provision made for management of sediments (either slats or soil) that are likely to build up in the lined ponds. It is likely that it will be a difficult process to remove these sediments without damaging the liners.	It is very unlikely that substantial volumes of sediment will collect in the ponds to the extent that it will affect the capacity and proper functioning. However, if this does occur, the sediment can be removed through pumping and filtering.

Note:

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

Appendix C - Consent conditions relevant to this Plan

Table C1 - SSD 6456 consent conditions directly relevant to this PIRMP

SSD 6456 consent conditions directly relevant to this PIRMP	Section reference
Consent condition B41 Prior to the commencement of Phase 1, the Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	
d) include a	
(x) Pollution Incident Response Management Plan, that has been prepared in accordance with Part 3A of the *Protection of the Environment Operations (General) Regulation 2009*, and includes:	This Plan
• detailed procedures for responding to incidents, spills and leaks associated with the produced water management system; and	Section 2.4
• a Dam Safety Emergency Plan for managing potential incidents and emergencies associated with produced water storages; and	Refer to Attachment 1
(xi) a protocol to report on the measures, monitoring result and performance criteria identified above, in the Annual review	Refer Section 6.1
Consent condition D3 The Applicant must ensure that (where relevant) the management plans required under this consent include:	
a) summary of relevant background or baseline data;	Refer to the WMP and PWMP
b) details of:	
(ii) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 1.1
(iii) any relevant limits or performance measures and criteria; and	Not relevant
(iv) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 1.1 Section 1.1.1
c) any relevant commitments or recommendations identified in the documents that together comprise the NGP EIS;	Not relevant
d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 2 Section 4.2
e) a program to monitor and report on the:	Section 6
(v) impacts and environmental performance of the development; and	
(vi) effectiveness of the management measures set out pursuant to paragraph (d);	
f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Not relevant
g) a program to investigate and implement ways to improve the environmental performance of the development over time	Section 6.4 Section 3.6
h) a protocol for managing and reporting any:	
(vii) incident, non-compliance or exceedance of any impact assessment criterion and performance criterion	Section 5.1
(viii) complaint; or	Section 5.2

SSD 6456 consent conditions directly relevant to this PIRMP	Section reference
(ix) failure to comply with other statutory requirements; and	Section 5.1
i) a protocol for periodic review of the plan.	Section 6.3 Section 6.4
Consent condition D4 Within 2 months of: a) the submission of an incident report b) the submission of an Annual Review c) the submission of an Independent Environmental Audit d) the submission of a Field Development Plan e) the submission of a Groundwater Model Update or f) the approval of any modification of the conditions of this consent g) the Applicant must review the suitability of existing strategies, plans and programs required under this consent.	Section 6.3
Consent condition D5 If the review determines that the strategies, plans and programs required under this consent require revision – to either improve the environmental performance of the development, cater for a modification or comply with a direction - then the Applicant must submit the revised document to the Secretary for approval within 6 weeks of the review. **Note**: *This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	Section 6.3
Consent condition D6 The Applicant must notify the Department and any other relevant agencies via the Major Projects Portal immediately after it becomes aware of the incident. This notice must describe the location and nature of the incident.	Section 5.1
Consent condition D7 Within 7 days of becoming aware of a non-compliance with the conditions of this consent, the Applicant must notify the Department of the non-compliance via the Major Projects Portal. This notice must set out the non-compliance, the reasons for the non-compliance (if known) and what actions have been taken, or will be taken, to address the non-compliance. **Note**: *A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance*	Section 5.1
Consent condition D8 By the end of March each year, unless the Planning Secretary agrees otherwise, the Applicant must submit an Annual Review of the environmental performance of the development to the Department via the Major Projects Portal.	Section 6.1
Consent condition D9 Within one year of commencement of Phase 1 and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development.	Section 6.2
Consent condition D13 From the commencement of Phase 1, until the completion of all rehabilitation required under this consent, the Applicant must:	

SSD 6456 consent conditions directly relevant to this PIRMP	Section reference
a) make copies of the following information publicly available on its website: (x) the document/s listed in condition A2(c) (xi) current statutory approvals for the development (xii) approved strategies, plans and programs (xiii) detailed plans for the Phases of the development (xiv) minutes of CCC and Advisory Group meetings (xv) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent (xvi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs (xvii) a summary of the current phase/s and progress of the development (xviii) contact details to enquire about the development or to make a complaint (xix) a complaint register, updated monthly (xx) a record of all incidents and non-compliances (xxi) the Annual Reviews of the development (xxii) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and (xxiii) any other matter required by the Planning Secretary; and	Section 1.6
b) keep such information up to date.	Section 1.6

Appendix D - Incident Response Procedures

PIPELINE INTEGRITY COMPROMISED CHECKLIST

Initial Site Activity by On-Scene Commander	
• On-Scene Commander to confirm the type of pipeline emergency, immediately raise the alarm and take actions to ensure the safety of personnel	
• If possible, evaluate the emergency area and take actions to make it safe (do not take unnecessary risks) – cut sources of ignition & ensure pumping has ceased	
• Arrange for the safe shutdown of equipment/plant, vehicles and machinery in the affected area (if possible) as long as personnel are not endangered in the process	
• Ensure first aid treatment is provided to any casualties	
• Establish a Muster Point and account for personnel at the emergency site. Ensure people evacuate the emergency scene or area on foot only	
• Identify location of leak and isolate affected section of pipeline	
• Gather information as soon as possible about the situation and determine the initial human and physical resources required to bring the situation under control	
• As soon as practical advise the ERC of the emergency situation (SITREP) and in consultation with the ERC determine the appropriate Emergency Level	
• On-Scene Commander and ERC to determine what external assistance should be sought (Emergency Services, Local & Government Authorities and Landowners) – provide a full brief of the situation to the Emergency Services.	

Emergency Deployment	
• On-Scene Commander to continuously review what human and physical resources are to be deployed taking into consideration the location and severity of the emergency	
• If available and deemed necessary, ensure that the Emergency Response Trailer is deployed to the affected site	
• Ensure that communications between the emergency site, the On-Scene Commander and ERC are established and working effectively	
Any person that has been deployed to the affected site will: • Notify the On-Scene Commander/ERC on arrival and establish communications • Ensure their own safety, utilise PPE and take actions to protect the public • Approach the site upwind • Carry out gas tests prior to introducing vehicles or other ignition sources • Establish a safe work perimeter	
• Obtain weather forecast for local area (via EOC or Bureau of Meteorology directly). • Future weather conditions must be taken into account for response operations	
• Establish a staging area at the emergency site for response vehicles and the assembly/preparation of equipment: no closer than 100 metres	
• Erect safety barriers and signs where possible	
• If the pipeline emergency is likely to have a long duration, ensure site amenities and lighting are established	
• EOC to support affected site by arranging all logistical requirements for a prolonged response period (i.e. food, water, amenities, accommodation, transportation, relief crews, medical assistance etc.).	

FIRE / EXPLOSION CHECKLIST

Person at Emergency Scene	
• Remove yourself and others from danger (DO NOT place yourself in unnecessary danger) stop all work, extinguish any possible ignition sources and evacuate the area on foot	
• Raise the alarm and report the nature, location, extent of emergency, wind direction and product if known – (Call "Emergency, Emergency, Emergency" on nominated site radio channel or trigger a manual alarm)	
• If fire, contain the fire with correct extinguisher if trained and it is safe to do so and extent of fire could be extinguished with the fire extinguisher.	
• For a vehicle fire; stop the vehicle and if possible, use a hand held powder extinguisher to extinguish fire (red with white band)	
• Evacuate the area if fire spreads/escalates beyond control (remember your safety is paramount). Shut down equipment/plant if safe to do so	
• Go to Emergency Muster Point and stay until directed by Muster Point Warden or On- Scene Commander	
• When evacuating from a fire, DO NOT GO DOWNWIND OF THE SOURCE, AS EXPOSURE TO THE SMOKE/FUMES MAY BE LIFE THREATENING	
• Do not enter smoke filled buildings and avoid passing through smoke plumes en route to Emergency Muster Point	
• Close doors/windows etc as you evacuate buildings to help contain the fire	
• If exposed to bush fire and you are unable to evade the fire front, stay inside your vehicle	
• Provide First Aid to any injured persons if qualified and safe to do so.	

On-Scene Commander	
• Initiate alarms to warn site personnel – audible alarms, broadcast on radio, word of mouth	
• Call 000 and notify emergency services as necessary	
• Mobilise appropriate fire fighting resources if safe to do so	
• Proceed to scene and assess the situation (hazard assessment/response options). • Consider the following: – Combustible materials (flammable stores, toxic fumes/gas, vehicles, buildings etc) – Structures affected by the fire (heat damage to buildings/steelwork)	
• Arrange for the safe shutdown of equipment/plant in the affected area	
• Ensure medical aid is provided to injured personnel	
• Notify the ERC and provide a SITREP (emergency details/location/conditions)	
• If primary Emergency Muster Point is down wind of fire/affected by products of combustion from fire, determine an acceptable alternate Muster Point (in consultation with the Muster Point Warden)	
• Identify any chemicals that may be involved in the fire and the risks associated with them (e.g. toxic products of combustion, handling/exposure) – communicate to ERC and attending Emergency Services. Obtain the relevant Chemical Manifests and/or MSDSs as required	
• Identify possible escalation targets for fire (nearby vessels, storage areas, vehicles) and arrange for mitigation actions to protect them in consultation with ERC	

On-Scene Commander	
• Provide regular SITREPS to the ERC and develop ongoing response strategy in consultation with ERC and FRT	
• If fire/explosion escalates or creates secondary hazards to personnel, consider further/more extensive evacuations (or relocation of evacuated personnel)	
• For bushfire – consider safety of site and possibility of smoke affecting other services/properties/personnel	
• For a significant bushfire consult with the ERC/FRT regarding the use of a earthmoving contractor to create fire breaks at site	
• Assist with/request further evacuation of personnel as required	
• Assist in investigating the emergency and reviewing the procedures/actions taken.	

CHEMICAL SPILLS / PRODUCED WATER / GAS RELEASE SITUATION CHECKLIST

Person at Incident Scene	
• Remove yourself and others from danger (DO NOT place yourself in unnecessary danger)	
• Raise the alarm and report the nature, location and extent of emergency – (Call “Emergency, Emergency, Emergency” on nominated site radio channel or trigger a manual alarm)	
• Evacuate areas that may be affected by the spill either directly or through exposure to fumes (remember your safety is paramount)	
• Immediately try to locate the source of the spill, remaining up wind	
• When evacuating a chemical spill/gas release, DO NOT GO DOWNHILL/DOWNWIND OF THE SOURCE, AS EXPOSURE TO THE FUMES MAY BE LIFE THREATENING	
• If release is from a storage facility, isolate/contain the release (if it is safe to do so) by closing valves, switching off pumps, blocking drains, establishing temporary bunds, use of spill kits, contacting control room etc	
• Identify and isolate any potential sources of ignition	
• Go to Emergency Muster Point/Control Room, stay until directed by the Muster Point Warden or On-Scene Commander	
• Provide First Aid to any injured persons if qualified to do so	
• Ensure that any contaminated personnel utilise emergency showers and eye washes	
• Safely dispose of any contaminated clothing.	

On-Scene Commander	
• Initiate alarms to warn site personnel – audible alarms, broadcast on radio, word of mouth	
• Ensure site of emergency is evacuated to a safe distance: evacuate all areas that: – Are directly affected by the release (impinged/engulfed) – May be indirectly affected (e.g. exposure to toxic fumes/vapour cloud, access restrictions)	
• Arrange for the safe shutdown of equipment/plant in the affected area	
• Ensure that external emergency services have been contacted	
• Notify the ERC and provide a detailed SITREP of the situation (details, site location/conditions)	

On-Scene Commander	
• Identify released materials and source appropriate chemical manifests and/or SDSs; make these available for response personnel as necessary	
• In consultation with the Muster Point Warden, determine the suitability of the Primary Emergency Muster Point/Control Room (is it affected by/downwind of release); determine alternate Muster Point as required	
• For an offsite spill/release, ensure that the ERC has all information required to carry out appropriate notification of government departments, Police etc.	
• Relay all environmental information to the ERC and ERT and ensure that appropriate environmental/governmental agencies are notified	
• Determine containment/decontamination requirements (in consultation with FRT or specialists – onsite or offsite) and source equipment from offsite as required – confer with ERT	
• Continue to provide SITREPS to the ERC and FRT - develop ongoing response strategy in consultation with them	
• When developing response strategies, consider: – Advice from Environmental Department – Physical response constraints (weather, wind direction/strength, release location) – Review available chemical manifests and/or MSDSs – PPE/response equipment availability – Exposures of site personnel (injuries/trapped personnel)	
• Ensure that appropriate toxic/chemical exposure monitoring is conducted during response to limit responders' exposure to within acceptable levels (refer to relevant chemical manifests and/or MSDSs)	
• If spill/release escalates or creates secondary hazards to personnel (e.g. escalation, exposure to spill/release), consider further/more extensive evacuations (or relocation of evacuated personnel)	
• Arrange for barricading of affected area until remediation is complete/atmosphere is clear	
• When considering the impacts of the release, take into the account any potential for contamination of site water supplies – provide alternate drinking water supply if required	
• Try to minimise the impact of the spill by implementing the three C's rule: – CEASE flow of release into the surrounding area – CONTAIN the spillage – CLEAN-UP spill	
• Review the need for any off-site expertise or equipment to control/contain the spill/release and communicate requirements to the ERC and ERT	
• Establish Control Zones	
• Assist with investigation and review of the procedures/actions taken.	

SEVERE WEATHER EVENT

The Operations site manager shall arrange for monitoring of severe weather warnings (Flood, Storm) and advise site personnel accordingly.

Weather information can be found on the Bureau of Meteorology web site – www.bom.gov.au

In the event of a pending flood or severe weather event requiring the location to be partially or completely evacuated, the preferred means of evacuating shall be by motor vehicle along the safest route to the nearest place of safety.

The following precautionary measures will be considered by site personnel:

- follow necessary shut-in procedures to make the well safe
- brief field response team of pending event and actions required
- identify the safest location for personnel to shelter from the weather, if remaining on site
- close doors and windows
- bring indoors or firmly secure any objects outside which could become airborne in strong wind gusts and cause damage
- check serviceability of emergency response equipment
- place NSW ERT and IMT on alert
- do not use electrical equipment during an intense electrical storm (this includes computers and telephones).
- prepare vehicles for evacuation (when safe to do so).

Appendix E - Responsible persons & notification to regulatory authorities and other persons

SANTOS CONTACTS	
PIRMP activation	Name of person responsible: Scott Purcell/Nathan Melton **Position or title:** Team Leader Narrabri Operations **Business hours contact number/s:** 0419 356 584 / 0409 840 709 **After hours contact number/s:** 0447 483 995 **Email:** narrabri.operations.atl@santos.com scott.purcell@santos.com
Notifying relevant authorities	As above or their delegate: **Name of person responsible:** Georgie Peak **Position or title:** Area Manager Scotia, Arcadia and Narrabri **Business hours contact number/s**: 0466 408 428 **After hours contact number/s:** 0466 408 428 **Email:** georgina.peak@santos.com
	Name of person responsible: Curtis Attard **Position or title:** Environmental Adviser **Business hours contact number/s:** 0457 186 632 **After hours contact number/s:** 0457 186 632 **Email:** curtis.attard@santos.com
Managing response to pollution incident	**Name of person responsible:** Scott Purcell/Nathan Melton **Position or title:** Team Leader Narrabri Operations **Business hours contact number/s:** 0419 356 584 / 0409 840 709 **After hours contact number/s:** 0447 483 995 **Email:**narrabri.operations.atl@santos.com scott.purcell@santos.com

Notification of Relevant Authorities (contact as relevant)	
NSW Police Narrabri Police Station	Call 000 02 6792 7199
NSW Ambulance	Call 000
Fire and Rescue NSW / Rural Fire Service	Call 000 Call 02 6792 3667 Michael Brooks – 0427 101 124
EPA	Call Environment Line 131 555
NSW Health (Tamworth Public Health)	Call 02 6274 8000
Forestry Corporation NSW	Call 02 6843 1067 Jarod Dashwood 0427 293 501
SafeWork NSW	Call 131 050
Narrabri Shire Council	02 6799 6866 Donna Ausling

Notification of Relevant Authorities (contact as relevant)	
Department of Planning and Environment	compliance@planning.nsw.gov.au Major Projects Portal - https://majorprojects.planningportal.nsw.gov.au
Resources Regulator	1300 814 609
Notification of neighbours and the local community	Refer Community Database

Appendix F - Emergency Incident Notification Checklist

EMERGENCY INCIDENT NOTIFICATION CHECKLIST	
NOTIFICATION	
Notification taken by:	Date / time:
Notification provided by	Date / time:
Dedicated phoneline to site? Yes / No	Phone number:
INCIDENT DESCRIPTION	**DETAILS**
What has happened?	
Where did it happen?	
When did it happen?	
What is at risk	
Is everyone accounted for? Are there casualties?	
Have any external agencies been advised (police, ambulance, etc.)	
INCIDENT DESCRIPTION	**DETAILS**
Contained or escalating? Potential to escalate?	
What are your objectives? What are you trying to prevent from happening?	
What actions are being taken? Is the area secured?	
Who is taking the actions? Who is responding? What resources are used?	

EMERGENCY INCIDENT NOTIFICATION CHECKLIST	
ADDITIONAL SUPPORT	**DETAILS**
Personnel	
Resources	

Appendix G - Emergency Situation Report

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EMERGENCY SITUATION REPORT						
INCIDENT LOCATION						
Reported By:	Contact No:	Date:	Time:			
EMERGENCY TYPE: (circle)						
INJURY	FIRE	MEDICAL	ACCIDENT	SPILL	PIPELINE	POLLUTION RELEASE
FATALITY	BUSHFIRE	COLLISION	ENVIRONMENT	DISTURBANCE	EXPLOSION	OTHER:
Provide description: (indicate if situation is under control or escalating)						
INJURY DETAILS: (for multiple injuries attach separate sheet/s)						
Number of fatalities:	Number of serious injuries:	Number of minor injuries:				
Name of Injured:	Position:					
Injuries:	Location:	Date:				
WEATHER CONDITIONS:						
DRY	Wind Direction:		Temperature:			
WET	Wind Speed:		Forecast:			
EXTERNAL ASSISTANCE: (circle)						
MEDICAL	FIRE	POLICE	AMBULANCE	EPA	MUTUAL AID	
Other:						
IMPACT ON OPERATIONS:						

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EMERGENCY SITUATION REPORT	
INFRASTRUCTURE DAMAGED:	OPERATIONS SHUT DOWN:
REA/SITE AFFECTED	
RESPONSE FORWARD PLAN	
Next 30 minutes: Next 6 hours: Next 12 hours:	
LAST EXTERNAL CONTACT	

Agency	Contact Name	Time	By whom	Agency	Contact Name	Time	By whom
EOC				Medical			
ERC				Polic			
Fire				EPA			

Nature of assistance or resources required:		
Further remarks:		
Prepared by:	Time:	**Date:**
Authorised by:	Time:	Date:
MARK ANY SPECULATIVE INFORMATION WITH AN ASTERISK (*). Completed SITREP to be retained at EOC – if requested – forward to DM/IMT		

Appendix H - Record of PIRMP testing

Date tested	Tested by	Details of test	Finding of test, including issues identified	Next scheduled test*
3 May 2023	Area Team Leader, Narrabri	Desktop exercise testing the emergency response for the release of contaminants to land	Activation of PIRMP satisfactory	3 May 2024
1 May 2024	Manager HSS EA Field	Tested isolation, containment and escalation	Update PIRMP to reflect changes in ERT structure. Improve ready reckoner. Run spill awareness inhouse training	30 April 2025

* must be within 12 months of current test

Appendix I -Facility Maps

149°37'16" 149°37'18" 149°37'20"

-30°30'10" -30°30'12" -30°30'14"

Legend

- Chemical Storage shed
- Dry Powder / Chemical Extinguisher
- Eye Wash
- First Aid & Defibrillator Main Office
- Muster Point
- Safety Shower
- Spill Kit
- Septic
- Diesel

Santos

New South Wales

Leewood

Location of Facilities & Emergency Equipment

0 20

meters

Rev 2 Date: 3/11/2022 File No. GUN 427.WOR

GDA 2020

149°40'36" 149°40'38" 149°40'40" 149°40'42"

-30°21'44" -30°21'46" -30°21'48" -30°21'50"

Legend

- Chemical Storage shed
- Dry Powder / Chemical Extinguisher
- Eye Wash
- First Aid & Defibrillator Main Office
- Muster Point
- Spill Kit
- Septic
- Oil
- Production Water

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New South Wales

Wilga Park Power Station

Location of Facilities & Emergency Equipment

0 20

meters

Rev 2 Date: 3/11/2022 File No. GUN 428.WOR

GDA 2020

149°38'50"

149°39'0"

-30°37'50"

-30°38'0"

See Inset

Inset

0 10

meters

Legend

- Chemical Storage shed
- Dry Powder / Chemical Extinguisher
- First Aid & Defibrillator Main Office
- Muster Point
- Spill Kit
- Diesel
- Septic

Santos

New South Wales

Bibblewindi

Location of Facilities & Emergency Equipment

0 100

meters

Rev 2 Date: 3/11/2022 File No. GUN 429.WOR

GDA 2020

149°43'45"

149°43'50"

-30°20'10"

-30°20'15"

Legend

- Chemical Storage shed
- Dry Powder / Chemical Extinguisher
- Eye Wash
- First Aid & Defibrillator Main Office
- Muster Point
- Spill Kit
- Septic

Santos

New South Wales

Narrabri Operations Centre

Location of Facilities & Emergency Equipment

0 50

meters

Rev 2 Date: 3/11/2022 File No. GUN 430.WOR

GDA 2020

Appendix J - Pollutant Inventory

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
Wilga Park	Facility	Methane	NA		
		Mysella SN 6 - Central tank	1	10,000 litres	10,000 litres
		Mysella SN 6 - 3MW Day Tank	6	300 litres	1800 litres
		Mysella SN 6 - 1 MW Day Tank	4	300 litres	1200 litres
		Mysella SN 6 - 3MW Sump	6	670 litres	4020 litres
		Mysella SN 6 - 1MW Sump	4	370 litres	1480 litres
		Sewage Effluent	1	5000 litres	5000 litres
		Production Water	1	4000 litres	4000 litres
	Oil Shed	210 Metal Prime	10	20 litres	200 litres
		390 Equipment Enamel	10	4 litres	40 litres
		5.56 Aerosol	1	400g	400g
		Anti Corrosion Light Wet Film	10	300g	3 litres
		Bushmans Repellent	1	75g	75g
		Bushmans Repellent Aerosol	1	50g	50g
		Clipsil PVC Cement N Blue 240Yes	1	500ml	500ml
		Co Contact Cleaner (Aerosol)	1	350g	350g
		CRC (NZ) 3063 CDT Cutting Oil (Aerosol)	1	300g	300g
		Earth Choice Dishwashing Liquid	1	1 Litre	1 Litre
		Earth Choice Toilet Cleaner	1	750 ml	750 ml

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Galmet Fence Guttera Facia Aerosol	1	350g	350g
		Galmet Rustpaint (All Colours)	1	350g	350g
		Wurth Hand cleaner	1	4 litres	4 litres
		Isowipe bactericidal wipe	1	1.2 litres	1.2 litres
		Loctite 243	1	50 ml	50 ml
		Loctite 567	1	50 ml	50 ml
		Methylated Spirits	1	25 litres	25 litres
		Mortein Fast Knockdown	1	300 g	300 g
		Nitrogen Compressed Gas	1	D2 - 1.8m3 (20000 kPa)	D2 - 1.8m3 (20000 kPa)
		Nytro Gemini X	1	205 litres	205 litres
		Seal N Flex 1 Grey	1	300 ml	300 ml
		Selleys Auto Fix Instant Gasket Silicone RTV Black	1	75 g	75 g
		Sika Boom AP	1	500 ml	500 ml
		T102 Enamel Thinners	1	20 litres	20 litres
		WD-40 Aerosol	1	350 ml	350 ml
Bibblewindi	Facility	Methane	NA		
		Mysella SN 6 Tanks	2	2000 litres	4000 litres
		Mysella SN 6 Tanks	1	3800 litres	3800 litres
		Sewage Effluent	1	3000 litres	3000 litres

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Shell Diesel	1	1500 litres	1500 litres
	Flammable Cabinet	Diggers Mineral Turpentine	12	2 litres	24 litres
		Dy-Mark Zinc Gal Aerosol	5	400 g	2 litres
		Galmet Coldgas Aerosol	5	400 g	2 litres
		Mortein Fast Knockdown	4	300 g	1.2 litres
		Ramset Premier Grout MP	5	500 ml	2.5 litres
		WD-40 Aerosol	5	350 ml	1.75 litres
	Kitchen	Cusson Morning Fresh Dish Washer	1	1 litre	1 litre
		Harpic White & Shine Bleach Gel	1	250 ml	250 ml
		Palmolive Antibacterial Dishwashing	3	250 ml	0.75 litres
		Septone Organic Scrub	1	400 ml	400 ml
		White King Power Clean Toilet Gel	1	1 litre	1 litre
	Oil Shed	Casterol Antifreeze NF 50	10	5 litres	50 litres
		Honda Power Equipment Oil	1	1 litre	1 litre
		Mobil Delvac MX 15W-40	1	20 litres	20 litres
		Mobil SHC 629	1	22.7 litres	22.7 litres
		Shell Corena S2 P 68	1	20 litres	20 litres
		Shell Corena S3 R 68	1	20 litres	20 litres
		Super Diesel 15W - 40	1	5 litres	5 litres

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Ultramax 46 Hydraulic Oil	1	5 litres	5 litres
Leewood Ponds	Facility	Produced Water / Brine	2	346 ML (max operating level)	692 ML
	Operators Hut	Mortein Fast Knockdown	1	300 g	300 g
	Mothballed Treatment Plant	Shell Diesel	1	10000 litres	10000 litres
		Shell Diesel	1	20000 litres	20000 litres
Tintsfield	Facility	Brine Water	1	900,000 litres	900,000 litres
		Brine Solids	1	1,007m^3	1,007m^3
	Operators Hut	Mortein Fast Knockdown	1	300 g	300 g
Narrabri Operations Centre		Vital Bon-Matt Stonewall (IGD)	1	1000 Litres	1000 Litres
		Sewage effluent	1	3000 litres	3000 litres
	CSG D&C and Completions Laydown Yard	AMC Potassium Chloride	2	25 KG	50 KG
		Baracor 100	2	208.2 litres	416.4 litres
		GEM CP	1	208.2 litres	208.2 litres
		STOPPIT	2	25 KG	50 KG
	Flammables Cabinet	Cetol Deck	1	1 litre	1 litre
		Chemtech CT20 Wash'N'Wax	1	5 litres	5 litres
		Dy-Mark Spray Writer Fluro All Colours	10	400 g	4 litres
		Genfarm Panzer 450 Herbicide	1	20 litres	20 litres
		K&N Air Filter Oil Aerosol	1	300 g	300 g

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Kenso Agcare Ken-Amine 625 Selective Herbicide	1	20 litres	20 litres
		Maxi Mineral Turpentine	1	1 litre	1 litre
		Molytec Cobra Cote	1	250 g	250 g
		Mortein Kill and Protect Surface Spray	1	300 g	300 g
		Motortech Contact & Circuit Board Cleaner	1	400 g	400 g
		MSA Wasp Killer	1	350 g	350 g
		Rocol RTD Spray	1	300 g	300 g
		Spreadwet 1000	1	20 litres	20 litres
		Wattyl KillRust Gloss Enamel Aerosol	1	300 g	300 g
		Wattyl Spraymate Primer Super Etch Grey	1	400 g	400 g
		Wurth Cutting and Drilling Oil ECO	1	400 ml	400 ml
	Gas Storage	Acetylene	1	Size G 7m^2	Size G 7m^2
		Nitrogen	2	10.2 m^3	20.4 m^3
		PTG-4000	2	10.2 m^3	20.4 m^3
	Oil Shed	Caterol Vecton Long Drain 15W-40	5	20 litres	100 litres
		Cat ELC (Extended Life Coolant) Premix 50/50 with Embitterment	1	18 litres	18 litres

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Chemtech CT 18 Superwash	1	5 litres	5 litres
		Chemtech CT20 Wash'N'Wax	1	5 litres	5 litres
		Chemtech Workshop Heavy Duty Degreaser	1	20 litres	20 litres
		Earthcore Glycophosphate Weedkiller	1	1 litre	1 litre
		Herbi Red Liquid Dye	1	5 litres	5 litres
		Husqvarna 2 Stroke Oil LS+	1	1 litre	1 litre
		Mobil 1 5W-30	1	1 litre	1 litre
		Mobil Delvac MX 15W-40	1	20 litres	20 litres
		Mobil SHC 629	1	22.7 litres	22.7 litres
		Mobil SHC 100	1	22.7 litres	22.7 litres
		Molytec Cobra Cote	1	250 g	250 g
		Shell Mysella S5 N 40	1	250 litres	250 litres
		Super Diesel 15W-40	1	5 litres	5 litres
		Toyota Super LLC 50%	1	5 litres	5 litres
		UltraMax 46 Hydraulic Oil	1	5 litres	5 litres
		Valvoline Diesel Extra LD	1	20 litres	20 litres
		Water Based Degreaser	1	5 litres	5 litres
Wells under construction	Lease pad	Methane (uncontrolled discharge)	NA	NA	NA
		Sediment laden runoff	NA	NA	NA

Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Drilling muds			1000 bbl
		Cement returns	1	100 bbl	100 bbl
		BARACARB® 5	40	25 kg	1000
		BARACARB® 25	40	25 kg	1000
		BARACARB® 50	40	25 kg	1000
		BARACARB® 600	40	25 kg	1000 kg
		BARAZAN® D	40	25 kg	1000 kg
		BARITE	120	25 kg	3000 kg
		BAROFIBRE®	40	25 lb	1000 lb
		BAROFIBRE® SUPERFINE	40	25 lb	1000 lb
		BAROLIFT®	20	15 lb	300 lb
		CALCIUM CARBONATE (OMYCARB)	40	25 kg	1000 kg
		Caustic Soda (Sodium Hydroxide)	4	25 kg	100 kg
		CITRIC ACID	40	25 kg	1000 kg
		DEXTRID® E	120	25 kg	3000 kg
		MAGNESIUM OXIDE	20	25 kg	500 kg
		PAC™-L	120	25 kg	3000 kg
		Potassium Chloride	40	25 kg	10000 kg
		SAPP	20	25 kg	500 kg
		Soda Ash	20	25 kg	500 kg

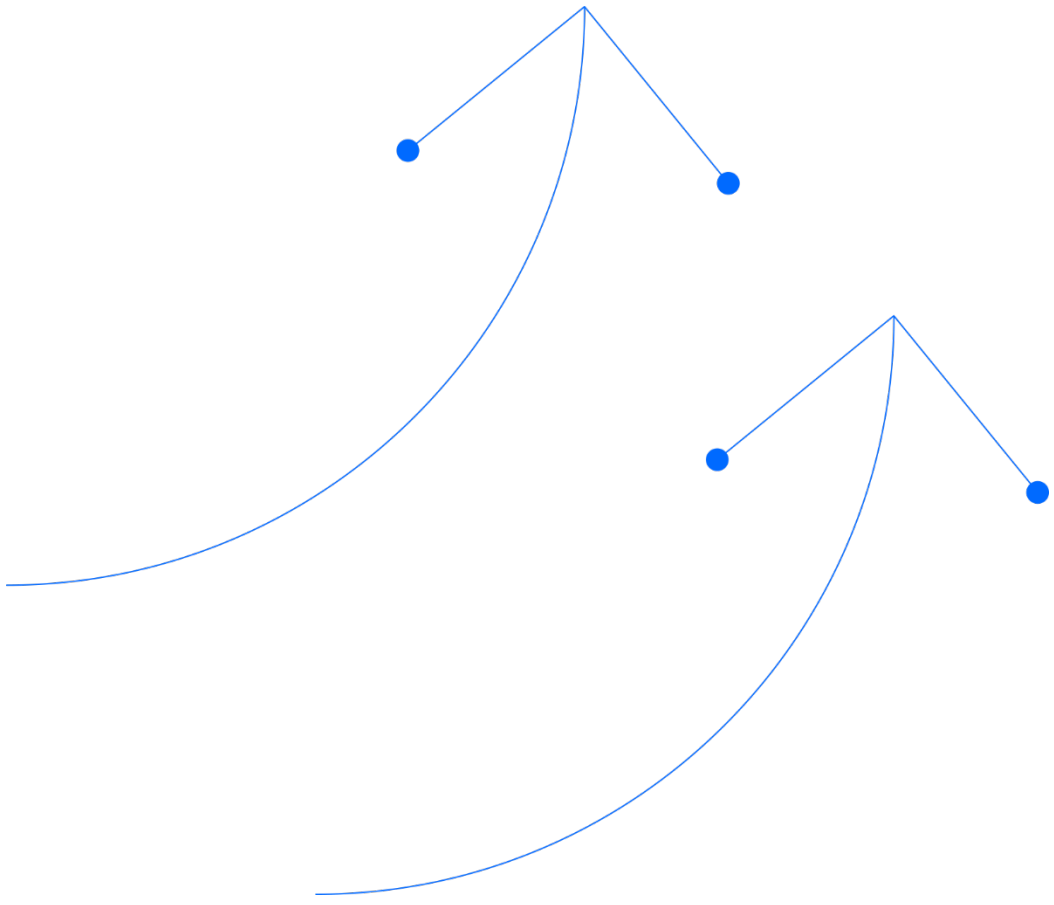
Site	Location	Chemical	Number of Containers / Units / Pieces	Container Size	Volume stored at location
		Sodium Bicarbonate	40	25 kg	1000 kg
		Sodium Chloride	240	25 kg	6000 kg
		STOPPIT®	40	25 kg	1000 kg
		STARCIDE	1	1000 litres	1000 litres
		Econolite	1	1000 litres	1000 litres
Operational wells	Lease pad	Methane (uncontrolled discharge)	NA	NA	NA

Attachment 1 - Dam Safety Emergency Plan

Santos

NARRABRI GAS PROJECT DAM SAFETY EMERGENCY PLAN – PHASE 1

March 2025



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Dam Summary Information Sheet			
General Dam Information			
Name of Dam	Leewood ponds	**Dam ID Number**	1134
Description/Purpose	Storage of produced water from the Narrabri Gas Project		
Above the Safety Threshold	No		
Owner	Santos QNT Pty Ltd		
Main Emergency Contact	Emergency On-call Officer – (02) 6792 0000 / 0427 923 401		
After Hours Contact	Senior Incident, Emergency Response and Compliance Adviser – 0438 825 343		
Location of Dam	In Petroleum Assessment Lease 2		
River/Stream/ Catchment	Bohena Creek, Namoi Catchment		
Towns Impacted	Narrabri		
LGA's Impacted	Narrabri Shire Council		
Alert Levels – Key Response Levels			
White Alert The lowest level of dam safety emergency and is assigned for unusual incidents which have the potential to threaten the dam.	White Alert Trigger Condition – A structural defect has been detected.		
Amber Alert The second highest level of dam safety emergency assigned when dam integrity is compromised.	Amber Alert Trigger Condition – Dam failure could be possible if storage continues rising or structural defect not fixed.		
Red Alert The highest level of dam safety emergency assigned when the dam is failing, or failure is imminent.	Red Alert Trigger Condition – Dam failure is imminent or has occurred.		

Dam Summary Information Sheet

Downstream Communities and Consequences

Downstream Communities	See inundation maps in Appendix C-3. Includes: Glenwood - Lot 183DP814965 Glengarry - Lot 10DP757084 Success - Lot 32DP1034772				
'Sunny Day' Failure (SDF) *[Floods caused by the unexpected failure of the dam that may happen at any time and may not involve a rainfall event - including Earthquakes]*	Initial water level at spillway crest, no flow in downstream watercourses.				
Consequence Summary	**Consequence Category**	**Population at Risk (PAR)**	**Potential Loss of Life (PLL)**	**Number of Dwellings**	**Flood Wave Depth and Travel Time**
	-	2.5	-	1	0.5m,4.2hr
'Probable Maximum Flood' Failure (PMF) *[The extreme flood for the catchment, typically presented as with and without dam failure]*	Critical scenario determined to be the breach on a flood day with concurrent downstream flood of 1:100 AEP, which results in an inundation zone ends approximately 12 km downstream of the Leewood Ponds.				
Consequence Summary	**Consequence Category**	**Population at Risk (PAR)**	**Potential Loss of Life (PLL)**	**Number of Dwellings**	**Flood Wave Depth and Travel Time**
	Significant	7.3	0.0053	5	0.7 m maximum at effected dwellings 397 Glenwood Lane (Homestead A) <30 minute 581 Nuable Rd (Homestead C) 4 hour 369 Kiandool Lane (Homestaed D) 4 hourr

Dam Characteristics and Hydrological Information

Type/Description	homogenous earth fill embankments with dual polyethylene (**HDPE**)	**Outlet/Spillway**	Spillway

Dam Summary Information Sheet			
	geomembrane lined storage facilities		
Height	5.1m	**Inlet Works**	Inlet pipe, above ground at crest
Crest Level	Pond 1: 250.4 m, Pond 2: 251.05 m	**Outlet Works**	Above ground pipe to adjacent pump station
Crest Width	Minimum = 5m	**Spillway Type**	Rock lined channel
Crest Length	Pond 1: 1,250m Pond 2: 1,300m	**Spillway Gated**	No
Catchment Area	Namoi Catchment Pond 1: 10.32 ha Pond 2: 9.05 ha	**Spillway Level**	Pond 1: 250.41 m / 438.4 ML Pond 2: 249.84 m / 411.4 ML
Full Supply Level (FSL)	Pond 1: 250.4 m AHD Pond 2: 249.85 m AHD	**Spillway Width**	Pond 1: 5m Pond 2: 5m
Storage Capacity at FSL	Pond 1: 411.4 ML Pond 2: 438.4 ML	**Spillway Length**	Pond 1: 28m Pond 2: 28m
Imminent Failure Level	Pond 1: 250.4 mAHD Pond 2: 251.05 mAHD	**Spillway Design Capacity**	1:10,000 AEP Rainfall + 1:100 AEP Wind speed Pond 1: 0.860 m^3/s Pond 2: 0.813 m^3/s
Freeboard allowance/Maximum	650.5 mm at FSL Environmental containment freeboard: 0.82m	**Streambed Level**	
Warning and Monitoring Systems			
Warning Systems	The Operator Maintainer will notify the Team Leader Narrabri Operations immediately: when the levels within the ponds increases above the Maximum Operating Level (MOL)[1] and the Emergency Reporting Level (ERL);		

[1] Refer to Appendix B for full descriptions of the different water level markers

Dam Summary Information Sheet

	if an unexpected increase (higher than forecast produced water production) or decrease (above the Normal Operating Leakage Rate) in the pond water level occur; and of any structural or equipment concerns. Response to pond levels and leakage is in accordance with 0011-465-PLA-0002 Trigger Action Response Plan – Pond Level Management, 7056-465-PLA-0002 Leewood WTP – Leewood Ponds Leakage Management Trigger Action and 7056-040-DDR-00611 Typical Depressurisation Sump Plan. The pond levels and leakage trigger action response plans are provided in section 10 of the PWMP.	
Monitoring Systems	Narrabri Operator Maintainer conducts monthly dam site inspections and visual assessment of water level against: • level markings on the inner embankment; and • reading pressure sensors that measure and record storage depth, volume and surface area. Narrabri Operator Maintainers are also able to remotely view the level of the pond's via CCTV and log into AquaTech which provides the data from the pond level sensors. AquaTech data is reviewed weekly by the Narrabri Operations Team Leader and the Narrabri Production Engineer.	
Notification Protocols	The Narrabri Operator Maintainer notify the Team Leader Narrabri Operations if inspections of the dam reaches the criteria for a warning.	
Bureau of Meteorology Warnings and Stream Gauges	**Bureau Warning Gauges**	**Stream Gauges** Stn. 419083 Brigalow Creek
NSW SES Local Flood Emergency Sub Plan Name	Narrabri Shire Flood Emergency Sub Plan	

Additional Information

References

Dam Failure Impact Assessment – Leewood Ponds (Golder Associates, 2012)
Qualitative Risk Report – Santos Leewood Ponds (WSP, 2024)
Quantitative Risk Report – Santos Leewood Ponds (WSP, 2024)

Prepared By	P. Burns	**Approved By**	D.Gornall
Position	Onward Consulting Pty Ltd, Principal	**Position**	Manager Environment EA PNG
Version Control	Version 0, Dam Safety Emergency Plan – Phase 1, March 2025		

Prepared by:

Title	Name	Date
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Director Onward Consulting	Mark Vile Onward Consulting	26/03/2025

Reviewed by:

Title	Name	Date
Senior Environmental Advisor Eastern AU & PNG EHSR Santos Ltd	JT	26/03/2025

Approved by:

Title	Name	Date
Manager Environment EA PNG Eastern AU & PNG EHSR Santos Ltd	DG	26/03/2025

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Figures

1. Introduction

1.1. Narrabri Gas Project

1.1.1. Background

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

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

The Leewood Ponds are existing infrastructure. The dam was assessed by a competent person as a Significant Consequence Dam. The methodology for assessment included NSW Dam Safety Committee (**DSC**) publications:

- “Consequence Categories for Dams Guidelines” DSC3A, June 2010; and
- “Tailing Dams” DSC3F Guidelines, June 2010.

The next consequence assessment will be in 2027 unless triggered by (2)(c) or (d), Clause 7 Assessment of consequence category of the NSW Dams Safety Regulation 2019.

Consequence classification was provided to the NSW Dam Safety Committee in August 2012.

The Leewood Ponds were gazetted as a declared dam in the “Government Gazette OF THE STATE OF NEW SOUTH WALES Number 61 Friday, 4 July 2014” in accordance with Section 369 of the *Mining Act 1992*. The gazettal also outlined the ‘notification area’ relevant to the ponds (refer below for coordinates). Mining activities must not occur within the notification area without approval from Dams Safety NSW.

The Leewood Ponds are published as declared dam on the Dams Safety NSW “List of declared dams in NSW” website.

Figure 1.1 - Leewood ponds 'notification area'

1.1.2. Current Project

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

The Project includes the progressive installation of up to 850 new gas wells on up to 425 new well pads over approximately 20 years and the construction and operation of gas processing and water treatment facilities. The Project area covers about 950 square kilometres (95,000 hectares) in size and the Project footprint will only directly impact about 1% of that area.

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

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

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

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

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

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

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

These exploration and appraisal activities will continue as part of the NGP; however it should be noted that Tintsfield and Dewhurst North pilots are currently not operating (suspended) and are not intended to operate during Phase 1 of the Project. The initial, new-appraisal Phase 1 scope is a relatively minor extension to these existing exploration and appraisal activities.

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

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

A full definition of the approved activities for each phase is provided in the conditions of consent (**CoC**) for SSD 6456 and each phase is further described in the Field Development Protocol. It should be noted that as per CoC A6, Santos is not prevented from carrying out any or all of the phases concurrently, subject to the conditions of this consent.

1.2. Purpose and scope of the DSEP - Phase 1

The owner of a declared dam under the *Dams Safety Act 2015* must prepare and implement an appropriate emergency plan for the dam. Santos has prepared this Dam Safety Emergency Plan (**DSEP** or **Plan**) to describe the emergency response procedures that will be followed by operations staff responsible for the managing the declared Leewood ponds, in the event of an imminent or actual uncontrolled release from the ponds that may present a risk to personnel, the general public or the surrounding environment. It has been developed in accordance with the applicable regulatory framework and to meet the requirements of any associated development and compliance conditions.

This DSEP applies only to the Leewood ponds and is applicable to Phase 1 activities only. No additional water storage ponds or dams will be constructed during Phase 1. As such, any requirements and obligations applicable to subsequent phases of the Project are not considered in this Plan.

This DSEP is an attachment to the Pollution Incident Response Management Plan (**PIRMP**) which in turn forms part of the suite of documents prepared as part of the Water Management Plan under Condition B41. It should be noted that in the event of an emergency in the field, the Santos Upstream Onshore Emergency Response Plan (ERP) remains the overarching strategy document and will prevail. However, the DSEP will be referenced for all incidents involving the Leewood ponds.

1.3. Objectives

In accordance with the *Dams Safety NSW Guideline - Emergency Plans* (DPIE, 2020) (the '**Emergency Plans Guideline**'), the objectives of this DSEP are to provide the following:

- details the relevant statutory requirements (including any relevant approval, licence or lease conditions);
- details any relevant commitments or recommendations identified in the Environmental Impact Statement (**EIS**) for the Project;
- provides a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria; and
- detailed description of the emergency management procedures and notification pathways.

1.4. Performance measures

Santos will report on the following performance measures annually via the Annual Dam Safety Report:

- assessment of societal and individual risk rating;
- incident reporting;
- safety review;
- significant changes to the dam; and
- emergency exercises.

1.5. Consultation

For Phase 1, this DSEP has been prepared in consultation with the former Water group within the then Department of Planning, Industry and Environment, now the water group within the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW Water Group), the NSW Environment Protection Authority (**EPA**) and the Water Technical Advisory Group (**WTAG**). The details of the consultation are provided in the PIRMP.

1.6. Structure of this Plan

This Plan is a supporting document to (and Attachment 1 of) the PIRMP, which in turn forms part of suite of plans under the Water Management Plan. The Water Management Plan sets out the overall details how the documents are related and where information or details are located in the event of any overlap or commonality.

The structure of this Plan is as follows:

Section 1	Provides an introduction to the Project and the context, scope, purpose and performance measures related to managing dam safety emergencies.
Section 2	Defines the roles and responsibilities of personnel involved with emergencies relating to NGP produced water management.
Section 3	Outlines the statutory provisions relevant to dam safety emergencies for the NGP
Section 4	Provides details of the Leewood ponds and site access during emergencies
Section 5	Outlines communication and warning systems
Section 6	Outlines emergency incident management
Section 7	Defines emergency categories and dam failure alerts
Section 8	Outlines emergency notification and actions
Section 9	Provides an overview of the risk controls, based on the Emergency Plans Guidelines
Section 10	Details the emergency contacts for the management of the Leewood ponds
Section 11	Provides the details of the preventative actions
Section 12	Outlines emergency exercises and record keeping
Section 13	Outlines evaluation and review processes
Section 14	Glossary
Appendix A	Provided a list of potential emergency scenarios for the Leewood ponds
Appendix B	A summary of the characteristics of the Leewood ponds
Appendix C	Provides a Dam Failure Assessment Summary, including dam failure inundation maps
Appendix D	Recording of emergency situations
Appendix E	DSEP training and review

1.7. Distribution

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

A copy of this DSEP is also available at the Santos Operations Centre located at 300 Yarrie Lake Road in Narrabri. This is where operational and field staff commence and finish each workday.

A copy of the DSEP has also been provided to Dams Safety NSW and the NSW State Emergency Services (**SES**). Note that wherever this DSEP refers to the SES, this may mean the NSW SES and/or any other local authority or emergency agency that needs to be involved in dealing with a dam emergency. This is especially important for testing of the DSEP.

It is to be noted that any printed copies of the DSEP are uncontrolled, unless specifically stated.

2. Roles and responsibilities

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

In accordance with consent condition D1, the Environmental Management Strategy (**EMS**) sets out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the Project, including the requirements and obligations in this DSEP.

2.1. Responsibilities during and emergency situation and contact details

Santos is the organisation responsible for operational activities at the Leewood ponds. Santos personnel in charge of operational activities, their roles, responsibilities during an emergency situation and contact numbers are summarised in Table 2.1.

Table 2.1 - Santos personnel responsibilities and contact details

Responsibility	Name	Title and role	Contact details
Conducts visual inspections and notifies Operations Supervisor if emergency situation observed	Operator on call	Operator Maintainer	0447 483 995
Takes control of site incident management and notifies Area Manager.	Scott Purcell Nathan Melton	Team Leader Narrabri Operations	0419 356 584 0409 840 709
Coordinates corporate response protocols and notifies Production Manager or IMT Lead (as applicable)	Georgina Peak	Area Manager Scotia, Arcadia and Narrabri	0466 408 428

Note: This table is reviewed annually and updated as required.

Contact details for other Santos personnel, potentially affected parties, external parties and contractors are provided in section 10.

3. Regulatory requirements

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

The Project was subject to the State significant development assessment and approval provisions of Division 4.1 of Part 4 of the EP&A Act and was approved as a State significant development under the EP&A Act and the EPBC Act.

The Project will be carried out in accordance with the:

- relevant existing development consents and activity approvals;
- the conditions of relevant tenements of PAL 2 and the provisions of the *Petroleum (Onshore) Act* 1991 (NSW) (**PO Act**) and relevant guidelines;
- the requirements of the *Dams Safety Act 2015* (NSW) (**Dams Safety Act**) and the Dam Safety Regulation 2019 (NSW) (**Dam Safety Regulation**) and any instructions from Dams Safety NSW;
- Environment Protection Licence (**EPL**) 20350 issued by the EPA and the provisions of the *Protection of the Environment Operations Act 1997* (**POEO Act**); and
- conditions of consent for the NGP SSD 6456.

3.1. Compliance conditions

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

- PAL 2, granted on 30 October 2007;
- Petroleum Production Licences (**PPLs**) 13, 14, 15 and 16, once issued;
- EPL 20350; and
- SSD 6456.

3.2. PAL 2

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

3.3. EPL 20350

'Petroleum exploration, assessment and production' is a scheduled activity listed in Schedule 1 of the POEO Act. Under Section 48 of this Act, all scheduled activities are required to hold an environment protection licence. EPL 20350 is held for CSG activities in PEL 238, PAL 2 and PPL 3 and states that a PIRMP must be developed which documents the procedures to deal with all types of incidents.

3.4. Development consent SSD 6456

There is a single SSD 6456 consent condition that is directly relevant to emergency management relating to dams.

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

> *(d) include a:*
>
> *(x) Pollution Incident Response Management Plan, that has been prepared in accordance with Part 3A of the Protection of the Environment Operations (General) Regulation 2009 and includes:*
>
> i. a Dam Safety Emergency Plan for managing potential incidents and emergencies associated with produced water storages

3.5. Relevant codes, standards, policies and guidelines

As per consent condition B37, all water management infrastructure will be designed, installed, operated and maintained in a proper and efficient manner.

The Dams Safety NSW Guideline - Emergency Plans (DPIE, 2020), published by Dams Safety NSW, an independent regulator established under the Dams Safety Act. Dams Safety NSW seeks to ensure that dam owners achieve compliance with the Dams Safety Act and the Dams Safety Regulation. Dams Safety NSW "declares" those dams which have a potential to threaten downstream life, or cause major property, environmental, or public welfare damage.

3.6. EIS commitments

In the EIS Chapter 31, Santos has committed to implement a number of measures pending Project approval and a final investment decision. These have been reproduced below in Table 3.1. Note that the commitments related to produced water management are addressed in the Produced Water Management Plan (**PWMP**).

Table 3.1 - EIS commitments relevant to dam safety

Number	EIS Commitment relevant to dam safety
16.3	All facilities will be designed and operated under the applicable Australian safety standards and protocols

4. Leewood ponds location and access

The Leewood ponds are located approximately 24 km south-west of Narrabri within PAL 2, as shown in Figure 4.1. The ponds consist of two double-lined produced water and brine storage ponds, with an approximate capacity of 355 megalitres (**ML**) each. Both ponds consist of two cells each, with each cell having a total capacity of approximately 170-180 ML.

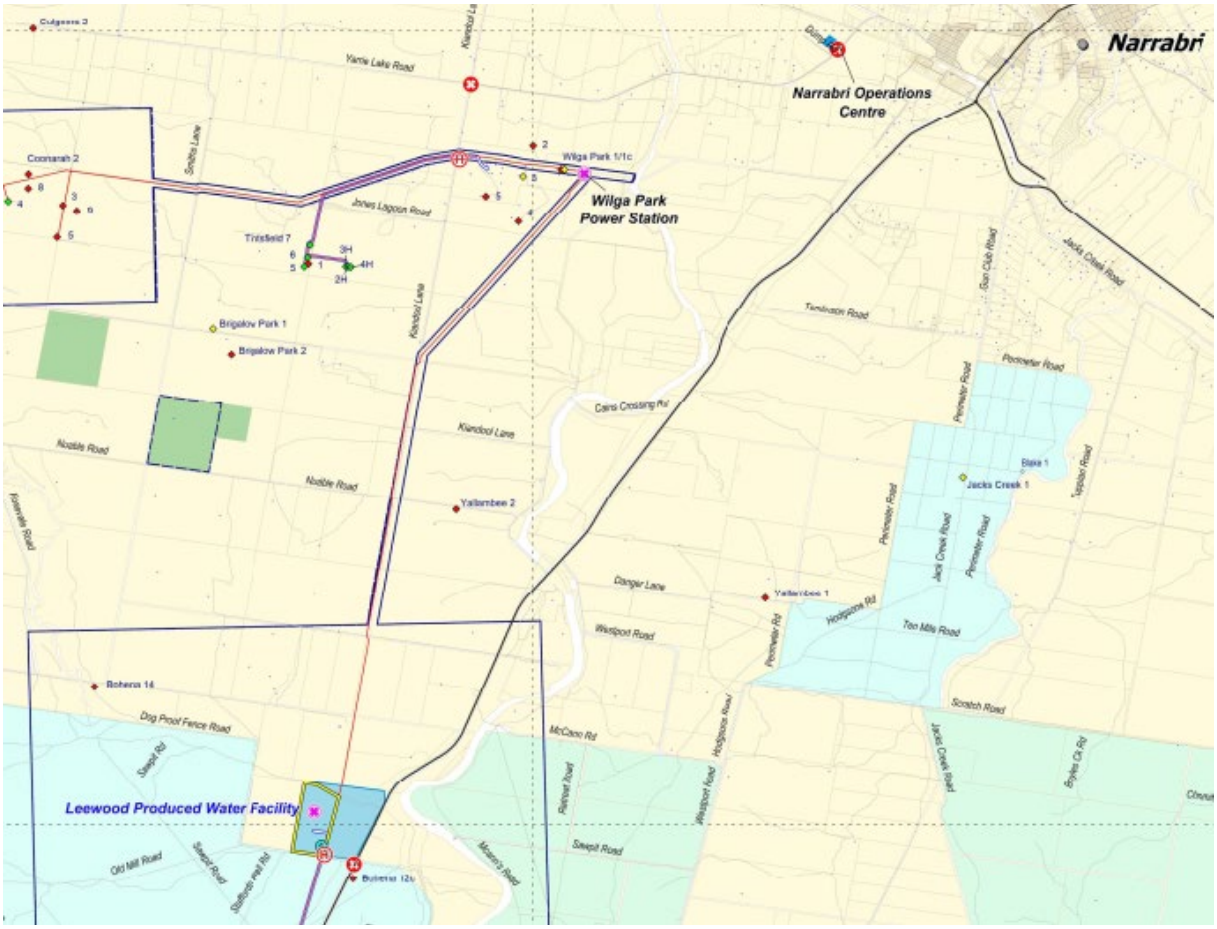

Figure 4.1 - Location of the Leewood ponds

The primary access route to the site is from Old Mill Road off the Newell Highway, located to the south of the site. Emergency access to the ponds is available from the north of the site from the gazetted thoroughfare (not developed) that runs south of Homestead A (refer to Appendix C for dam failure inundation maps) and by cutting through existing fencing.

Access into the fenced property where the ponds are located is controlled by Santos. The ponds are surrounded by a 1.8 m high chain link security fence with 3 strands of barbed wire on top. Access to the ponds for inspection, monitoring and maintenance purposes is through locked gates. Unauthorised visitor access to the site and the ponds is not permitted. Cameras have been installed around the Leewood site for security purposes providing access to live feed if required.

Figure 4.2 - Aerial view of the Leewood ponds (due south-east)

Figure 4.3 - Aerial view of the Leewood ponds (due north-east)

5. Communication and warning systems

5.1. Communication systems

The following telecommunication systems are available at the Leewood ponds site:

- Telephone;
- Internet;
- mobile phone coverage;
- satellite phone coverage; and
- radio communication systems, including UHF/VHF.

From the above list, the following telecommunication systems are available to contact the emergency management agencies.

- Internet;
- Telephone;
- mobile phone coverage; and
- satellite phone coverage.

5.2. Monitoring and warning systems

Narrabri Operator Maintainer conducts monthly dam site inspections and visual assessment of water level against:

- level markings on the inner embankment; and
- reading pressure sensors that measure and record storage depth, volume and surface area.

The Operator Maintainer will notify the Team Leader Narrabri Operations immediately:

- when the levels within the ponds increases above the Maximum Operating Level (MOL)[2] and the Emergency Reporting Level (ERL);
- if an unexpected increase (higher than forecast produced water production) or decrease (above the Normal Operating Leakage Rate) in the pond water level occur; and
- of any structural or equipment concerns.

Narrabri Operator Maintainers are also able to remotely view the level of the pond's via CCTV and log into AquaTech which provides the data from the pond level sensors. AquaTech data is reviewed weekly by the Narrabri Operations Team Leader and the Narrabri Production Engineer.

Response to pond levels and leakage is in accordance with *0011-465-PLA-0002 Trigger Action Response Plan – Pond Level Management*, *7056-465-PLA-0002 Leewood WTP – Leewood Ponds Leakage Management Trigger Action and 7056-040-DDR-00611 Typical Depressurisation Sump Plan.* The pond levels and leakage trigger action response plans are provided in section 10 of the PWMP.

Refer to Appendix B for information on pond water levels.

[2] Refer to Appendix B for full descriptions of the different water level markers

As detailed in the 2012 Review of Environmental Factors for the Leewood Produced Water & Brine Management Ponds, the environmental containment freeboard (**ECF**) is the vertical distance between the MOL and the spillway crest level. It is designed to maximise the containment of stored water and minimise the number and size of potentially damaging outflows during flood events over the life of a dam. This freeboard is normally set to contain the rainfall volume produced by a 72-hour storm of a certain annual exceedance probability (**AEP**), without spilling (which at the Leewood site would equate to a rainfall depth of approximately 155 mm). The ECFs for the Leewood ponds are sufficient to provide storage in excess of the 48-hour 1:20,000 annual recurrence interval (**ARI**) event (assumed to be 650.5 mm) or approximately three 48-hour 1:100-year ARI events.

During the above monthly inspections, the Narrabri Operator Maintainer also inspects the Leewood ponds depressurisation and leakage collection return systems and sumps. In addition to this monthly inspection, each week the Narrabri Operator Maintainer visits Leewood Ponds to start the generator and pump the sumps. The depressurisation and leakage collection systems are a series of drains below the liner system to collect water to sumps from which the water is extracted and returned to the ponds. These systems reduce the risk of liner uplift and also of piping erosion of the embankments due to long term seepage.

6. Emergency incident management

An emergency notification and action flow chart is presented in Section 8. The following information is provided in support of the emergency notification and action flow chart for incident management for Santos only. The observer or recorder of an incident is responsible to instigate the notification chain up to the Area Manager of Santos NSW Operations where required. An example of the Santos internal notification chain is provided in Figure 6.1. This notification chain reflects the line of command within Santos operations. Where, after 3 attempts a role within this line is unable to be reached, the escalation will go to the next role, therefore ensuring timely escalation.

Notification by phone should be carried out as soon as the actual and potential of the emergency scenario is understood.

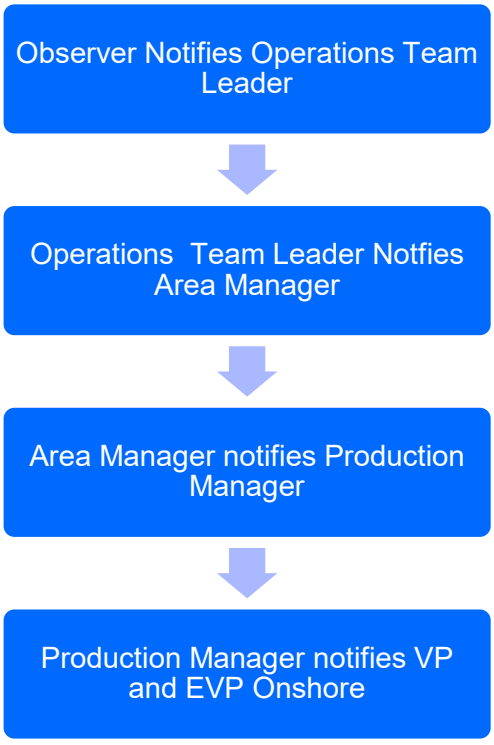

Figure 6.1 - Example of a Santos internal notification chain

7. Emergency categories and dam failure alerts

For the purpose of incident management and emergency actions, the Leewood ponds emergency incidents related to dam failure are categorised as emergency types outlined in Table 7.1.

Table 7.1 - Emergency categories

Emergency type	Description
Type 1	An **uncontrolled** release from the facility is considered imminent due to potential water management issues, a heavy rainfall event that exceeds the spillway capacity and/or a structural defect is detected (e.g. significant movement, significant seepage, cracks in embankment, piping erosion of embankment)
Type 2A	A release, including via the spillway, has occurred and the flow is not contained. Harm to human life and/or stock/fauna may have occurred and/or there is further risk to human and animal safety.
Type 2B	A release, including via the spillway, has occurred and the flow has ceased. Harm to human life and/or stock/fauna may have occurred and/or there is further risk to human and animal safety.

Leewood ponds has no overland water flow. All flow into the Leewood Ponds is piped production water and impingent rainfall.

In line with the NSW State Emergency Service Dam Failure Alert Categories, notifications will be made as outlined in Table 7.2.

Table 7.2 - Dam failure alert notifications

Alert level		Santos action
White Alert	A structural defect has been detected.	Internal notifications and implement Emergency Plan and TARPS. External notification to: • Persons, property, infrastructure at risk • SES • Dams Safety NSW • NSW Fire & Rescue
Amber Alert	Dam failure could be possible if storage continues rising or structural defect not fixed.	Internal notifications and implement Emergency Plan and TARPS. External notifications to: • Persons, property, infrastructure at risk • SES • Dams Safety NSW • NSW Fire & Rescue
Red Alert	Dam failure is imminent or has occurred	Internal notifications and implement Emergency Plan and TARPS. External notifications to: • Persons, property, infrastructure at risk • SES • Dams Safety NSW • NSW Fire & Rescue

8. Emergency notification and actions

A flowchart outlining the sequence of notification and action required in response to an emergency incident is provided in Figure 8.1. A list of mechanisms which may result in a dam failure emergency incident is provided in Table A1 in Appendix A.

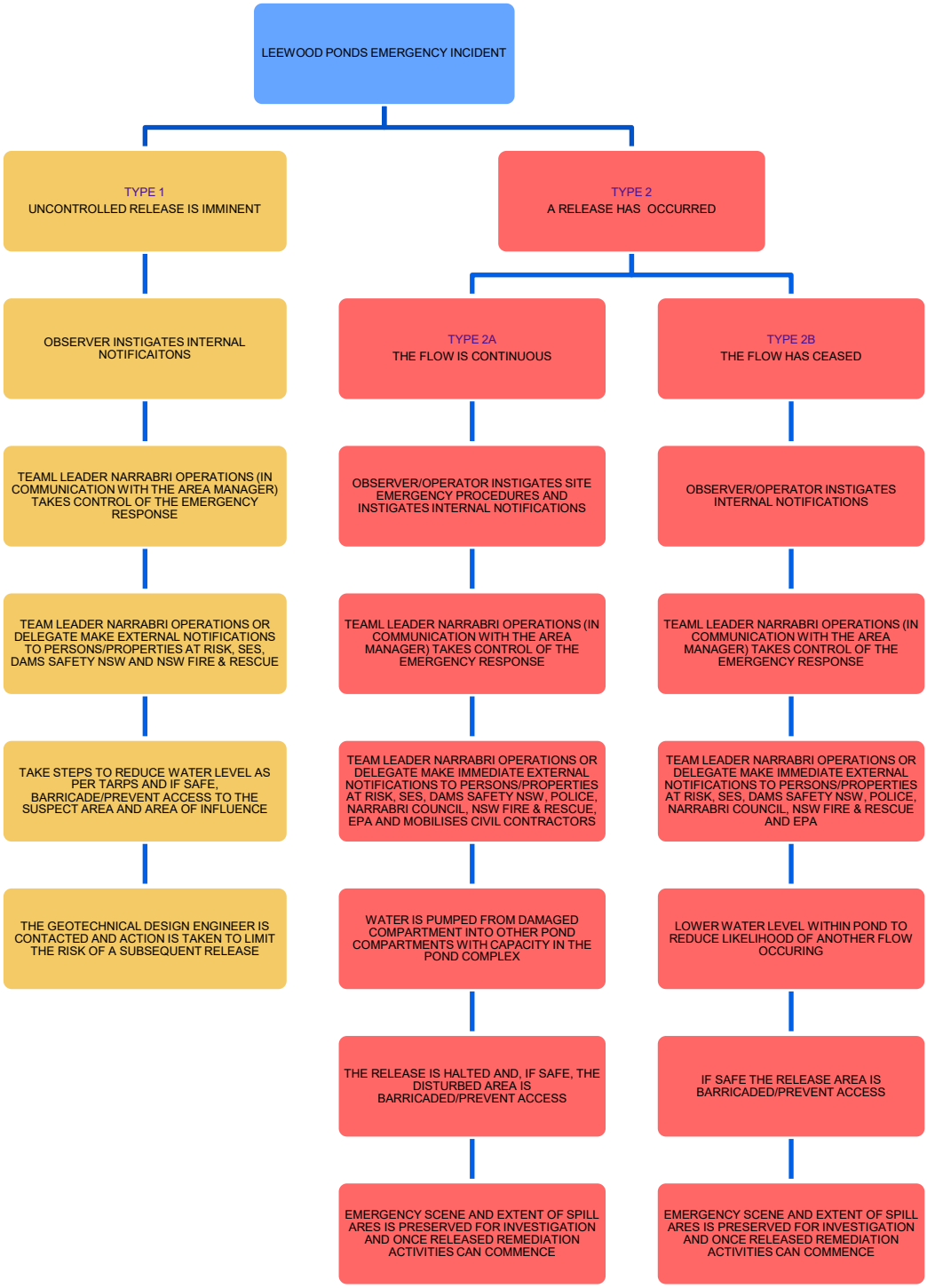

Figure 9.1 - Emergency notification and action flowchart

9. Risk controls

The following risk controls identified in Figure 9.1 are to be administered.

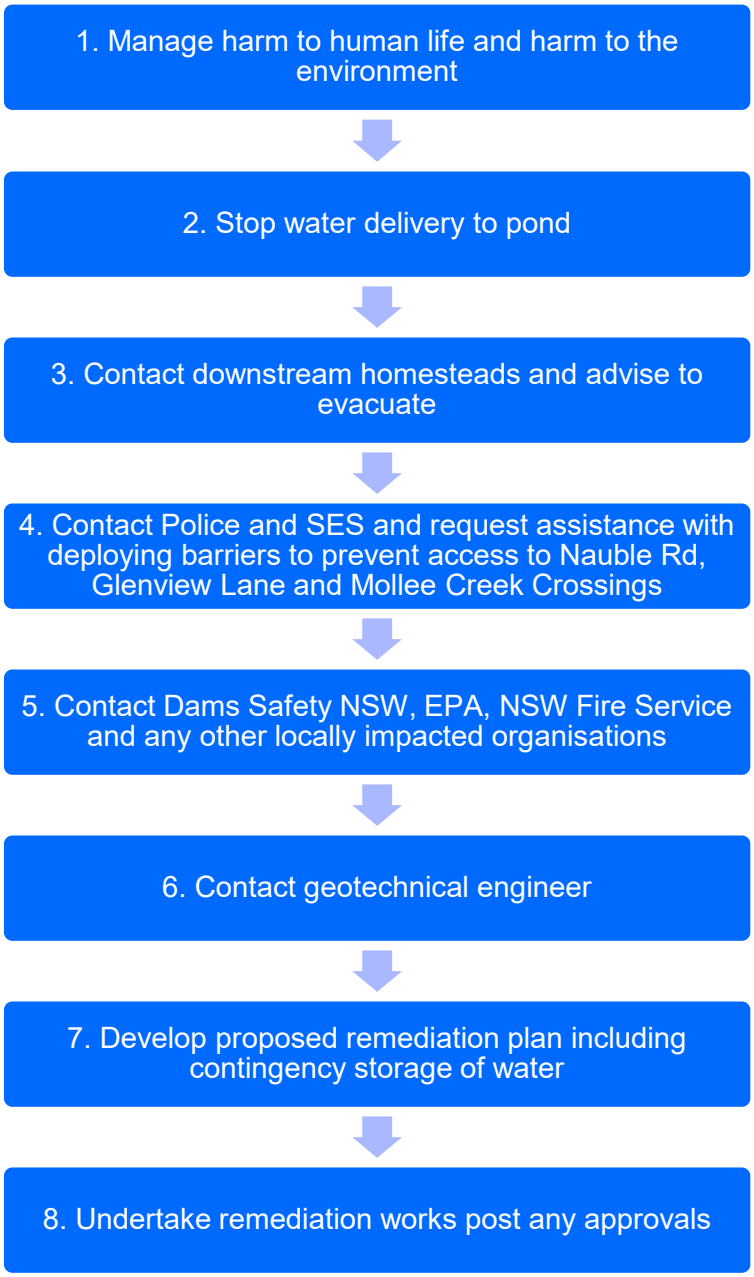

Figure 9.1 - Risk control flowchart

10. Emergency contacts

10.1. General

Notification of the internal contacts will be in accordance with the notification flow chart (Figure 8.1). External notification will be managed by the Santos Team Leader Narrabri Operations or their delegate.

10.2. Population at risk

The Leewood Ponds Dam Failure Assessment identified the following persons, property and infrastructure at risk should there be a catastrophic failure of the Leewood (refer to Appendix C for location of homesteads and flow depths).

Table 10.1 - Homesteads contacts list

Person	Property Name and Lot #	Appendix C Reference ID	Phone
Daniel Kane	Glenwood Lot 183DP814965	A	0427 110 985
Tom and Nicki Lampe	Glengarry Lot 10DP757084	C	0429 921 959
Mark Strahle and Karen Kirkby	Success Lot 32DP1034772	D	0497 404 151 0428 944 500

10.3. Santos internal contacts

Table 10.2 identifies relevant Santos personnel who may be required to be notified.

Table 10.2 - Santos internal contact list

Person	Role	Phone
Scott Purcell Nathan Melton	Team Leader Narrabri Operations	0419 356 584 0409 840 709
Georgina Peak	Area Manager Scotia, Arcadia and Narrabri	0466 408 428
Brendon Child	Development Manager NSW	0437 428 506
Todd Armstrong	Senior Incident and Emergency Adviser	0429 171 727
Curtis Attard	Environmental Adviser	0457 186 632
Rotational (Nominated leaders)	Emergency On-call Officer	(02) 6792 0000 0427 923 401
Annie Moody	Team Leader – Community and Land	(02) 6792 9031 0407 759 264

10.4. External contacts

Table 10.3 identifies relevant external parties who may be required to be notified.

Table 10.3 - External contacts list

Organisation/Company/Homestead	Person	Role	Phone
Dams Safety NSW	na	na	0403 681 645
NSW State Emergency Service (SES)	na	na	All hours: 1300 737 326
SES Operations Comms Centre (ONLY use if above number goes unanswered)	na	na	1300 677 677
Emergency – Police, Ambulance, Fire Brigade	na	na	000
Non-emergency: Narrabri Police Station Narrabri Fire and rescue	na	na	(02) 6792 7199 (02) 6792 5107
North West Region SES (Moree)	na	na	(02) 6757 2950
Narrabri Shire Council	na	na	(02) 6799 6866
Golder Associates – Geotech Engineer	na	Geotech Engineer	(03) 8862 3500
NSW Environmental Protection Authority – Narrabri National Parks Office	na	na	(02) 6792 7300
NSW Department of Primary Industries – Lightning Ridge Regional Office	na	na	(02) 6829 9200
NSW Transport – Roads and Maritime Services (road conditions reporting)	na	na	131 700
Nextgen Networks (Visionstream Pty Ltd) – Reporting Damage	na	na	1800 032 532
Essential Energy – Supply Interruption and/or Reporting Damage	na	na	13 20 80
Telstra – Reporting Damage	na	na	13 22 03
Downstream Homestead (ID A)	Daniel Kane	na	0427 110 985
Downstream Homestead (ID C)	Tom & Nicki Lampe	na	0429 921 959
Downstream Homestead (ID D)	Mark Strahle and Karen Kirkby	na	0497 404 151 0428 944 500

Table 10.4 identifies relevant external parties who may be required to be notified.

Table 10.4 - Contractor contact list

Contact	Contact Number
Earthmoving - Daracon	(02) 4903 7000
Specialised Civil Services	(02) 6792 5120
Liner Installation - Fabtech	(08) 8347 3111 (1300 664 776)

11. Preventative actions

The Leewood ponds will be operated in accordance with the Operations and Maintenance Plan and the requirements of Appendix B, thus reducing the likelihood of an emergency situation occurring. Water levels within the Leewood ponds will be maintained below the MOL of each compartment, which are summarised in Appendix B. The water level in the ponds may be operated for short periods up to the ERL. The storage between the MOL and the ERL is intended as buffer storage for prolonged wet weather conditions. The water level within the ponds will be continuously monitored using sensors combined with regular visual inspections. Visual inspections will be undertaken to monitor for signs of seepage or embankment deformation.

The results of the dam break assessment for the Leewood Ponds (summarised in Appendix C) indicate that it will take at least one hour for the water to reach the first homestead downstream of the Leewood ponds that may be impacted. This implies that the DSEP will be implemented and warnings given to downstream homesteads within 0.5 hours of an uncontrolled release occurring. The public roads north of the ponds, including Nuable Road and Glenwood Lane may be overtopped from an uncontrolled release from the ponds. The roads will therefore be barricaded should an uncontrolled release be imminent. The roads will be barricaded at least 500 m east and west of the Mollee Creek crossings. Water from a dam break is expected to flow for less than 24 hours.

12. Emergencies, exercises and record keeping

Dam emergencies will be managed in accordance with this Plan and records recorded within the Emergency Response Module of EHS Toolbox. The Annual Dam Safety Report provided to Dam Safety NSW, also reports the number of dam incidents (emergencies) in the reporting period.

Emergency exercises are conducted at least once every three years for the Leewood Ponds in accordance with the Dam Safety Regulation 2019 Clause 22, subclause (1). An exercise plan is developed annually by the Senior Incident and Emergency Adviser. Compliance to the plan and learnings are reported to the Production Operations Monthly Performance Review (MPR).

The next exercise is scheduled to be carried out prior to 31 December 2025. The scope of the next exercise will include the internal and external notifications based on the updated inclusion of the Dam Failure Alerts.

All emergency exercises are recorded within the Emergency Response Module of EHS Toolbox.

The Annual Dam Safety Report provided to Dams Safety NSW, captures the completed and next scheduled emergency exercise dates.

13. Evaluation and review

The Emergency Plan will be reviewed and updated as required, in accordance with Clause 10, subsections (3) (4) (5) and (6) of the Dam Safety Regulations 2019:

- updated at least once every five years;
- updated to take account of the following changes within 30 days after the change occurs:

  a. a change to the consequence category of the dam;

a significant change, since the consequence category of the dam was last determined, to the number of persons who would be put at risk if there were to be a failure of the dam; and

  b. a change to the emergency management arrangements.

- annually to verify and update contact details and any other changes to the Leewood Ponds. Dams Safety NSW may direct the owner of a declared dam to update the emergency plan for the dam within a time specified in the direction.

Reviews will be recorded in the Audit Module of EHS Toolbox.

Updated Emergency Plans will be provided to Dams Safety NSW and the State Emergency Service.

Glossary

Term	Definition[3]
Council	Narrabri Shire Council
Department	NSW Department of Planning, Housing and Infrastructure (DPHI)
EIS	The Environmental Impact Statement titled Narrabri Gas Project Environmental Impact Statement, dated 31 January 2017, submitted with the development application, including the response to submissions and supplementary response to submissions, and the additional information provided to the Department in support of the application
Gas compression facility	A facility that houses multiple compressor units, either nodal or hub compressors or a mixture of both used to increase the pressure of gas for the purpose of transmission; may be collocated with a gas treatment facility and/or water management facility
Gas field infrastructure	All Project-related infrastructure, excluding the Leewood facility, Bibblewindi facility and the road upgrades required under SSD 6456
Gas well	Pilot wells and production wells
Gathering lines	Pipelines used to transfer gas and produced water from wells
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance
Linear infrastructure	Project related infrastructure of a linear nature including gas and water gathering lines, gas and water pipelines, access tracks, power lines, communication lines and other service lines
Major facilities	Leewood facility and Bibblewindi facility
Material harm	Material harm to the environment is defined in section 147 of the POEO Act
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Project
Mitigation	Activities associated with reducing the impacts of the development
Notification area	Area that underlies or surrounds the wall of a declared dam. It is defined by straight lines joining a series of coordinates. Dams Safety NSW may declare an area of land around or near to a declared dam as a “notification area” under section 48 of the Dams Safety Act 2015. Mining activities must not occur within the area without approval to avoid unacceptable risks to dams safety.
Petroleum Assessment Lease 2 (PAL 2)	A PAL is required to hold the exclusive right to prospect for petroleum and to assess any petroleum deposit over a specified area of land in NSW. A lease allows the holder to maintain a title over a potential area, without having to commit to further exploration. The holder can, however, continue prospecting operations and to recover petroleum in the course of assessing the viability of commercial

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

Term	Definition[3]
	mining. PAL 2 is held by Santos NSW Pty Ltd.
Petroleum Exploration Licence 238 (PEL 238)	Before exploring for minerals or petroleum in NSW, an explorer must first obtain a Petroleum Exploration Licence (PEL) under the Petroleum (Onshore) Act 1991. An exploration licence gives the licence holder exclusive rights to explore for petroleum or specific minerals within a designated area but it does not permit mining, nor does it guarantee a mining or production lease will be granted. PEL 238 is held by Santos NSW Pty Ltd.
Petroleum Production Lease 3 (PPL 3)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. PPL 3 is held by the following titleholders: • Santos QNT Pty Ltd; • Santos NSW (Hillgrove) Pty Ltd; and • Santos NSW (Eastern) Pty Ltd.
Petroleum production lease application (PPLA)	A petroleum production lease gives the holder the exclusive right to extract petroleum within the production lease area during the term of the lease. Development consent under the Environmental Planning and Assessment Act 1979 must be in place before a petroleum production lease can be granted. Santos, on behalf of its joint venture partner lodged four petroleum production lease applications under the PO Act in May 2014 for the Project area, being PPLAs 13, 14, 15 and 16. The ownership of the application is now held by Santos NSW Pty Ltd.
Pilot well	A well for gas and water extraction, for the purpose of exploration, appraisal and assessment of the gas field potential
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
Pollution incident	Has the same meaning as in the POEO Act
Produced water	Any form of groundwater that is actively extracted from a borehole, well or excavation, excluding incidental groundwater mixed with drilling fluids
Production well	A well for gas and water extraction, for the purpose of commercial gas production and/or use
Project area	The area of approximately 95,000 hectares that encompasses the Project
Project footprint	The area of surface expression being about 1,000 hectares occupied by the infrastructure components of the Narrabri Gas Project
Project-related infrastructure	All infrastructure and other structures associated with the development. This includes linear infrastructure and non-linear infrastructure, surface infrastructure and subsurface infrastructure, major facilities, wells and well pads and other gas field infrastructure
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Unacceptable risk	The level of risk at which mitigation actions are deemed to be warranted.

Term	Definition[3]
Well	Pilot wells and production wells
Well pad	An area of up to 1 hectare upon which the gas wells are to be located, with the area decreasing to no more than 0.25 hectares following rehabilitation4, or other area as may be approved in the Field Development Plan

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

Appendix A - Potential dam failure emergency scenarios

The potential emergency scenarios that may result in a release from the Leewood Ponds are summarised in Table A1.

Table A1 - Potential dam failure emergency scenarios

Mechanism	Trigger/Indicator	Potential Result	Remediation
Static embankment movement	Tension cracks in embankment crest, settlement of embankment, mounding at toe of embankment	Large settlement or batter slide may result in loss of containment and overtopping. Movement could indicate stability issues	Transfer pond water no separate compartment, stop inflow pumping and remediate pond stability issues. Investigate potential seepage through the liner and embankment soils.
Dynamic embankment movement	An earthquake induces shaking of the pond	Shaking of the embankment may result in settlement of the embankment crest and deformation of the batters	Drain pond compartment and remediate embankment
Seepage and/or wet soils observed at the toe of downstream embankment	If no seepage is observed in the seepage collection system this may indicate that the seepage collection system is not functioning and that seepage through the embankment is occurring	Ongoing seepage may lead to risk of piping erosion of embankment and severe surface erosion of slopes	Drain pond and investigate the integrity of the liner system
Embankment overtopping	A large rain event exceeds the discharge capacity of the spillway or the spillway is blocked	May result in water flowing over the embankment and eroding a breach, resulting in a loss of containment	If possible, unblock spillway and drawdown pond
Large defects in liner	Large volume of seepage water continuously pumped from sumps. Floating geomembrane liner	Ongoing seepage may result in erosion through the embankment	Drain pond and repair liner defects
Piping and tunnelling erosion	Sediment laden seepage from embankment surface with visible flow and possibly sediment fans on the downstream slope or toe area of the embankment	Ongoing seepage may result in progressive erosion of soil particles within the embankment, resulting in a release of water from the breach area adjacent to the embankment	Drain pond, inspect liner for defects and remediate embankment

Appendix B - Leewood ponds characteristics

B-1 Leewood ponds characteristics

The Leewood ponds are high-density polyethylene (**HDPE**) geomembrane lined storage facilities that receive CSG water and brine resulting from CSG extraction and CSG water treatment. The key features of the Leewood ponds are:

- design life of 20 years;
- the embankments have a minimum crest width of 5 m with upstream and downstream batters constructed to minimum 4H:1V. The eastern embankment is constructed with a batter of reduced grade;
- each pond comprises two compartments, separated by an intermediate bund, to facilitate potential maintenance requirements and facilitate separate storage options from the gas well field;
- stormwater diversion bunds have been constructed upslope of the ponds (incorporated into the perimeter access track);
- the earth fill embankment was constructed using site-won and locally available materials for embankment construction;
- provision of freeboard allowances are in accordance with both the Queensland CSG water guidelines and current Dams Safety NSW design requirements;
- spillway and associated spillway channel works have been constructed in accordance with both the Queensland CSG water guidelines and Dams Safety NSW design requirements;
- brine and produced water ponds lined with double liner system consisting of a 1.5 mm thick HDPE geomembrane primary liner underlain by leak collection system underlain by composite liner comprising a secondary 1.5 mm thick HDPE geomembrane liner. The secondary geomembrane liner is underlain with a geosynthetic clay liner on the floor and a compacted clay subgrade on the slopes;
- pond floors include depressurisation system to limit the risk of liner seepage uplift;
- pond floors include underline drainage collection with collection sumps and pumped returns; and
- a minimum water level and permanent ballast designed to reduce potential stresses on the geomembrane caused by wind uplift.

Water storage levels have been defined for each of the ponds for monitoring and management purposes. These definitions are based on the Queensland guidelines '*Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*' (Department of Environment and Resource Management, 2011), and include:

- wet season containment (**Maximum Operating Water Level (MOL)**) - includes a minimum spare storage capacity (Design Storage Allowance) required at the nominal start of the wet season (1 November each year) to give the regulatory agency confidence that wet season inputs can be managed without loss of containment (i.e. spillway discharge);
- storm event containment (**Emergency Reporting Level (ERL)**) - the dam level at which loss of containment could potentially occur within a single storm event (72-hour duration event) triggering notifications and further action; and
- spillway capacity (**Full Supply Level (FSL)**) - sufficient spillway capacity is required to ensure that the design flood event can be conveyed by the spillway without causing overtopping of the dam embankment which could lead to catastrophic failure of the dam structure.

Water storage levels for each pond are identified in Table B1.

Table B1 - Defined pond operating levels

Produced water storage facility	Full Supply Level (FSL) (m AHD [a])	Emergency Reporting Level (ERL)	Maximum Operating Level (MOL) (m AHD [a])
Leewood pond 1	250.4	249.9	249.6
Leewood pond 2	249.85	249.4	249.0

[a] AHD - Australian Height Datum

B-2 Leewood ponds consequence category

The Leewood ponds are designed to store CSG water and brine and are classified as having a **significant consequence category.** The design and Consequence Category Assessment is based on the consequence categories assessment guidelines included in the NSW Dam Safety Committee publications "Consequence Categories for Dams", DSC3A and "Tailing Dams", DSC3F Guidelines, both dated June 2010.

In accordance with Dams Safety Regulation 2019, Clause 7 (2), the consequence category is due for re-assessment prior to August 2027 or upon a modification or any significant change in the number of persons likely to be affected by a dam failure or the change in severity of damage and loss (other than a minor change).

Appendix C - Dam failure assessment summary and inundation maps

C-1 Dam failure assessment summary

The purpose of the dam failure assessment was to evaluate the impacts of a dam failure on the safety of the people, infrastructure and livestock downstream of the ponds. A detailed dam failure impact assessment has been undertaken using a 2-dimensional hydrodynamic model which models a potential dam breach and its flood impacts on downstream areas. Inundation maps have been developed to illustrate the following dam break scenarios:

1. **Sunny day dam failure** - dam failure occurs on a sunny day. It is assumed that no rainfall has occurred, and there is 'normal' flow in the downstream watercourses. Normal flow has been assumed to be zero as the median discharge for this area is insignificant relative to the dam failure discharge; and
2. **Dam failure during a flood** - dam failure occurs on a flood day. This scenario evaluates the incremental flooding effect of a dam failure during a downstream flood condition. The 1:2 and 1:100 annual exceedance probability (AEP) flood events have been assessed.

The failure impact zone ends when the:

- flooding caused by a dam failure is retained within the existing natural watercourse bed and banks and no additional population is at risk; and
- difference between the flooding effect with dam failure and the flooding effect without dam failure is less than 300 mm.

The population at risk (**PAR**) is estimated from buildings or other places of occupation that are located within the failure impact zone. It is based on allocating default populations to each building according to the census data published on NSW government websites.

C-1-1 Dam failure flow results

Table C1 shows the flood peak arrival times at each cross section (refer to the attached inundation maps shown in Figure C1, C2 and C3) for the sunny day dam failure scenarios once breaching has occurred.

Table C1 - Flood peak arrival times at each section after dam breach

Cross section	Distance downstream of dam (km)	Arrival time of flood peak (hours after initial dam failure)
1	1.2	1.3
2	6.9	4.2
3	11.3	7.0

C-1-2 Sunny day population at risk

In the sunny day dam break, none of the homesteads can be excluded on the basis that 12 hours prior notification is not possible. The maximum arrival time of the flood peak within the dam break affected zone is 7.0 hours (Table C1). Homestead C is the only structure that is inundated by flood water resulting from the dam break (Table C2). The total PAR in the sunny day failure assessment is 2.5. Refer Figure C1.

Table C2 - Sunny day failure PAR

		Dam failure		
ID	House Level (m AHD)	Water Level (m AHD)	Footprint of structure wet	Total PAR
A	242.2	242.0	No	0
B	239.8	239.3	No	0
C	233.3	233.38#	Yes	2.5
D	227.4	226.8	No	0
E	227.4	226.5	No	0
			TOTAL	2.5

 # water level in creek. Where a levee is in place, the water level reported is the level in the creek rather than the level at the homestead (behind the levee).

C-1-3 Flood day population at risk

In the flood day dam break, there may be extensive floodplain inundation prior to the dam break event. PAR exposed to pre-dam break flood waters where the product of the depth (D) and velocity (V) is greater than 0.6 m^2/s are discounted from the dam break PAR. In determining this value of D*V, D_{max} should not exceed 1.2 m or V_{max} should not exceed 1.5 m/s.

The PAR in the flood day dam break for the 1:2 AEP and 1:100 AEP flood is provided in Table C3 and Table C4. Refer Figure C2 and Figure C3 respectively.

Table C3 - 1:2 AEP flood day PAR

		Flood only			Dam failure during flood		
ID	House Level (m AHD)	Water Level (m AHD)	Footprint of structure wet	D x V (m^2/s)	Water Level (m AHD)	Footprint of structure wet	Total PAR
A	242.2	241.7	No	N/A	242.2	No	0
B	239.8	238.9	No	N/A	239.6	No	0
C	233.3	233.5#	Yes	<0.6	233.9 #	Yes	2.5
D	227.4	226.3	No	N/A	227.2	No	0
E	227.4	226.3	No	N/A	226.9	No	0
F	220.9	220.7	No	N/A	221.3	Yes	2.5
G	220.6	220.0	No	N/A	220.6	No	0
H	217.0	216.4	No	N/A	216.8	No	0
I	215.4	214.5	No	N/A	215.2	No	0
J	216.3	214.5	No	N/A	214.7	No	0
						TOTAL	5.0

[#] water level in creek. *Where a levee is in place, the water level reported is the level in the creek rather than the level at the homestead (behind the levee).*

Table C4 - 1:100 AEP flood day PAR

		Flood only			Dam failure during flood		
ID	House Level (m AHD)	Water Level (m AHD)	Footprint of Structure Wet	D x V (m^2/s)	Water Level (m AHD)	Footprint of Structure Wet	Total PAR
A	242.2	241.9	No	N/A	242.3	Yes	2.5
B	239.8	239.2	No	N/A	239.6	No	0
C	233.3	233.8#	Yes	<0.6	234.0 [#]	Yes	2.5
D	227.4	227.0	No	N/A	227.5	Yes	2.5
E	227.4	227.0	No	N/A	227.2	No	0
						TOTAL	7.5

[#] water level in creek. *Where a levee is in place, the water level reported is the level in the creek rather than the level at the homestead (behind the levee).*

In the three scenarios the maximum PAR is 7.5.

C-2 Receiving environment

C-2-1 Description

Pilliga Box - White Cypress Pine - Buloke shrubby woodland is located in the north-east and west of the Leewood Ponds site. Approximately 8 km downstream of Leewood ponds is the Brigalow Nature Reserve and Brigalow State Conservation Area.

Immediately downstream of the Leewood ponds is an overland flow path leading to approximately 3 km downstream, Mollee Creek. Aerial imagery shows both the overland flow path and Mollee creek to be largely cleared, with little riparian vegetation present, until greater than 8 km downstream. Small, isolated patches of Brigalow and Pilliga Box woodland are present alongside the creek. Mollee creek is an ephemeral feature.

Rural / productive lands occur along the length of the overland flow path / Mollee creek.

C-2-2 Dam failure scenarios

In a failure to contain scenario (i.e. spillway and seepage flows), no harm is expected to occur to the vegetation communities located to the west and north-east of the ponds due to natural contours expected to prevent the flow from reaching the vegetation. The Brigalow Nature Reserve and Brigalow State Conservation Area are also not expected to be impacted, as spill way discharge should not breach the western bank of Mollee Creek. Under a dam break scenario (i.e. all ponds breach simultaneously) the vegetation community to the west of the ponds may be inundated, however due to existing contours, the Brigalow Nature Reserve and Brigalow State Conservation Area would remain unaffected, as would the vegetation north-east of the Leewood pond site. Inundation may result in adverse impacts to the soils and to the health of the vegetation present.

Under a sunny day (no concurrent flooding) or flood day dam break (concurrent flooding) scenario the Pilliga Box - White Cypress Pine - Buloke shrubby woodland occurring to the west of the ponds is likely to inundated. The other identified vegetation areas remain unaffected.

Under all scenarios, adverse impacts would occur to surface water quality and to the in-stream environment present within Mollee Creek. Productive lands / soils may also be impacted, depending on the extent of flooding, as well as the extent of natural flow and its ability to dilute and flush the system. Water contained in low-lying landholder dams receiving overland flow could be impacted, with the produced water affecting the water quality within the dams. Vegetation present within the overland flow path / Mollee creek may also be adversely impacted.

No impacts to Bohena Creek or Bundock Creek are anticipated.

C-3 Inundation maps

Dam failure inundation maps are provided below.

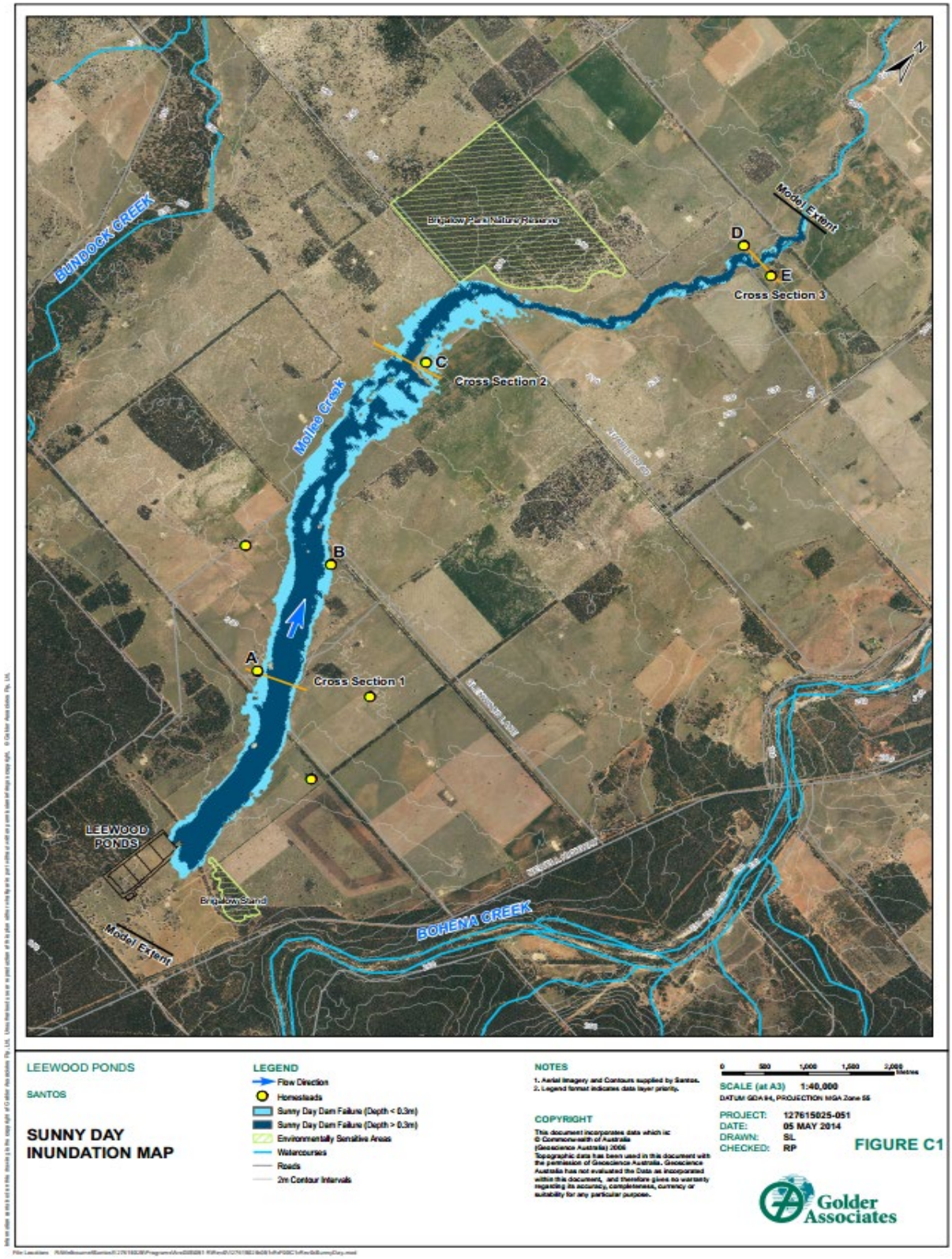

Figure C1 – Sunny Day Inundation

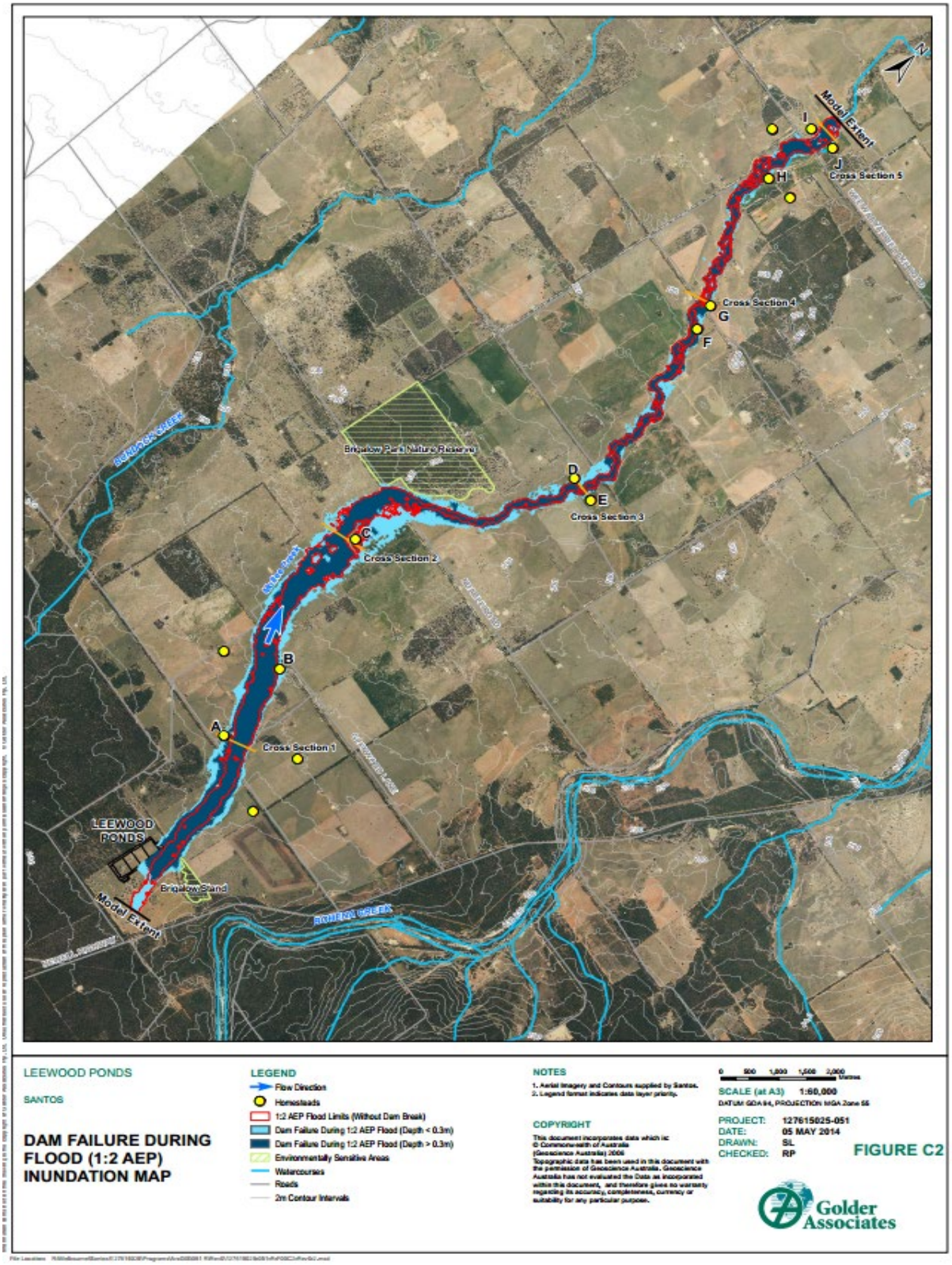

Figure C2 – Dam Failure During Flood (1:2 AEP) Inundation

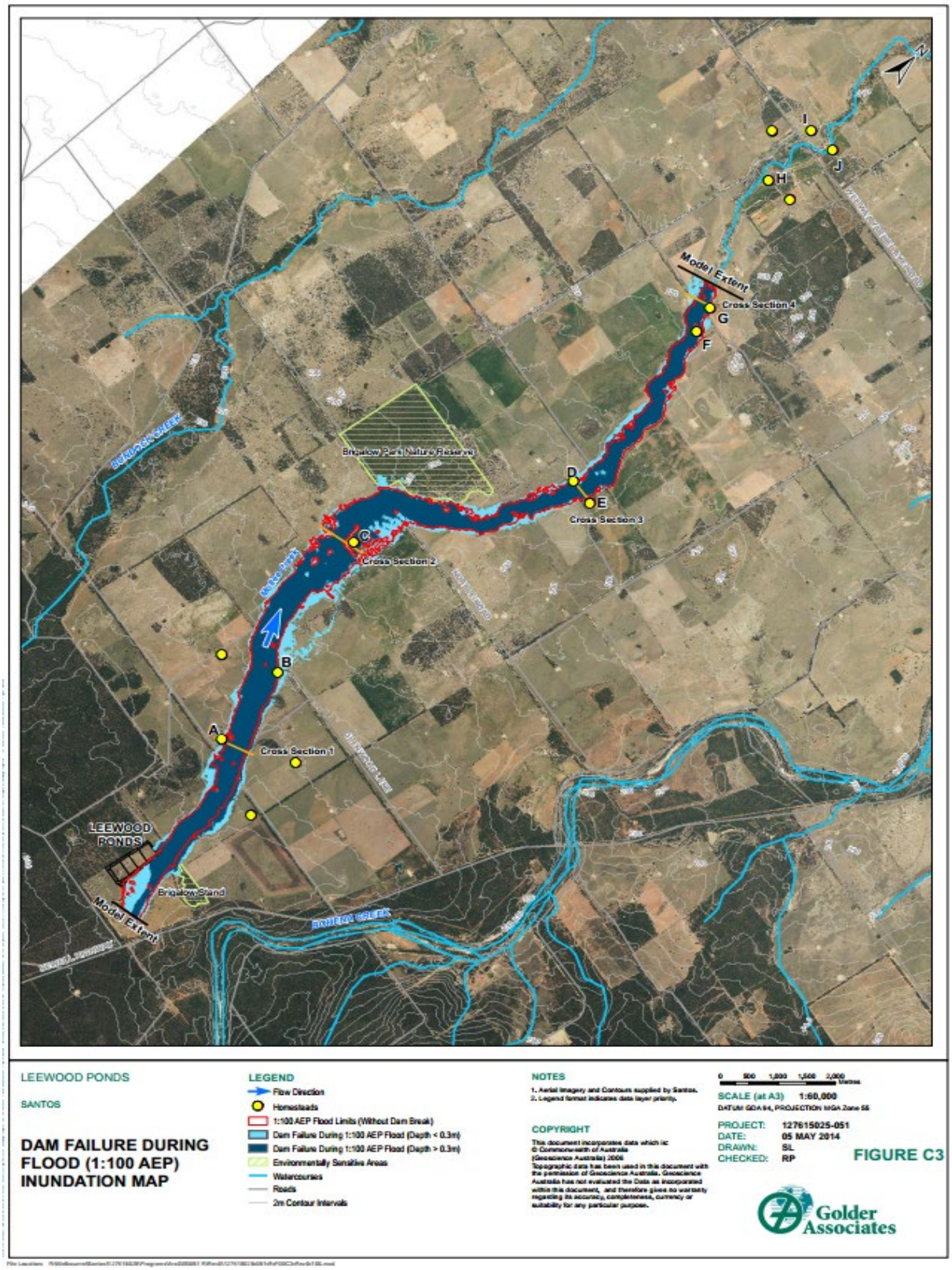

Figure C3 – Dam Failure During Flood (1:100 AEP) Inundation

Appendix D - Records of emergency situations

Emergency situations that occur during the operation of the Leewood ponds should be recorded in Table D1, with reference made to any documents that summarise the events.

Table D1 - Record of emergency situations at the Leewood ponds

Date	Brief description of the emergency situation	References

Appendix E - DSEP training and review

Table E1 - Record of DSEP testing

Date Tested	Personnel involved	Actions / recommendations

Table E2 - Record of DSEP update

Reviewed By	Version	Date Issued