

Gorgon Gas Development and Jansz Feed Gas Pipeline Solid and Liquid Waste Management Plan

State: Ministerial Statement 769 and 800

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1 Executive Summary

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Aspect	Summary
Proposal name	Gorgon Gas Development Revised and Expanded Proposal: Barrow Island Nature Reserve
Proponent name	Chevron Australia Pty Ltd (CAPL)
Approval number/s	State: Ministerial Statement (MS) 769 MS 800 Commonwealth: EPBC Reference: 2003/1294 EPBC Reference: 2008/4178
Proposal description and scope	The construction of facilities for the development of the Greater Gorgon Gas Fields on the North West Shelf, and the processing and export of the gas at a liquefied natural gas (LNG) plant to be constructed on Barrow Island, as more generally described in the Draft Environmental Impact Statement / Environmental Review and Management Programme for the Proposed Gorgon Development, the Final Environmental Impact Statement/ Response to Submissions on the Environmental Review and Management Programme; as amended under Section 45C; and as expanded and revised in the Public Environmental Review for the Gorgon Gas Development Revised and Expanded Proposal and the Response to Submissions: Gorgon Gas Development Revised and Expanded Proposal, Public Environmental Review.
Purpose of the EMP	The purpose of the Solid and Liquid Waste Management Plan is to satisfy the requirements of Condition 30.1 of MS 800 and Condition 16.1 of MS 769 and Condition 20.1 of EPBC Reference: 2003/1294 and 2008/4178
Key objectives	 The stated objectives of this Plan in Condition 30.2 of MS 800, Condition 16.1 of MS 769, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178 are to: i. Ensure all Proposal (action) related solid and liquid waste all Proposal [action]-related solid and liquid wastes are either removed from Barrow Island or, if not, that all practicable means are used to ensure that waste disposal does not cause Material or Serious Environmental Harm to Barrow Island and its surrounding waters The stated objectives of this Plan in Condition 30.2 of MS 800, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178 are to: ii. Ensure discharges from any waste water treatment plant, reverse osmosis plant, or other process water are disposed of via deep well injection, unless otherwise authorised by the [Western Australian] Minister; and iii. Ensure any deep well injection of Proposal [action]-related liquid wastes is conducted in a manner that will not cause Material or Serious Environmental Harm to subterranean fauna and their habitats on Barrow Island.
Key environmental factors	Flora and vegetation Landforms (referred to as Soil and Landform within the Plan) Subterranean fauna Terrestrial fauna Inland waters (referred to as Surface and Groundwater within the Plan)
Approval Condition clauses	Condition 30 of MS 800 and Condition 16 MS 769 Conditions 3 and 20 of EPBC Reference: 2003/1294 and 2008/4178

2 Introduction

2.1 Proponent

Chevron Australia Pty Ltd (Chevron Australia) is the proponent and the person taking the action for the Gorgon Gas Development on behalf of the following companies (collectively known as the Gorgon Joint Venturers):

- CAPL
- Shell Australia Pty Ltd
- Mobil Australia Resources Company Pty Limited
- Osaka Gas Gorgon Pty Ltd
- Midocean Gorgon Pty Ltd
- JERA Gorgon Pty Ltd.

2.2 Project

CAPL has developed the gas reserves of the Greater Gorgon Area for processing in the Gorgon Gas Treatment Plant (GTP) on Barrow Island, which is located off the Pilbara coast 85 km north-north-east of Onslow in Western Australia (WA) (Figure 2-1).

Subsea gathering systems and pipelines deliver feed gas from the Gorgon and Jansz–lo gas fields to the west coast of Barrow Island. The underground feed gas pipeline system then traverses Barrow Island to the east coast where the GTP is located. The GTP includes natural gas trains that produce liquefied natural gas (LNG), as well as condensate, and domestic gas. Carbon dioxide (CO_2), which occurs naturally in the feed gas, is separated during the production process and injected into deep rock formations beneath Barrow Island. The LNG and condensate are loaded onto tankers from a jetty and then transported to international markets. Gas for domestic use is exported by pipeline from Barrow Island to the domestic gas collection and distribution network on the WA mainland.



Figure 2-1: Location of Barrow Island and the Greater Gorgon Area

2.3 Environmental Approvals

Table 2-1 describes State and Commonwealth approvals for the components of the Gorgon Gas Development.

These approvals, and projects as approved under these approvals, have been and may continue to be amended (or replaced) from time to time.

Table 2-1: State and Commonwealth Approvals

Project Approval Stage	State	Commonwealth
Jansz Feed Gas Pipeline	Ministerial Statement (MS) 769 (Ref. 1). 28 May 2008	EPBC Reference: 2005/2184 (Ref. 2) 22 March 2006.
Initial Gorgon Gas Development (2 LNG Trains)	Initial Gorgon Gas Development comprising two LNG Trains – MS 748 (Ref. 4). This was superseded by MS 800. 6 September 2007	Initial Gorgon Gas Development comprising two LNG Trains – EPBC Reference: 2003/1294 (Ref. 6). 3 October 2007
Revised and Expanded Gorgon Gas Development (3 LNG Trains)	MS 800 (Ref. 3) provides approval for both the initial Gorgon Gas Development and the Revised and Expanded Gorgon Gas Development (compromising three LNG Trains), which together are known as the Gorgon Gas Development. This statement supersedes MS 748. 10 August 2009	The Revised and Expanded Gorgon Gas Development (EPBC Reference: 2008/4178 [Ref. 5]) was approved, and the conditions for the initial Gorgon Gas Development (EPBC Reference: 2003/1294 [Ref. 6]) were varied. 26 August 2009
Dredging Amendment	MS 865 (Ref. 8) provides approval to establish a restart mechanism in the event of a project-attributable coral health management trigger. This statement is an amendment to Conditions 18, 20, and 21 of MS 800. 8 June 2011	N/A
Additional Support Area	MS 965 (Ref. 7) applies the conditions of MS 800 to an Additional Support Area. 2 April 2014	The conditions for the initial Gorgon Gas Development (EPBC Reference: 2003/1294) [Ref. 6) and for the Revised and Expanded Gorgon Gas Development (EPBC Reference: 2008/4178) [Ref. 5]) were varied. 15 April 2014
Gorgon Gas Development Fourth Train Expansion ¹	MS 1002 (Ref. 9) applies the conditions of MS 800 to the Fourth Train Expansion, and has additional conditions. 30 April 2015	EPBC Reference: 2011/5942 (Ref. 31). 27 May 2016
Greenhouse Gas Condition Amendment	MS 1198 (Ref. 30) amends Conditions 5, 26, and 27 of MS 800. 20 October 2022	N/A
Trenching earthworks for the terrestrial section of the three new electrical umbilical lines within the existing disturbance footprint of the Barrow Island pipeline right of way between North Whites	N/A	Conditions 3 and 6 of EPBC Reference: 2003/1294 (Ref. 6), EPBC Reference: 2008/4178 (Ref. 5) and EPBC Reference: 2011/5942 (Ref. 31) were varied. 7 August 2023

¹ At this stage CAPL has not progressed with the Fourth Train Expansion. If this expansion proceeds, this Plan would be updated. Document ID: GOR-COP-01286

Project Approval Stage	State	Commonwealth
Beach and the Gas Treatment Plant GTP.		

2.4 Purpose of this Plan

2.4.1 Requirement for this Plan

This Plan outlines the management of solid and liquid waste generated within Barrow Island and surrounding waters during the construction and operation of the Gorgon Gas Development.

2.4.1.1 State Environmental Approval Requirement

This Plan is required under Condition 30.1 of MS 800:

 Prior to commencement of construction of the terrestrial facilities listed in Condition 6.3, the Proponent shall submit a Solid and Liquid Waste Management Plan (this Plan) to the Minister that meets the objectives of Condition 30.2 and the requirements of Condition 30.3, unless otherwise allowed in Condition 30.1A, as determined by the [State] Minister to cover all solid wastes, waste from the wastewater treatment plant and other liquid waste.

This Plan is also required under Condition 16.1 of MS 769:

• Prior to commencement of construction of the Terrestrial Facilities listed in Condition 6.3, the Proponent shall submit a Solid and Liquid Waste Management Plan (this Plan) to the Minister that meets the objectives of Condition 16.2 and the requirements of Condition 16.3 as determined by the Minister to cover all solid wastes, waste from the wastewater treatment plant and other liquid waste.

2.4.1.2 Commonwealth Environmental Approval Requirement

This Plan satisfies the requirements of Condition 20.1 of EPBC Reference: 2003/1294 and 2008/4178.

 Prior to commencement of construction of the terrestrial facilities listed in Condition 5.2, the Proponent shall submit a Solid and Liquid Waste Management Plan (this Plan) to the Minister that meets the objectives of Condition 20.2 and the requirements of Condition 20.3, unless otherwise allowed in Condition 20.1A, as determined by the [Commonwealth] Minister to cover all solid wastes, waste from the wastewater treatment plant and other liquid waste.

2.4.2 Objectives of this Plan

The stated objectives of this Plan in Condition 30.2 of MS 800, Condition 16.1 of MS 769, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178 are to:

• Ensure all Proposal [action]-related solid and liquid wastes are either removed from Barrow Island or, if not, that all practicable means are used to ensure that waste disposal does not cause Material or Serious Environmental Harm to Barrow Island and its surrounding waters

The stated objectives of this Plan in Condition 30.2 of MS 800, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178 are to:

- Ensure discharges from any waste water treatment plant, reverse osmosis plant, or other process water are disposed of via deep well injection, unless otherwise authorised by the [Western Australian] Minister; and
- Ensure any deep well injection of Proposal [action]-related liquid wastes is conducted in a manner that will not cause Material or Serious Environmental Harm to subterranean fauna and their habitats on Barrow Island.

As per Condition 30.2 of MS 800, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178, approval of this Plan acts as the authorisation by the WA Minister for the Environment for discharges from any wastewater treatment plant (WWTP), reverse osmosis (RO) plant, or other process water not disposed of via deep well injection.

Management of waste from the Gorgon Gas Development on the mainland is out of scope of this Plan.

2.4.3 Contents of this Plan

Table 2-2 lists the State and Commonwealth Condition requirements of this Plan and the sections in this Plan that fulfil them.

Table 2-2: Condition Requirements Addressed in this Plan

Note: This requirements text is based on MS 800. Additional words in these requirements from MS 769 are contained in [square brackets]; additional words in the requirements from EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178 are contained in (parentheses), except when they are abbreviations.

Approval Condition Decision No.		Condition Requirement	Section in this Plan	
MS 800 30.3i		The Plan shall include a description of the facilities to be	Section 3	
EPBC Refs: 2003/1294 and 2008/4178	20.3i	provided and management measures to be implemented to ensure wastes are managed to meet the objectives set in this Condition.	Section 5	
MS 769	16.2			
MS 800	30.2i	Ensure all Proposal [action]-related solid and liquid wastes	Section 3.5	
EPBC Refs: 2003/1294 and 2008/4178	20.2i	are either removed from Barrow Island or, if not, that all practicable means are used to ensure that waste disposal does not cause Material or Serious Environmental Harm to Barrow Island and its surrounding waters	Section 5	
MS 769	16.1			
MS 800	30.2ii	Ensure discharges from any waste water treatment plant,	Section 3.5	
EPBC Refs: 2003/1294 and 2008/4178	20.2ii	everse osmosis plant, or other process water are disposed f via deep well injection, unless otherwise authorised by the Western Australian] Minister; and	Approval of this Plan	
MS 800	30.2iii	Ensure any deep well injection of Proposal [action]-related	Section 3.5.2	
EPBC Refs: 2003/1294 and 2008/4178	20.2iii	Iquid wastes is conducted in a manner that will not cause Material or Serious Environmental Harm to subterranean fauna and their habitats on Barrow Island.	Section 5.4	
MS 800	30.3ii	Performance Standards against which achievement of the Sec	Section 5	
EPBC Refs: 2003/1294 and 2008/4178	20.3ii	objectives of this Condition can be determined.		

Approval Decision	Condition No.	Condition Requirement	Section in this Plan
EPBC Refs: 2003/1294 and 2008/4178	3.2	All plans, reports, programs or systems (however described) re approval must include the following elements:	equired under this
EPBC Refs: 2003/1294 and 2008/4178	3.2.1	A description of the EPBC Act listed species and their habitat likely to be impacted by the components of the action which are the subject of that plan.	Section 4.4
EPBC Refs: 2003/1294 and 2008/4178	3.2.2	An assessment of the risk to these species from the components of the action the subject of that plan, relevant to that plan.	Section 5
EPBC Refs: 2003/1294 and 2008/4178	3.2.3	Details of management measures proposed in relation to these species if it is a requirement of the Condition requiring that plan.	Section 5 Appendix B
EPBC Refs: 2003/1294 and 2008/4178	3.2.5	Performance standards in relation to that species if it is a requirement of the Condition requiring that plan	Section 5
EPBC Refs: 2003/1294 and 2008/4178	3.2.A	To ensure that all plans required under this approval adopt best practice environmental management to protect EPBC listed species, the person taking the action must, by 30 June 2024, and again by the tenth anniversary of 30 June 2024 and each multiple of the tenth anniversary of 30 June 2024, submit to the department for the Minister's approval, a revised version of each plan required under the conditions attached to this approval. Each revised version of each plan so submitted must be prepared in accordance with the Environmental Management Plan Guidelines.	Section 6.9
EPBC Refs: 2003/1294 and 2008/4178	35[20]	Management plans, reports, systems, and programs referred to in the following conditions shall be made publicly available as determined by the Minister: 5.1, 5.3, 6.1, 7.1, 8.1, 10.1, 11.1, 12.1, 13.1, 14.2, 16.1, 17.1, 20.1, 22.1, 23.1, 23A.1, 24.3, 25.1, 26.3, 27.1, 28.1, 29.1, 30.1, 31.1, 32.1, 33.1 and 34.1.	Section 2.8
EPBC Refs: 2003/1294 and 2008/4178	22	Management plans, reports, systems and programs (however described) referred to in these conditions of approval must be made publicly available as determined by the Minister.	Section 2.8
EPBC Refs: 2003/1294 and 2008/4178	23	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Section 6.7
EPBC Refs: 2003/1294 and 2008/4178	24	The person taking the action must maintain accurate records of activities associated with or relevant to the above conditions of approval, and make them available on request by the Department. Such documents may be subject to audit by the Department and used to verify compliance with the conditions of approval.	Section 6.7
EPBC Refs: 2003/1294 and 2008/4178	25	If the person taking the action wishes to carry out an action otherwise than in accordance with any plan, report, program or system (however described) approved in relation to this approval, they may submit a revised plan, report, program or system (however described) for the Minister's approval. If the Minister approves a revised plan, report, program or system (however described) the person taking the action	Section 6.8

Approval	Condition	Condition Requirement	Section in this
Decision	No.		Plan
		must implement that plan, report, program or system (however described) instead of the plan, report, program or system (however described) as originally approved.	

Any matter specified in this Plan is relevant to the Gorgon Gas Development only if that matter relates to the specific activities or facilities associated with that particular development.

The sections in this Plan listed in Table 2-2 to meet the conditions of EPBC Reference: 2003/1294 and 2008/4178 shall be read and interpreted as only requiring implementation under EPBC Reference: 2003/1294 and 2008/4178 for managing the impacts of the Gorgon Gas Development on, or protecting, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) matters. The implementation of matters required only to meet the requirements of MS 800 and MS 769 are not the subject of the EPBC Reference: 2003/1294 and 2008/4178.

2.4.4 Related Ministerial approval plans – Terrestrial

This Plan should be read in conjunction with the Terrestrial and Subterranean Baseline State and Environmental Impact Report (TSBSEIR) (Ref. 16), Terrestrial and Subterranean Environmental Protection Plan (TSEPP) (Ref. 14) and the Terrestrial and Subterranean Environment Monitoring Program (TSEMP) (Ref. 21).

The baseline environmental state for areas potentially affected by construction and operation of terrestrial facilities of the Gorgon Gas Development is described in detail in the TSBSEIR, as required by Condition 6 of MS 800 and MS 769 and Condition 5 of EPBC Reference: 2003/1294 and 2008/4178. The TSBSEIR also provides the results of qualitative ecological risk assessment of impacts from the Terrestrial Facilities on the relevant ecological elements and defines the Terrestrial Disturbance Footprint (TDF).

In accordance with Condition 7.4 of MS 800 and MS 769 and Condition 6.4 of EPBC Reference: 2003/1294 and 2008/4178, the TSEPP outlines the management measures to reduce the adverse impacts from the construction and operation of the terrestrial facilities as far as practicable and to ensure that construction and operation of the terrestrial facilities do not cause Material or Serious Environmental Harm outside the Terrestrial Disturbance Footprint, including below the surface of the land.

In accordance with Condition 8 of MS 800 and MS 769 and Condition 7 of EPBC Reference: 2003/1294 and 2008/4178, the TSEMP outlines the ecological monitoring program to detect any Material or Serious Environmental Harm to the ecological elements outside the TDF. The TSEMP (Ref. 21) defines management trigger values, response actions and external reporting protocols for the ecological monitoring programs.

In addition to the above, the conditions set out in MS 800 and MS 769 and EPBC Reference: 2003/1294 and 2008/4178 require a number of specific subject matter plans which result in a number of instances where the objectives of this Plan are covered, or partly covered, by Plans required under separate conditions. Where these other Plans provide more detail on a specific aspect and the associated management measures to ensure that waste disposal does not cause Material or Serious Environmental Harm to Barrow Island and its surrounding waters, the Plans have been referred out to, rather than duplicating the content in this Plan.

Table 2-3 outlines Plans required under MS 800, MS 769 and EPBC Reference: 2003/1294 and 2008/4178 that also relate to managing impacts from the construction and operation of the terrestrial facilities.

Table 2-3: Summary of terrestrial-relate	d plans under other approval conditions
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Plan ¹	Condition	Plan Objective	Status
Terrestrial and Subterranean Baseline State and Environmental Impact Report (TSBSEIR; Ref. 16)	Condition 6 of MS 800 and MS 769 Condition 5 of EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178	 The purposes of the Report are to: i. Define and map the pre-development baseline state for the ecological elements within the areas that are expected to, or may be at risk of Material or Serious Environmental Harm due to any works associated with the terrestrial facilities listed in Condition 6.3; ii. Define and map the ecological elements within the Terrestrial Disturbance Footprint; and iii. Define and map the ecological elements of reference sites to be used as part of Condition 8, which are not at risk of Material or Serious Environmental Harm due to construction or operation of the terrestrial facilities listed in Condition 6.3. 	Approved ¹
Terrestrial and Subterranean Environmental Protection Plan (TSEPP; Ref. 14)	Condition 7 of MS 800 and MS 769 Condition 6 of EPBC Reference: 2003/1294 and 2008/4178	 The objectives of this Plan are: i. To reduce the adverse impacts from the construction and operation of the terrestrial facilities (within the Terrestrial Disturbance Footprint) as far as practicable; and ii. To ensure that construction and operation of the terrestrial facilities does not cause Material or Serious Environmental Harm outside and below the Terrestrial Disturbance Footprint 	Approved ¹
Terrestrial and Subterranean Environment Monitoring Program (TSEMP; Ref. 21)	Conditions 8 and 26 of MS 800 Condition 8 of MS 769 Conditions 7 and 19 of EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178	The objective of this Program is to establish a statistically valid ecological monitoring program to detect any Material or Serious Environmental Harm to the ecological elements outside the Terrestrial Disturbance Footprint and monitoring of any seepage of injected carbon dioxide to the surface or near surface environments, including those which may support subterranean fauna, including the Blind Gudgeon <i>Milyeringa veritas</i> ² .	Approved ¹
Terrestrial and Marine Quarantine Management System (QMS) (Ref. 12), including the Weed Hygiene Procedure (Ref. 49)	Condition 10 of MS 800 and MS 769 Condition 8 of EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178	 The overall aim of the QMS is that the Proponent shall not introduce or proliferate Non-indigenous Terrestrial Species and Marine Pests to or within Barrow Island or the water surrounding Barrow Island, as a consequence of the Proposal. The specific objectives of the QMS are: To prevent the introduction of Non-indigenous Terrestrial Species and Marine Pests; To detect Non-indigenous Terrestrial Species (including weed introduction and/or proliferation) and Marine Pests; To control and, unless otherwise determined by the Minister, eradicate detected Non- 	Approved

² Species currently identified as Barrow Cave Gudgeon (Milyeringa justitia); this species is undergoing an EPBC Act threatened listing assessment due 30 October 2024. It is currently listed as vulnerable under BC Act and CE under IUCN.

Plan ¹	Condition	Plan Objective	Status
		indigenous Terrestrial Species (including weeds) and Marine Pests; and iv. Mitigate adverse impacts of any control and eradication actions on indigenous species taken against detected Non-indigenous Terrestrial Species (including weeds) and Marine Pests.	
Fire Management Plan (Ref. 13)	Condition 12 of MS 800 Condition 11 of MS 769 Condition 9 of EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178	 The objectives of the Plan are to ensure that: i. The Proposal does not cause Material or Serious Environmental Harm outside the Terrestrial Disturbance Footprint due to fire; and ii. Fire risk reduction measures are built into the design of the facilities to protect the Proponent's assets from the impact from fire on Barrow Island. 	Approved ¹
Long-Term Marine Turtle Management Plan (Ref. 50)	Condition 16 of MS 800 Condition 12 of EPBC Reference: 2003/1294 and EPBC Reference: 2008/4178	 The objectives of the Plan are to: Address the long-term management of the marine turtles that utilise the east coast beaches and waters where there are Proposal related stressors to marine turtles. Establish baseline information on the populations of marine turtles that utilise the beaches adjacent to the east coast facilities identified in Conditions 6.3 and 14.3; Establish a monitoring program to measure and detect changes to the flatback turtle population in accordance with Condition 16.4ii; and Specify design features, management measures and operating controls to manage, and where practicable, avoid adverse impacts to marine turtles, with specific reference to reducing light and noise emissions as far as practicable. 	Approved ¹
Marine Environmental Quality Management Plan (MEQMP; Ref. 20)	Condition 23A.1 of MS 800	 The objectives of this Plan, as specified in MS 800, Condition 23A.2, are to: i. establish and spatially define a set of EVs, EQOs, and associated levels of ecological protection for marine waters of the Barrow Island Port area and any other areas of State Coastal Waters (with the exception of waters within gazetted Marine Conservation Reserves where Management Plans are in place and interim EVs, EQOs, and LEPs have been endorsed by the EPA), where there is potential for the operation of the Proposal to affect marine environmental quality; and ii. to protect the EVs, and achieve EQOs and associated levels of ecological protection for marine waters defined in Condition 23A.2 for the life of the Proposal. 	Approved
Decommissioning and Closure Plan	Condition 34 of MS 800 Condition 19 of MS 769 Condition 21 of EPBC Reference: 2003/1294	 The objectives of the plan are to ensure that: i. unless otherwise agreed with the Minister, the area occupied by the terrestrial (and marine) infrastructure facilities is returned to its undisturbed state; and 	Not yet developed

Plan ¹	Condition	Plan Objective	Status
	and EPBC Reference: 2008/4178	unless otherwise agreed with the Minister, the site does not pose a risk to wildlife or personnel greater than surrounding undisturbed areas.	

Notes:

1 In accordance with Condition 3.2A of EPBC Reference: 2003/1294 and 2008/4178 a revised version of this plan shall be submitted to DCCEEW for the Minister's approval, by 30 June 2024.

2.4.5 Other related approvals

In addition to the Ministerial conditions of approval under Statement No. 800 and Statement No. 769 and under EPBC Reference: 2003/1294, 2008/4178 and 2005/2184, there are a number of other approvals, such as Environment Plans and licences, that are related to the operation of the terrestrial facilities and waste management. Table 2-4 lists related approvals under other legislation, related to waste.

Table 2-4: Summary of terrestrial-related approvals under other legislation, related to waste

Approval	Legislative requirement	Scope	Status
Part V Licence L9102/2017/1	Environmental Protection Act 1986 (WA) (EP Act)	 Facilities: GTP, Waste Transfer Station (WTS), Wastewater Treatment Plants (WWTPs), Concrete Batching, Liquid Waste Facility and Disposal Wells. Discharges to air, surface water management, discharges to land (including stormwater and downhole disposal) and waste. Further details are provided in Section 2.5.1. 	In Force
Dangerous Goods Site Licence DGS021356	Dangerous Goods Safety Act 2004 (WA) Dangerous Goods (Storage and Handling of Non-explosives) Regulations 2007 (WA)	Storage and handling of dangerous goods.	In Force
Gorgon Project Carbon Dioxide Disposal Management Plan (Ref. 32)	Section 13 <i>Barrow</i> <i>Island Act 2003</i> (WA)	The Gorgon Joint Ventures (GJV) must comply with the conditions of the approval obtained under the <i>Barrow Island Act 2003</i> (WA), Section 13 Approval to Dispose of Carbon Dioxide by Injection into a Subsurface Formation, referred to as the Section 13 Approval. This approval is referred to as the Section 13 Approval from here on in. Condition 5 of the Section 13 Approval requires the GJV to comply with the approved CO ₂ Disposal Management Plan (approved by the Barrow Island Act Minister; Ref. 32). The CO ₂ Disposal Management Plan identifies subsurface risks; management options that may be applied to deal with these risks; and also contains a monitoring program for the injected CO ₂ .	Approved
Gorgon Project Carbon Dioxide Injection System Pipeline and Wells Operations Environment Management Plan (Ref. 23)	Petroleum Pipelines (Environment) Regulations 2012	Provides for the operation of the CO ₂ injection systems wells and pipeline. Further details are provided in Section 2.5.2.	Approved

Approval	Legislative requirement	Scope	Status
Gorgon Project Carbon Dioxide Injection System Well Maintenance Environment Plan (Ref. 24)	Petroleum Pipelines (Environment) Regulations 2012	Provides for the maintenance of the CO ₂ injection, pressure management wells and reservoir surveillance wells.	Approved
Gorgon Major Hazard Facility Safety Report (Ref. 51)	Dangerous Goods Safety Act 2004 (WA) and Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007 (WA)	Facilities: GTP, Utilities, Dangerous Goods Storage Areas. Aspects: Dangerous Goods, Fire and Gas, Loss of Containment, Emergency Response.	Approved

2.4.6 Plan Scope

This Plan applies to solid and liquid wastes generated during construction, infrastructure projects and operation of the Gorgon Gas Development. It meets the requirements and objectives as outlined in Sections 2.4.2 and 2.4.3 and minimises regulatory duplication, as far as practicable. Waste streams solely managed via other regulatory instruments as identified in Table 2-6, are out of scope of this Plan.

This Plan provides the framework for the storage, treatment and disposal of in scope wastes (Table 2-6) generated on Barrow Island and its surrounding waters. More specifically, this Plan provides:

- An overview of solid and liquid wastes generated during construction, infrastructure projects and operation (Section 3).
- A summary of the regulatory instruments that manage the different waste streams and what is in and out of scope for this Plan (Table 2-6).
- For wastes that are regulated by other approvals in addition to this Plan (primarily Part V Licence (Ref. 22)), the aspects regulated under each are identified (Sections 2.5.1 and 2.5.2).
- The Waste Disposal hierarchy applied to the different waste streams and options available (Section 3.4).
- Details of the in-scope wastes and the associated Risk Assessment, Management Measures and Environmental Performance Standards (Section 0).

In addition, during the life of the Gorgon Project, operational needs may vary which may result in new or changes to waste handling activities that occur at the different general work areas (as outlined in Section 3.4.6. Given this, this Plan has been prepared to provide the overarching framework for waste management and outlines the standard management measures that apply to both existing and any potential new waste handling activities.

2.5 Waste Management Regulatory Context

In addition to this Plan, there are a number of approvals that regulate waste management at the Gorgon Gas Development. These include regulation by WA Department of Water (DWER) and Department of Energy, Mines, Industry Regulation and Safety (DEMIRS). Both these Regulators require CAPL to provide annual reports

and immediate reporting depending on the event (e.g. non-compliance). A full list of Regulatory Instruments is provided in Table 2-6.

Measures to manage wastes that are being implemented to meet other approval requirements have been included in this Plan, where relevant to provide context. For example, the Part V licence includes several waste management conditions (refer to Section 2.5.1). These conditions where applicable are included in Section 5 to provide a holistic overview of management measures and are annotated with an asterisk '*'. Compliance against requirements from other approvals is out of scope of this Plan and remains under the relevant approval (e.g. Part V licence). This is important to avoid regulatory duplication and reporting overlap.

2.5.1 Environmental Protection Act 1986 – DWER

The Gorgon Gas Development is regulated under the *Environmental Protection Act 1986 (EP Act)* via the Part V Licence (L9102/2017/1). In July 2018 when the Part V Licence covering 3 LNG Trains (3 Train Licence) was issued, and in subsequent licence amendments, DWER has considered the identified management measures in this Plan before applying any additional conditions to the licence, to avoid duplication.

The licence has been amended a number of times since it was first issued in 2018. The licence will continue to be amended from time to time, as required. This may be due to new infrastructure or an activity that requires either a works approval or licence amendment to be issued by DWER before construction or operation commences (as per the DWER Guideline Industry Regulation Guide to Licensing) (Ref. 25).

Table 2-5 provides an overview of the Part V Licence conditions relevant to waste management as set out in the version issued 30 August 2021. This table is not intended to capture word-for-word the Licence conditions and is only included to provide supporting context. The most recent Licence is publicly available via DWER's website.

Infrastructure	Condition Summary
Waste Transfer Station (WTS)	 Equipment to be maintained in good working order Hazardous waste at the WTS is to be stored in enclosed vessels and clearly labelled. Throughput volumes for different waste types recorded monthly Hazardous liquid waste and Per- and polyfluoroalkyl substances (PFAS) impacted solid waste to be handled, consolidated, sorted and stored in bunded area
Liquid Waste Facility (LWF) Water Disposal Tank at GTP	 Equipment to be maintained in good working order Alarm system that activates in the event of high tank levels or overflows
Wastewater Treatment Plants (WWTP) (bridging and permanent)	 Equipment to be maintained in good working order Alarm system that activates in the event of high tank levels or overflows Inflow, outflow and water quality monitoring
Permanent Wastewater Disposal Wells (PWD)	 Equipment to be maintained in good working order High pressure alarm for the A annulus pressure Wellhead pressure, A and B annulus pressure and flowline pressure monitoring Volumetric flow and water quality monitoring
Temporary Wastewater Injection Plant (TWIP) Wells	Wellhead pressure and A annulus pressure monitoringVolumetric flow and water quality monitoring

Table 2-5: Overview of relevant Part V Licence waste conditions¹

1 Licence amendment date of 30 August 2021

In addition to the above conditions, during the original 3 Train Licence assessment, DWER recognised that wastes will be stored outside of the WTS and that the licence does not restrict storage of waste in other areas. As per Appendix 4 (Summary of applicant's comments on risk assessment and draft conditions) of the DWER Assessment Report (DWER file number DER2017/001839) that accompanied the 3 Train Licence issued in 2018, CAPL noted that the condition was specific to the WTS and 'does not capture storage of waste in other areas of the Premises (e.g. hazardous solid waste stored in skip bins at the GTP)'. The DWER's response 'noted that waste generated in other areas are stored in appropriate containers such as skip bins, bunds, etc. prior to relocation to the Waste Transfer Station for consolidation. The risk assessment has identified that the environmental risk is primarily associated with the bulk handling and storage of waste at the Waste Transfer Station and therefore regulatory controls have been applied to activities at the Waste Transfer Station. The licence does not restrict the storage of waste in other areas of the Premises, which is subject to the UDR [Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)] and general provisions of the EP Act regarding causing pollution and environmental harm'.

2.5.2 Petroleum Pipelines (Environment) Regulations 2012 (PP(E)R) – DEMIRS

DEMIRS under the Petroleum Pipelines (Environment) Regulations 2012, regulate certain Gorgon related activities via Environmental Management Plans (EMP). These include well drilling activities and the management and maintenance of the CO₂ Injection System injection and pressure management wells and activities at the Pressure Management Drill Centres that have a waste management component (Section 3.3.1.2). Currently there are the following in force EMPs for maintenance and operation activities:

- Carbon Dioxide Injection System Pipeline and Wells Operations Environment Management Plan (Ref. 23).
- Carbon Dioxide Injection System Well Maintenance Environment Plan (Ref. 24).

These EMPs are publicly available via the DEMIRS website.

2.6 Barrow Island Act 2003

The GJV must comply with the conditions of the approval obtained under the *Barrow Island Act 2003* (BWI Act) (WA), Section 13 Approval to Dispose of CO_2 by Injection into a Subsurface Formation. This approval is referred to as the Section 13 Approval from here on in. Condition 5 of the Section 13 Approval requires the GJV to comply with the approved CO_2 Disposal Management Plan (approved by the Barrow Island Act Minister; Ref. 32). The CO_2 Disposal Management Plan identifies subsurface risks; management options that may be applied to deal with these risks; and also contains a monitoring program for the injected CO_2 .

Table 2-6: Waste management activities and regulatory instruments

	Regulatory instrument			
Management activity/facility	SLWMP	GOR Part V Licence	Other approval	Additional context
Permanent and Bridging RO facilities and brine discharge	Yes	No	Reverse Osmosis Brine Disposal via Ocean Outfall Environmental Management and Monitoring Plan (ROBDOOEMMP) (Ref. 10) Marine Environmental Quality Management Plan (MEQMP; Ref. 20)	ROBDOOEMMP (Ref. 10) was superseded by this Plan and the Marine Environmental Quality Management Plan (MEQMP; Ref. 20). This Plan includes reference to the RO Plants to provide a holistic overview. However, the majority of Management Measures for the RO Plants are within the MEQMP and are therefore not duplicated in this Plan. The MEQMP includes design requirements of the outfall and inline RO Plant monitoring. It also includes marine environment monitoring for effects of waste discharges and parameters for water and sediment quality. Monitoring against specific Environmental Quality Criteria and adaptive management actions are also defined in the MEQMP.
Bridging and Permanent Wastewater Treatment Plants	Yes	Yes	N/A	Part V Licence (L9102/2017/1) includes conditions for the WWTPs. Refer to Section 5.3 for details.
Liquid Waste Facility, Temporary Wastewater Injection Plant (TWIP) and the Permanent Wastewater Disposal (PWD) Wells	Yes	Yes	N/A	This Plan includes the Disposal Water Tanks, PWD and TWIP downhole disposal wells. Part V Licence (L9102/2017/1) includes conditions for the Disposal Water Tanks and downhole disposal wells. Refer to Section 5.4 for details.
Waste Transfer Station	Yes	Yes	N/A	Part V Licence (L9102/2017/1) includes conditions for the WTS. Refer to Section 5.2.3.4 for details.
Non-hazardous and hazardous materials storage, handling and transport	Yes	Yes	N/A	In addition to the WTS, waste is stored at temporary locations (e.g. work areas) prior to disposal off Barrow Island. Activities include non-hazardous and hazardous materials storage, handling (e.g. drying of waste, decanting excess water) and transport of waste.
Drilling activities and CO ₂ Pressure Management Drill Centres Solids Removal Packages	Yes	No	Petroleum Pipelines (Environment) Regulations 2012 (PP(E)R) and applicable Environmental Management Plans (e.g. Ref. 23)	

	Regulatory instrument			
Management activity/facility	SLWMP	GOR Part V Licence	Other approval	Additional context
Clearing and earthworks and movement of soil.	No	No	Terrestrial and Subterranean Environmental Protection Plan (TSEPP) (Ref. 14)	If through clearing and earthworks soil is determined to be contaminated and not viable for reuse it is treated as a hazardous waste and subject to the management measures in this Plan.
Stormwater drainage system at both the GTP and remote facilities. This includes all drainage pipework, manholes, the Stormwater Holding Pond (SWHP) and the Oily Water Sump (OWS) prior to downhole disposal or transport off site.	No	Yes	Terrestrial and Subterranean Environmental Protection Plan (TSEPP) (Ref. 14)	Stormwater drainage system has been designed as a tiered/segregated system depending on the level of contamination or origin of the intercepted surface water. There are four classes of drainage as per the design i.e. Class 1 (contaminated stormwater); Class 2 (potentially contaminated stormwater); Class 3 (uncontaminated stormwater) and Class 4 (natural drainage channels). The Class 1 and 2 drainage systems also includes the pipework, SWHP and OWS which are in scope for the TSEPP and out of scope for this Plan.
Quarantine-risk material and the discharge of ballast water from marine vessels	No	No	Terrestrial and Marine Quarantine Management System (Ref. 12)	
Sea dumping for disposal of waste e.g. maintenance dredging spoil ⁵	No	No	<i>Environment Protection (Sea Dumping) Act 1981</i> and associated Sea Dumping Permit	Sea dumping may be considered for disposal of waste such as from maintenance dredging spoil and for other wastes if the other options in the Waste Hierarchy (as outlined in Section 3.4) are not available. The <i>Environment Protection (Sea Dumping) Act 1981</i> (Cth) requires Chevron Australia to consult with relevant authorities regarding approval requirements prior to any sea dumping activities.
Marine vessel discharges including sewage and putrescible waste	Yes	No	Protection of the Sea (Prevention of Pollution from Ships) Act 1983 MARPOL 73/78	
Construction dredge spoil	No	N/A	Dredging and Spoil Disposal Management and Monitoring Plan (DSDMP) (Ref. 11)	DSDMP (Ref. 11) and associated Conditions were only applicable during the foundation Project design and construction phase and are considered closed.
Barrow Island Joint Venture Project (WA Oil) waste management activities and facilities	No	No	Barrow Island Joint Venture Environment Plan (Ref. 26)	This Plan does not apply to WA Oil (WAO) facilities (including the BWI Airport) and activities undertaken on Barrow Island as part of WA Oil. As identified in Section 2.7.1 there may be occasions where Gorgon wastes are disposed of at WA Oil facilities (such as the WAO Wellwork

	Regulatory instrument			
Management activity/facility	SLWMP	GOR Part V Licence	Other approval	Additional context
			Barrow Island Oil and Gas Facility Part V Licence (L4467/1972/14).	Washdown Facility). Any disposal at WA Oil facilities will be undertaken in accordance with the relevant WAO
				approval. As per the Gorgon Part V licence (L9102/2017/1), the WTS and downhole disposal wells are approved to accept wastes from WAO.

2.7 Land Management

2.7.1 Barrow Island Joint Venture Project (WA Oil)

CAPL is the proponent and nominated operator of the Barrow Island oilfield (known as WA Oil) on behalf of the Barrow Island Joint Venture partners.

This Plan does not apply to WA Oil facilities (including the BWI Airport) and activities undertaken on Barrow Island as part of WA Oil. As per the Gorgon Part V Licence (L9102/2017/1), the WTS and downhole disposal wells are approved to accept wastes from WAO.

As identified in 2.7.1, there may be occasions where Gorgon wastes are disposed of at the WA Oil facilities (such as the WAO Wellwork Washdown Facility). Any disposal at WA Oil facilities will be undertaken in accordance with the relevant WAO approval.

2.7.2 Barrow Island Nature Reserve

Under the *Conservation and Land Management Act 1984* (WA) Barrow Island is designated as a Class A nature reserve (Reserve 11648) for the purposes of 'Conservation of Flora and Fauna' and covers an area of 23,483 ha. The BWI Act and related State Agreement allows for the implementation of the Gorgon Gas Development and makes provision for land on Barrow Island to be used for gas processing purposes.

2.7.3 Barrow Island Marine Park

Except for the area defined by the Port of Barrow Island, the waters around BWI are part of the Montebello/Barrow Island Marine Conservation Reserve. Most of the conservation area is zoned as a Marine Management Area, inclusive of the Western Barrow Island Sanctuary Zone. The conservation reserves also comprise the Barrow Island Marine Park and Bandicoot Bay Conservation Area, located adjacent to the west and south coasts of Barrow Island, respectively. The BWI marine area is listed on both the State Register of Heritage Places and the Commonwealth Register of the National Estate.

A large area off the east coast of BWI is a designated port, the Port of BWI, which was created under the *Shipping and Pilotage Act 1967* (WA) and is vested under the *Marine and Harbours Act 1981* (WA) in the Minister for Transport. The marine facilities on the eastern side of BWI are contained entirely within the Port area.

2.8 Stakeholder consultation

Regular consultation with stakeholders has been undertaken by CAPL throughout the development of the environmental impact assessment management documentation for the Gorgon Gas Development and Jansz Feed Gas Pipeline and since the commencement of operations.

Stakeholder consultation has included engagement with the community, government departments, industry operators, and contractors to CAPL via planning workshops, risk assessments, meetings, teleconferences, and the Public Environmental Review (PER) (Ref. 52), Environmental Impact Statement (EIS)/ Environmental Review and Management Programme (ERMP) (Ref. 18) formal approval processes.

2.8.1 Ongoing consultation

CAPL will continue to provide updates regarding Gorgon Operations (as required) at regular informal interface meetings with these stakeholders.

DCCEEW and DWER continue to receive annual updates on Gorgon status and environmental performance via existing regulatory defined avenues such as annual performance reporting, annual compliance reporting and incident notifications.

For other interested stakeholders, annual performance reports and annual compliance reports are publicly available on the CAPL website

(https://www.chevronaustralia.com/our-businesses/gorgon/environmentalapprovals). In accordance with Condition 35 of MS800, Condition 20 of MS769 and Condition 22 of EPBC Reference: 2003/1294 and 2008/4178 the approved SLWMP will be made publicly available on the CAPL website.

A Memorandum of Understanding has been established between the WA Department of Biodiversity, Conservation and Attractions (DBCA) and CAPL formalising communication arrangements, ensuring DBCA are kept informed of Gorgon related activities.

3 Waste management overview

3.1 Nature of current and future activities

The Gorgon Gas Development transitioned from Construction Phase to Operations Phase in 2016.

Whilst in Operations Phase, various types of activities will continue to occur, including, but not limited to:

- ongoing operation of terrestrial facilities
- major maintenance / turnaround activities
- construction and infrastructure projects, ranging from minor technical projects through to major capital projects
- rehabilitation of areas that are not required for the future construction and operation of the Proposal.

3.2 Waste streams overview

Various wastes are generated during the Operation Phase of the Gorgon Gas Development. These wastes can be broadly classified under the waste stream categories of general waste, recyclable waste, solid and liquid hazardous waste. In addition, the waste management activities can be grouped into the following – storage and handling (including transport); treatment facilities; and disposal on Barrow Island. Further details are provided below.

As identified in Section 2.4.6 and Table 2-6, some wastes fall outside the scope of this Plan and are managed under other Regulatory instruments and are not discussed further in this Plan.

The below are examples of the different waste streams generated during the different phases of the Gorgon Gas Development, from both planned and unplanned events. Definitions of the main waste groupings are included in Table 7-1.

3.2.1 General waste – Solid

These include, but are not limited to:

- recyclables
- putrescible
- concrete
- drill cuttings
- tyres
- e-waste

3.2.2 General waste – Liquid

These include, but are not limited to:

- RO brine
- hydrotest water
- seawater from emergency fire system

3.2.3 Hazardous waste (hazardous materials) – Solid¹

These include, but are not limited to:

- spent products e.g. catalyst
- filters e.g. mercury impacted
- soil impacted with contaminants e.g. PFAS, mercury or Naturally Occurring Radioactive Materials (NORM)
- biological sludge
- incident or emergency response generated solids e.g. contaminated soil, spill pads.
- 1 As per solid waste definition in Table 7-1.

3.2.4 Hazardous Waste (Hazardous Materials) – Liquid²

These include, but are not limited to:

- produced water
- drilling fluids
- Wastewater impacted with contaminants e.g. hydrocarbon, mercury
- elemental mercury
- chemical cleaning fluids
- wash water e.g. from filter flushing or vessel washing
- cement (wet) waste from truck/agitator washout
- spent chemicals e.g. amine
- effluent from WWTPs
- sediments and sludges impacted with contaminants e.g. PFAS, mercury or NORM
- process solids e.g. vessel sludges
- incident or emergency response generated liquids e.g. fire fighting foams
- 2 As per liquid waste definition in Table 7-1.

3.3 Waste management activities and facilities overview

There are different waste activities and facilities that support the Gorgon Project and are included in this Plan as shown in Figure 3-1 and grouped as per the following:

- Waste Storage and Handling Facilities:
- General work area locations where waste is either generated, handled and/or temporarily stored, generally as a result of the 'primary' activity undertaken.
- Dedicated waste handling and storage areas or facilities where the primary activity is waste handling and/or storage.
 - Waste Treatment Facilities.
 - Disposal on Barrow Island.

Wastes are also transported at different stages from the point of generation to storage or treatment facilities pending either reuse on site, on island disposal or off island disposal.

Waste management facilities are further described below.

3.3.1 Waste storage and handling facilities (general work areas)

These include areas where waste is generated, handled (including drying), transferred and/or temporarily stored, generally as a result of a primary activity. These areas include, but are not limited to the GTP; CO₂ Pressure Management Drill Centres (DC); Bridging and General Utility Areas; Dangerous Goods (DG) Storage Yards; Mercury Management Facilities, Concrete Batching Plant and Evaporation Ponds. Waste storage is also present at other Associated Terrestrial Infrastructure (e.g. Butler Park (Accommodation Village)).

3.3.1.1 Gas Treatment Plant

Routine operation or maintenance (including Turnaround events) activities result in the generation of wastes within the GTP. These include general and hazardous solid or liquid wastes. For example, liquid wastes generated during draining of vessels or chemical cleaning during routine maintenance activities. Waste generated are temporarily stored in the appropriate receptable at the work location and then transferred to the relevant location for treatment/ disposal or transport off island.

3.3.1.2 CO₂ pressure management drill centres

The CO_2 Injection System is designed to dispose by underground injection wells the reservoir carbon dioxide that is removed during routine gas processing operations at the GTP. Injection of CO_2 is into the Dupuy formation and pressure within this formation is currently managed via pressure management wells located at Drill Centres.

Solids removal packages are currently installed at the Pressure Management Drill Centres. Each package consists of a hydro-cyclone unit and bin, a filtration unit and a wastewater storage tank. Further details on the on the solids removal packages are provided in Carbon Dioxide Injection System Pipeline and Wells Operations Environment Management Plan (Ref. 23).

As per the approved Carbon Dioxide Injection System Pressure Management Wells Drilling and Construction Environment Plan (Ref. 27), an additional pressure management water injection well is being installed at the existing DCs along with new water processing facilities (solids removal, oil removal). Depending on operational requirements, there may be a need to install additional DCs in the future. Such activities will be subject to the required approvals.

In addition, to support these drilling activities there is a Liquid Waste Facility to process spent drilling fluids and reduce waste volumes being sent off-island. Further details are provided in Section 3.3.2.2.

3.3.1.3 Bridging and general utility areas

These areas include the dedicated waste facilities of the WWTP and RO Plants, along with general work area waste handling activities (i.e. where waste is generated and/ or handled (including drying), transferred and/or temporarily stored).

The ROBDOOEMMP (Ref. 10) was superseded by this Plan and the MEQMP (Ref. 20). This Plan includes reference to the RO Plants to provide a holistic overview. However, the majority of Management Measures for the RO Plants are within the MEQMP and are therefore not duplicated in this Plan. The RO Plants (bridging and permanent) sea water intakes are located either at the Materials Offloading Facility or in close proximity to it. The Plants produce freshwater and discharge RO brine and backwash water to dedicated marine outfalls.

The MEQMP includes design requirements of the marine outfall and inline monitoring of the RO Plants. It also includes marine environment monitoring for potential effects of waste discharges on water and sediment quality. Monitoring against specific Environmental Quality Criteria and adaptive management actions are also defined in the MEQMP (Ref. 20).

Further details on the WWTPs and are included in Section 3.3.3.2.

3.3.1.4 Dangerous goods yards

These facilities are dedicated to the storage of Dangerous Goods outside of the WTS. In some instances hazardous wastes classified as Dangerous Goods or general hazardous wastes are stored in these facilities pending off island disposal. These facilities are HDPE-lined and bunded and meet the requirements of the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007.

3.3.1.5 Mercury management facilities

These facilities provide a location for the cleaning, inspection, repair, or preparation for transportation offsite, of primarily mercury impacted process equipment. The facilities include washdown bays and hardstand laydown areas. Through the cleaning processes, hazardous solid and liquid wastes are generated and stored at the facilities pending off-site disposal. Depending on operational requirements, other hazardous wastes may be generated, handled or stored at these facilities.

3.3.1.6 Concrete batching plant

The facility is located on a concrete hardstand and includes infrastructure required for concrete batching. This includes collection sumps and ponds that settle suspended solids from wastewater streams which is collected in a recycled water tank for reuse in concrete batching and truck washout. Collected sediment from the ponds and sumps is either collected for waste disposal off-island, or assessed for re-use in accordance with Gorgon Operations Waste Re-use and Disposal on Barrow Island: Environmental Assessment Procedure (Ref. 28).

3.3.2 Waste storage and handling facilities (dedicated facilities)

These are primary waste facilities dedicated to the storage and handling of waste and include, but are not limited to the WTS; LWFs; evaporation ponds; and concrete stockpile.

3.3.2.1 Waste Transfer Station

WTS receives, stores, and handles solid and liquid wastes generated by the Gorgon Project prior to offsite disposal. The WTS is subject to the Part V licence (L9102/2017/1) that includes the conditions outlined in Section 2.5.1 and authorises acceptance of waste from WA Oil. More specifically, the WTS receives general waste such as plastics, paper and cardboard, aluminium cans, and putrescible wastes (such as food scraps) generated on the Premises. Hazardous wastes including hydrocarbons and chemicals are also received.

Wastes are transferred to the WTS for consolidation and/or storage prior to removal from the island for disposal at appropriate DWER Licensed facilities on the mainland. Putrescible wastes are either refrigerated, compacted or processed through rotary food waste dryers to reduce odour and volume. Details on the food dryers are outlined in Section 3.3.3.3. Processed waste is transferred into sealed containers pending disposal. Hazardous wastes are also segregated where the wastes are incompatible.

Waste is generally segregated at source prior to transfer to the WTS for efficient processing in the following waste reception areas:

- General sorting and bin loading;
- Putrescible waste sorting and compacting area;
- Waste sorting and baling area; and
- Dangerous goods area.

3.3.2.2 Liquid waste facilities

These facilities are located at the GTP and near the TWIP wells.

As per the Part V Licence, Schedule 2: Primary Activities, Table 12: 'Infrastructure and Equipment', the LWF at the LNG Plant includes the following: Disposal Water Tanks at the LNG Plant; PWD wells and TWIP. The PWD wells and TWIP are discussed further in Section 3.4.2.

The LWF at the LNG Plant includes the Disposal Water Tanks, which are subject to the conditions outlined in Section 2.5.1. The LWF at the LNG Plant stores liquid wastes including, but not limited to - contaminated stormwater, wastewater, effluent, process water and produced water in the Disposal Water Tanks prior to disposal downhole via the PWD wells. The liquid wastes are dominated by produced water from the Gorgon and Jansz gas fields.

The drilling LWF (i.e. dewatering facility) supports management of wastes from the CO_2 injection system Drill Centres as outlined in Section 3.3.1.2. This facility is currently subject to Works Approval W6772/2023/1 issued by DWER and once operational will separate the suspended solids and liquid within the drilling waste fluid for more efficient downhole disposal.

Drilling fluids from the Drill Centres are transported to the LWF via vacuum tank and stored in waste tanks. Pre-mixed coagulating or flocculating agents will be used to aggregate solid particulates which are then removed from the fluid via a highspeed decanting centrifuge. This treated water is then disposed of via deep well injection.

The Class 1 pipelines which transport the wastewater to the downhole disposal wells are excluded from the scope of this Plan (as per Table 2-6) and are in scope for the TSEPP (Ref. 14).

3.3.2.3 Evaporation ponds

From time to time due to operational requirements or infrastructure Projects, purpose built facilities, such as evaporation ponds are required to store and dry out wastes to ensure the most effective management prior to disposal off island.

For example, an evaporation pond could be installed to primarily support the management of drilling wastes (e.g. drilling fluids) from the CO₂ injection drill centres, as outlined in Section . This evaporation pond will be subject to any approvals or licenses required under Part V of the EP Act.

3.3.2.4 Concrete storage areas

A separate location at the GTP is used for the storage of waste concrete. This storage is regulated under the Part V Licence with an approved maximum annual capacity of 240,000 tonnes. Depending on future operational requirements, there may be a need for additional concrete storage areas.

3.3.3 Waste treatment facilities

The facilities include primary waste facilities, which are dedicated to the treatment of solid and/or liquid waste on Barrow Island and surrounding waters.

3.3.3.1 Oil/water separators

Oily water treatment systems such as oil/water separators and skimming devices treat various sources of hydrocarbon-contaminated water (including hydrocarbon-contaminated stormwater) on Barrow Island. For example, these are located within the LWF and WTS (Section 3.3.2).

3.3.3.2 Wastewater treatment plants

Wastewater treatment plants within the Bridging and Permanent Utilities Areas treat effluent. There are currently Bridging and Permanent WWTPs that are subject to the Part V licence (L9102/2017/1) which includes the conditions outlined in Section 2.5.1. An additional WWTP is subject to Works Approval W6772/2023/1.

The WWTPs receive wastewater from within the GTP, accommodation and other supporting facilities. Raw effluent is piped from Flow Equalisation Tanks to the WWTP where the effluent is screened and solids collected in screening bins. Effluent is then processed through a series of process tanks and transferred via pipeline to the Disposal Water Tanks at the GTP for disposal via the PWD wells or transported to the TWIP for disposal.

3.3.3.3 Food waste dryers

Food waste dryers treat putrescible solid wastes which are generated from various sources across Barrow Island. No hazardous materials are treated in the food waste dryers. Food waste dryers are located at the WTS (Section 3.3.2.1). Treated waste from these dryers is packaged and disposed off-island.

3.4 Waste disposal options and facilities

Appropriate waste management is supported through the hierarchical application of reuse, recycling/recovery, treatment, and acceptable disposal practices. Where practicable, the following waste disposal hierarchy is adopted for infrastructure projects and operation of the Gorgon Gas Development:

- 1. Re-use and recycling
- 2. Disposal via deep well injection
- 3. Disposal to a third-party facility
- 4. Disposal to the terrestrial or marine environment.

Implementation of the waste disposal hierarchy allows for a holistic approach to environmental management and resource efficiency. Re-use and recycling, and deep well injection are preferred over removing waste off Barrow Island given the environmental footprint of removal activities may exceed the environmental benefit of removing it.

3.4.1 Waste re-use and recycling on Barrow Island

In accordance with the Waste Hierarchy outlined in Section 3.4, re-using and recycling solid and liquid waste is preferred over other disposal options, where practicable and where environmentally acceptable.

Re-use is assessed in accordance with the Waste Re-use and Disposal on Barrow Island: Environmental Assessment Procedure (Ref. 28). This assessment procedure is to minimise the potential environmental risks to as low as reasonably practicable (ALARP) and to ensure no Material or Serious Environmental Harm will result from the re-use or recycling of solid and liquid wastes.

This assessment considers factors such as:

- characteristics of the waste and the receiving environment
- potential impacts to fauna, flora, and fauna habitats and matters of NES
- potential run-off and sedimentation impacts, such as erosion.

This assessment does not negate the requirement to obtain other approvals where required for reuse or recycling of wastes.

3.4.2 Downhole (deep well) injection

Liquid wastes are disposed of via downhole (deep well) injection (either PWD or TWIP), in accordance with the Waste Hierarchy. The PWD wells are located ~630 m south of the GTP and the TWIP wells are located ~6 km west of the GTP. For all wells, disposal is through the deep injection wells into the isolated Upper Barrow Group, located 1,000 m plus below ground.

At the LWF at the GTP, various liquid waste streams are combined in the Disposal Water Tanks prior to disposal via the PWD wells. The major source of wastewater is produced water from the Gorgon and Jansz/Io gas fields. Other wastes include process water streams originating from within the GTP (e.g. wash down water, chemical fluid wastes from cleaning), permanent WWTP and contaminated stormwater from the stormwater drainage network. Treated effluent from the permanent WWTP is transferred to the Disposal Water Tanks. The Part V Licence DWER Decision Report (Ref. 53) also allows for the disposal of treated effluent from the permanent WWTP to the TWIP, should this be required.

Given that produced water accounts for the majority of waste disposed via the PWD wells, the characteristics of the comingled liquid waste is expected to be dominated by the produced water characteristics. The Part V Licence DWER Decision Report (Ref. 53) provides further examples of anticipated liquid waste streams for downhole disposal.

Treated sewage from the bridging WWTP is also disposed of via downhole injection. The primary injection point for the disposal of treated sewage is the TWIP, however it may also be discharged via the PWD wells, as per the Part V Licence DWER Decision Report (Ref. 53).

In addition, as per the Part V Licence DWER Decision Report (Ref. 53) untreated wastewater from the Bridging and Permanent WWTPs may also be injected downhole in instances where the plants experience upset conditions or breakdown. These events are expected to be infrequent and over short periods and should not significantly alter the composition of waste disposed of downhole.

The PWD and TWIP wells are both subject to the Part V licence (L9102/2017/1) that includes the conditions outlined in Section 2.5.1. The disposal criteria for the PWD wells are based on the specified targets for water quality parameters outlined within the Part V

Licence DWER Decision Report (Ref. 53). These targets are for TPH - 200 ppm, pH - 6 to 9 and TSS - 100 ppm.

In addition, CAPL has an internal Drainage Discharge Approval (DDA) process to support management of the drainage system and downhole disposal, which requires its employees and contractors to comply with. Prior to disposal of non routine liquid wastes (e.g. wash down water, chemical fluid wastes from cleaning) via the PWD deep wells, sampling of the waste occurs to confirm it meets the downhole disposal criteria. Wastewater that doesn't meet the criteria is deemed unsuitable for downhole disposal and disposed off-island at a CAPL third party approved and DWER licensed facility.

The DDA process ensures that the different classes of stormwater and wastewater are managed and disposed of appropriately, including the option of downhole disposal. The process involves:

- completing a preliminary water quality assessment to determine potential contamination and contaminants that might be present
- sampling and analysis where required to determine the composition of the liquid waste
- determining the appropriate disposal pathway (e.g. disposal via the PWD wells, or off island).

3.4.3 Marine vessel discharges

Discharge of domestic vessel waste, including sewage and putrescibles, occurs in accordance with the requirements of MARPOL 73/78 (Ref. 16) as amended, the *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and Barrow Island Terminal Regulations Manual. Chevron Australia, Perth, Western Australia. (Ref. 62), as amended.

Greywater is not regulated under MARPOL 73/78, so untreated greywater is discharged from vessels, as per standard marine practice. Marine vessels operating within the waters surrounding Barrow Island may also discharge brine from vessel RO units to the marine environment. Sea water is used for engine cooling and is discharged immediately after use.

Hydrocarbon-contaminated drainage from decks and work areas is managed in accordance with MARPOL 73/78 (Ref. 16), or is stored for onshore disposal. There are no reception facilities for receiving oily waste, residues of liquid substances, sewage, garbage, exhaust gas cleaning residues, and ozone-depleting substances from vessels at the Port of Barrow Island LNG and condensate export berths.

Given the above and regulation under MARPOL 73/78, discharges from marine vessels are not assessed further.

3.4.4 Waste disposal at third-party facilities

In line with the Waste Hierarchy, solid and liquid waste streams that are not re-used, recycled, or disposed of via deep well injection (as described in Sections 3.4.1 and 3.4.2), are sent to a CAPL third party approved and DWER licensed facility off Barrow Island for recycling, treatment, or disposal, where practicable. Management of wastes at third party facilities is out of scope of this Plan. If it is not practicable to send waste off Barrow Island, then such waste may be discharged to the terrestrial environment or into the marine environment pending environmental acceptability.

3.4.5 Discharge to terrestrial and marine environment

Where it is not practicable to re-use, dispose of via deep well injection facilities, or transport off island to a third-party facility and disposal is not managed under Part V of the EP Act or another regulatory instrument, the decision on whether and how to discharge solid or liquid waste to the terrestrial or marine environment is assessed in accordance with this Plan. As an example, if there is an operational need to consider discharge of treated effluent from WWTPs to the marine environment (as was authorised in Rev 1 of this Plan for the Production Camp WWTP, which is no longer present on site), an environmental assessment in accordance with this Plan (outlined below) on the potential discharge would be completed.

An environmental assessment is conducted to minimise potential environmental risks to ALARP and to ensure no pollution or Material or Serious Environmental Harm is caused. The assessment is completed in accordance with the Waste Re-use and Disposal on Barrow Island: Environmental Assessment Procedure (Ref. 28) and considers factors such as the:

- characteristics of the waste and receiving environment
- potential impacts to fauna, flora, and fauna habitats and matters of NES
- potential run-off and sedimentation impacts, such as erosion
- selection of disposal methods and locations must consider sensitive receptors and aim to discharge at deep, well-flushed offshore locations.
- disposal of liquid waste in marine environment at the same location for disposal of other liquid wastes, where practicable.

3.4.6 Other waste activities

In addition, during the life of the Gorgon Project, operational needs may change which may result in new or changes to waste handling activities that occur at the different work areas (as outlined in Section 3.3). Given this, this Plan has been prepared to provide the overarching framework for waste management and outlines the standard management measures that apply to both existing and any potential new waste handling activities.



Figure 3-1: Indicative Location of Gorgon Gas Development Waste Management Facilities on Barrow Island

3.5 Terrestrial disturbance footprint

In accordance with Condition 6.4 of MS 800 and MS 769 and Condition 5.4 of EPBC Reference: 2003/1294 and 2008/4178, the TDF is defined in Section 6 of the Terrestrial and Subterranean Baseline State and Environment Impact Report (Ref. 16) (TSBSEIR), as amended from time to time. The TDF includes the Gorgon Gas Development and Jansz Feed Gas Pipeline Footprints and a zone beyond them that contains the area that may be disturbed by construction or operations activities associated with the Terrestrial Facilities. The TSBSEIR is the source document for the TDF and provides the methodology for delineating the TDF and the resulting dimensions. Given the TSBSEIR needs to remain the primary information source for the TDF, details are not duplicated in this Plan. To provide context for this Plan, Figure 3-2 is included. These figures are indicative only of the TDF. In the case of any inconsistencies between the TSEPP (Ref. 14) and TSBSEIR, the TSBSEIR takes precedence.



Figure 3-2: Gorgon Indicative TDF
4 Environmental risk assessment methodology

The risk assessment for this Plan was undertaken in accordance with the ABU OE Risk Management Process (Ref. 33) using Chevron Corporation's Integrated Risk Prioritization Matrix (Appendix A). This approach generally aligns with the processes outlined in ISO 31000:2018 Risk Management – Principles and Guidelines (Ref. 54) and Handbook 203:2012 Managing Environment-related Risk (Ref. 34).

Numerous risk assessments have been undertaken for the scope of this Plan, from initial environmental assessment and approval stage through to current operations. The risk assessment was revised and revalidated during the current revision of this Plan, considering the nature of current and future activities. The risk assessment process and evaluation involved numerous consultations and workshops with environmental, health, safety, project and engineering personnel.

Risks considered and covered in this Plan were identified and informed by:

- experience gained during previous stages of the Project
- mapping and monitoring studies undertaken for the Project
- review of historical significant environmental incidents
- expertise and experience of CAPL personnel
- stakeholder engagement (Section 2.8).

RISK: The ABU OE Risk Management Process (Ref. 33) defines risk as a measure of human injury or illness, environmental damage, or business impact in terms of both the likelihood and the magnitude of the injury, damage, or impact. A simplified version of this relationship expresses risk as the product of the likelihood and the consequences.

4.1 Identification of relevant environmental aspects

ASPECT: CAPL defines environmental aspects as the elements of Chevron's activities that interact with the environment. These interactions may result in direct or indirect environmental, community health, and/or social impacts.

In summary, given this Plan is dedicated to solid and liquid waste management, the environmental aspect is focused on 'Solid and Liquid Waste'. Further details are provided in Section 5.1.

The term 'environmental aspect' is considered analogous to the term 'threat' which is referenced in the DCCEEW Environmental Management Plan Guidelines (Ref. 55).

4.2 Identification of relevant environmental hazards

HAZARD: The ABU OE Risk Management Process (Ref. 33) defines a hazard as a chemical, biological or physical condition with the potential for causing harm to people, environment or property.

The aspects identified were used in the scoping process to determine environmental hazards associated with the construction, infrastructure projects and operation of the terrestrial facilities that had the potential to cause environmental damage. This information was then used to undertake the environmental risk assessment. Evaluation of consequence and risk

4.3 Evaluation of consequence and risk

CONSEQUENCE: The ABU OE Risk Management Process (Ref. 33) defines consequence as the possible effect of an event, accident scenario, or ongoing condition

in terms of human impact, environmental impact, or economic impact to the company or stakeholders.

After identifying the potential hazards, the potential consequences were assessed and evaluated. Consequence is defined using Chevron Corporation's Integrated Risk Prioritization Matrix (Appendix A). The level of consequence is determined by the potential level of impact based on:

- the spatial scale or extent of potential hazards of the environmental aspect within the receiving environment
- the nature of the receiving environment (within the spatial extent), including proximity to sensitive receptors, relative importance, and sensitivity or resilience to change
- the impact mechanisms (cause and effect) of the environmental hazard within the receiving environment (e.g. persistence, toxicity, mobility, bioaccumulation potential)
- the duration and frequency of potential effects and time for recovery
- the potential degree of change relative to the existing environment or to criteria of acceptability.

The consequence definitions are summarised in the Integrated Risk Prioritization Matrix (Appendix A).

The term 'consequence' is considered analogous to the term 'impact' which is referenced in the DCCEEW Environmental Management Plan Guidelines (Ref. 55).

During the risk assessment sessions, the worst-case credible scenario was used as the basis.

4.3.1 Quantification of the level of risk

The Integrated Risk Prioritization Matrix (Appendix A) was then applied to quantify the level of risk. This matrix uses consequence and likelihood rankings of 1 to 6, which when combined, result in a risk level between 1 (highest risk) and 10 (lowest risk). Risk assessment outcomes are based solely on risk assessment to the environment. Risk to company reputation, regulatory compliance, stakeholder expectations, or community relationships were considered but not risk assessed. The level of risk is based on the worse-case credible risk across each environmental factor/environmental aspect combination.

4.3.2 Management measures and likelihood

Following quantification of the level of risk, management measures were then identified for each hazard. Measures to reduce adverse impacts associated with the Gorgon Gas Development and Jansz Feed Gas Pipeline were initially defined in the Draft EIS/ERMP (Ref. 18) and have been developed over time through secondary approvals processes, additional risk assessments and experience gained through both the construction and operations phases of the Development.

The measures outlined in Section 5 meet the objectives set out in Condition 30.2 of MS 800, Condition 16.1 of MS 769, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178, and address the matters set out in Conditions 30.3 of MS 800, and Conditions 20.3 of EPBC Reference: 2003/1294 and 2008/4178. The measures include the measures required in respect of the MNES listed in the TSBSEIR (Ref. 13), as required by EPBC Reference: 2003/1294 and 2008/4178.

Management measures are either described or referenced to the relevant documentation; aspects that are assessed and managed via other approved

management documents (Sections 2.4.4 and 2.4.5) are not duplicated in the assessment.

Where management measures require direction(s) or authorisation(s) under other legislation, Chevron Australia will seek that direction/authorisation prior to implementing the measures, if reasonably practicable. Receiving direction/authorisation is dependent on third party regulatory decisions and is outside the scope of this Plan, and does not affect the compliance status of any action taken under the Plan.

The term 'management measure' is considered analogous to the terms 'mitigation actions', 'management actions', 'management activities' and 'controls' which are referenced in the DCCEEW Environmental Management Plan Guidelines (Ref. 55). These terms are also considered analogous to the term 'safeguard' which is the term used in Chevron's ABU OE Risk Management Process (Ref. 33).

The likelihood (probability) of a defined consequence occurring was then determined, taking into account confirmed management measures in place. The likelihood of a particular consequence occurring was identified using one of the six likelihood categories shown in Integrated Risk Prioritization Matrix (Appendix A).

4.3.3 Residual risk

Once the consequence and likelihood were determined, the Residual Risk score (on a scale of 1 to 10; where 1 is the highest and 10 the lowest) was identified using the Integrated Risk Prioritization Matrix. These scores were then assigned as either a High, Medium or Low, based on the following groupings:

- High: 1 to 4
- Medium: 5 to 6
- Low: 7 to 10

This grouping provides a clear indication as to the remaining residual risk from the different environmental aspects.

4.4 Environmental performance objectives, management measures and, performance standards

Environmental performance objectives, management measures and environmental performance standards were defined to address the potential environmental impacts and risks identified during the risk assessment.

CAPL is committed to conducting activities in an environmentally responsible manner and aims to implement best practice environmental management as part of a program of continual improvement to reduce potential impacts and risks to As Low As Reasonably Practicable (ALARP). CAPL defines environmental performance objectives, management measures and environmental performance standards that relate to managing the identified environmental risks as:

- Environmental Performance Objectives (EPOs): the level of performance in managing the potential environmental impacts and environmental risks. .EPOs defined within this Plan are aligned with the objectives of this Plan, defined by Condition 30.2 of MS 800, Condition 16.1 of MS 769, and Condition 20.2 of EPBC Reference: 2003/1294 and 2008/4178.
- Management measures: are identified measures/actions/procedures to be implemented to meet environmental performance objectives. Management measures are analogous to management actions as defined in the DWER guidance on preparing EP Act Part IV Environmental Management Plans (Ref. 56). Management measures

are also analogous to the following terms used in the DCCEEW Environmental Management Plan Guidelines (Ref. 55); mitigation actions, management actions, management activities, control measures, and management measures. In addition, the identification of management measures addresses the requirements of Conditions 30.3 of MS 800 and Condition 20.3 of EPBC Reference: 2003/1294 and 2008/4178.

Measures to manage wastes that are being implemented to meet other approval requirements have been included in this Plan, where relevant to provide context. For example, the Part V licence includes several waste management conditions (refer to Section 2.5.1). These conditions where applicable are included to provide a holistic overview of management measures and are annotated with an asterisk (*) at the end. Compliance against requirements from other approvals is out of scope of this Plan and remains under the relevant approval (e.g. Part V licence). This is important to avoid regulatory duplication and reporting overlap. For clarity this Plan is not intended to provide a comprehensive or fully up-to-date summary of other approval requirements, these are referred to for context only. Any measure or requirements annotated with an asterix (*) or which is otherwise a summary of requirements set out in other approvals must be read subject to their originating approval and the drafting in the latest version of the relevant approval takes precedence over this Plan.

Environmental Performance Standards: defined in accordance with Schedule 2 of MS 800, MS 769 and EPBC Reference: 2003/1294 and 2008/4178 are 'matters' which are developed for assessing performance, not compliance, and are quantitative targets or where that is demonstrated to be not practicable, qualitative targets, against which progress towards achievement of the objectives of conditions can be measured'. The environmental performance standards have been developed specifically for assessing performance, not compliance. Failure to meet the standards does not represent failure to implement this Plan; rather, it indicates that a performance objective may not have been met and management action or a review of the environmental performance objectives and standards may be needed. Performance Standards are analogous to the term 'management targets' as defined in the DWER guidance on preparing EP Act Part IV Environmental Management Plans (Ref. 56) and 'performance targets' referenced in the DCCEEW Environmental Management Plan Guidelines (Ref. 55). In addition, the identification of performance standards addresses the requirements of Condition 30.3(ii) of MS 800 and Condition 20.3(II) of EPBC Reference: 2003/1294 and 2008/4178.

4.5 Risk to Matters of National Environmental Significance

Condition 3.2.1 of EPBC Reference: 2003/1294 and 2008/4178 require a description of the EPBC Act listed species and their habitat that are likely to be impacted by the components of the action that is the subject of this Plan. That description is provided in Appendix B.

A detailed definition and description of the significant ecological elements on Barrow Island, which include relevant matters of NES, is contained in:

- Terrestrial and Subterranean Baseline State and Environmental Impact Report (Ref. 16)
- Coastal and Marine Baseline State and Environmental Impact Report (Ref. 17)
- Draft Environmental Impact Statement/Environmental Review and Management Programme (Ref. 18).

Condition 3.2.2 of EPBC Reference: 2003/1294 and 2008/4178 require an assessment of the risk to the EPBC Act listed species. The risks identified in Section 5 includes the risks to listed species in Appendix B.

Terrestrial and subterranean EPBC Act listed species identified on Barrow Island include:

- 19 listed threatened species (10 birds, seven mammals, one reptile and one fish) that are MNES.
- 26 migratory bird species (marine, terrestrial or wetland) that are MNES, of which some are also listed under the threatened species category.
- three listed sea bird species that are classified as Other Matters Protected by the EPBC Act (the White-bellied Sea Eagle, Silver Gull and Lesser Crested Tern).

Of the species identified as being present on Barrow Island, the following species were identified as being potentially impacted by from the construction and operation of the terrestrial facilities:

- Land birds White-winged Fairy-wren
- Raptors Spotted Harrier, Brahminy Kite, Osprey, White-bellied sea Eagle, Australian Kestrel
- Mammals Burrowing Bettong/ Boodie, Golden Bandicoot, Spectacled Harewallaby, Barrow Island Euro
- Fish Barrow Cave Gudgeon, Blind Eel

Table 4-1 summarises the environmental aspects identified as potentially interacting with various MNES and the associated level of residual risk.

Table 4-1: Environmental aspects and associated level of residual risk for each MNES identified as potentially impacted

MNES	Environmental aspect and activity	Associated level of residual risk		
Land birds: White-winged Fairy-wren 	Solid and Liquid Waste: storage and handling treatment facilities disposal on Barrow Island 	Low		
 Raptors (including raptor nest habitat): Spotted Harrier Brahminy Kite Osprey White-bellied Sea eagle Australian Kestrel 	 Solid and Liquid Waste: storage and handling treatment facilities disposal on Barrow Island 	Low		
 Mammals: Burrowing Bettong/ Boodie (including Boodie warren habitat) Golden Bandicoot Spectacled Hare-wallaby Barrow Island Euro 	 Solid and Liquid Waste: storage and handling treatment facilities disposal on Barrow Island 	Low		
Fish:	Solid and Liquid Waste:	Medium (TWIP downhole disposal)		

M	IES	Enviro	nmental aspect and activity	Associated level of residual risk
•	Barrow Cave Gudgeon	•	storage and handling	
•	Blind Eel	•	treatment facilities	
		•	disposal on Barrow Island	

5 Environmental risk assessment and management strategy

5.1 Overview

This Section evaluates the impacts and risks associated with the management of solid and liquid waste and details the environmental performance objectives and standards that are used to manage the identified risks and reduce them to an acceptable level.

Given this Plan is dedicated to solid and liquid waste management the environmental aspect of 'Solid and Liquid Waste' is the most appropriate aspect to apply and includes the wastes generated from the other aspects (e.g. Surface Water, Hazardous Materials, Fire). As identified in Table 2-6, there are wastes generated that are out of scope for this Plan.

The 'Solid and Liquid Waste' aspect has been divided into the following three activities and then defined further to complete the risk assessment and management measures.

- Storage and handling (including transport on island)
- Treatment facilities
- Disposal on Barrow Island.

Section 3.2 provides examples of general and hazardous solid and liquid waste streams generated and Section 3.3 provides an overview of facilities and activities.

5.2 Environmental Aspect: Storage and Handling

5.2.1 Description of activities

Storage, handling and transport is a key activity involved in solid and liquid waste management. Storage, handling and transport activities include, but are not limited to:

- General, putrescible and recyclable waste storage (including segregation) at either general work areas or dedicated facilities.
- Solid and liquid waste storage (including segregation) at either general work areas or dedicated facilities.
- Solid and liquid waste handling (e.g. transfer of waste via vacuum truck) into waste receptables; drying of waste; decanting excess water) at general work areas or dedicated facilities.
- Transport of waste from source or waste storage and handling facilities to either the WTS or directly to the Materials Offloading Facility (MOF) or other off loading facilities.

Examples of general work area locations where waste is either generated, handled and/or temporarily stored as a result of the primary activity, includes, but are not limited to the:

- GTP
- CO₂ Pressure Management DC
- Bridging and General Utility Areas
- DG Storage Yards
- Mercury Management Facilities
- Concrete Batching Plant.

Examples of dedicated waste handling and storage areas or facilities where the primary activity is waste handling and/or storage include, but are not limited to, the:

- WTS
- LWFs
- Evaporation ponds
- Concrete stockpiles.

5.2.2 Potential impact / consequence summary

An incident or unplanned event (e.g. loss of containment, incorrect segregation) from the storage, handling and transport of solid and liquid waste has the potential to:

- cause soil, surface water and groundwater contamination, loss of stygofauna.
- impact the marine environment
- cause injury or mortality to fauna or attract and alter fauna behaviour
- cause direct loss of vegetation and habitat
- create fire hazards
- generate windblown waste

Incident data for unplanned spills/releases related to waste management since completion of the main construction phase, shows that there have been no significant incidents (i.e. incidents classified above a Level 1 incident (based on spill volume)). There are only 11 minor spills recorded, two of which were to secondary containment. The minor spills either (1) occurred during transfer activities or (2) as a result of leaking waste receptacles. In addition, as per the Fire Management Plan (Ref. 13) and incident analysis, there were no fires related to waste management that impacted vegetation on Barrow Island.

5.2.3 Residual risk and key management measures

5.2.3.1 Overarching waste management measures

The following standard measures provide the overarching framework to ensure waste activities are managed effectively:

- All worksite personnel and visitors are to be inducted regarding waste management and hazardous materials requirements.
- A dedicated Waste Management resource will be available for Barrow Island waste management.
- Waste is managed in accordance with the Waste Hierarchy principles of: eliminate, reduce, re-use, recycle/recover, treat, and dispose in an environmentally responsible manner.
- Unidentified wastes will be regarded as hazardous waste for storage, treatment, and disposal.
- Washout of concrete and vacuum trucks will occur in designated washdown areas.
- Inspections of the waste management facilities in as per the ABU OE Assurance Plan (Level 2).

 Maintenance of the waste management facilities as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).

5.2.3.2 Unplanned releases

Management measures to reduce the risk of unplanned releases of hazardous materials to soil, surface, groundwater and subterranean fauna include:

- All spills will be recorded as per Chevron Incident Investigation and Reporting Process (Ref. 36).
- Sufficient and appropriate equipment, materials, are available and maintained, to respond to a spill incident.
- Spill response will be conducted in accordance with the Procedure for Use of Spill Kits Located in Gorgon Operation Areas (Ref. 35), Gorgon Project Barrow Island Onshore Spill Contingency Plan (OSCP) (Ref. 37), Safety Data Sheet (SDS) or equivalent procedure.

5.2.3.3 Storage, handling and transport management measures

The following management measures apply to the storage, handling and transport of wastes.

To reduce fauna attraction to terrestrial facilities, site protocols will include:

• Waste receptacles that may attract fauna or generate windblown rubbish will be covered or closed.

Hazardous material storage is designed and constructed to reduce risks of spills and releases, including:

- Permanent and temporary bunds:
- Constructed using waterproof reinforced concrete, steel, or an alternative material, which is deemed to be appropriate for the specific application.
- Impervious and chemically resistant to the liquid contained. Bunds with the potential to collect flammable and combustible substances will be constructed of fire-resistant materials.
 - RO Plants are located within a bund.

To reduce the risks of spills and releases of waste from receptacles, operational procedures will include:

- Fit-for-purpose for intended contents and appropriately labelled to identify contents.
- Inspected and maintained (including certification where required) to verify integrity.
- Securely stored and contained during transport.

To ensure the ongoing effective storage and handling of hazardous materials, operational procedures shall include:

- All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this.
- Hazardous liquids stored in isotainers will have spill protection under valves.
- Legal requirements pertaining to hazardous materials and substances adhered to for packaging, segregating, storing, transporting, transferring, and handling.

• An inventory of hazardous materials stored at work sites is maintained.

To reduce the risks of spills and releases of hazardous materials from handling and transport activities, operational procedures will include:

- Active receptacle (including isotainers) being filled located within secondary containment. Where this is impractical for isotainers, due to operational constraints, additional controls (e.g. spill trays and absorbent mats) will be implemented.
- Use of spill protection (e.g. spill trays and absorbent mats) under potential leak/release points (e.g. transfer and hose line connections and break points).
- Hoses used for transfer of hazardous materials will be fit-for-purpose, not outside design life limits, and regularly checked for damage to prevent leaks.
- Avoiding hose transfers within 2 m of Class 3 stormwater drains. Where this is impracticable due to operational constraints, additional controls will be implemented.

Review of incident data indicates that any spills or releases from waste storage and handling activities in work areas are localised and short term. In addition, no impacts to fauna from windblown waste or waste receptable management have been observed. Given this, the existing management measures are considered appropriate.

5.2.3.4 Dedicated waste facility – Waste Transfer Station

The WTS has been designed, constructed and operated in a manner to minimise environmental impacts. It receives, stores and handles solid and liquid wastes prior to disposal off island.

To reduce fauna attraction to the WTS, design, construction and operation includes:

- Waste receptacles that may attract fauna or generate windblown rubbish will be covered or closed.
- Waste sorting (general and putrescible), general bin loading and putrescible compacting areas enclosed on three sides.
- Site is enclosed by a high fence to limit fauna access and inspected on a regular basis.
- Putrescible waste residue on the ground will be cleaned and removed on a regular basis (e.g. at the end of each working day).
- Putrescible waste either refrigerated, compacted or processed through food waste dryers to reduce odour then either transferred into sealed containers for disposal off island or reused as per the assessment process in this Plan.

Hazardous material storage at the WTS is designed, operated and maintained to reduce risks of spills and releases, and includes:

- Permanent and temporary bunds:
- Constructed using waterproof reinforced concrete, steel, or an alternative material, which is deemed to be appropriate for the specific application.
- Impervious and chemically resistant to the liquid contained. Bunds with the potential to collect flammable and combustible substances will be constructed of fire-resistant materials.
 - Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1)*.

To reduce the risks of spills and releases of waste from receptacles at the WTS, operational procedures will include:

- Fit-for-purpose for intended contents and appropriately labelled to identify contents.
- Inspected and maintained (including certification where required) to verify integrity.
- Securely stored and contained during transport.

To ensure the ongoing effective storage and handling of hazardous materials at the WTS, operational procedures will include:

- All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this.
- Hazardous liquids stored in isotainers will have spill protection under valves.
- Hazardous waste, including Special Waste Type 3 (PFAS impacted soils and other solid waste) stored within enclosed vessels.*
- Legal requirements pertaining to hazardous materials and substances adhered to for packaging, segregating, storing, transporting, transferring, and handling.
- An inventory of hazardous materials stored at work sites is maintained.

To reduce the risks of spills and releases of hazardous materials from handling and transport activities at the WTS, operational procedures will include:

- Active receptacle (including isotainers) being filled located within secondary containment. Where this is impractical for isotainers, due to operational constraints, additional controls (e.g. spill trays and absorbent mats) will be implemented.
- Use of spill protection (e.g. spill trays and absorbent mats) under potential leak/release points (e.g. transfer and hose line connections and break points).
- Hazardous liquid waste and Special Waste Type 3 (PFAS impacted soils and other solid waste) handling, consolidation, sorting and storage within a bunded area.*
- Hoses used for transfer of hazardous materials will be fit-for-purpose, not outside design life limits, and regularly checked for damage to prevent leaks.
- Avoiding hose transfers within 2 m of Class 3 stormwater drains. Where this is impracticable due to operational constraints, additional controls will be implemented.

Review of incident data indicates that any spills or releases from waste handling activities at the WTS are localised and short term. In addition, no impacts to fauna from windblown waste or waste receptable management have been observed. Given this, the existing management measures are considered appropriate.

5.2.3.5 Dedicated waste facility – Liquid waste facilities

The LWF at the GTP includes the Disposal Water Tanks, which store wastewater prior to downhole disposal. The drilling LWF includes waste tanks. Both facilities have been designed, constructed and operated in a manner to minimise environmental impacts.

Disposal Water Tanks design and operation includes removal of solids and hydrocarbons to manage the wastewater prior to disposal via the PWD:

- Skimming arrangement to remove hydrocarbons
- Settlement of solids
- Fitted with chemical injection packages (e.g. biocide, scale inhibitor) to prevent blockages.

To prevent overtopping or unplanned releases of hazardous materials the design, operation and maintenance of the Disposal Water Tanks includes:

- An alarm system that is maintained that activates in the event of:
- high tank levels
- tank overflows.*
 - Location within bunded area.
 - Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).*

To prevent overtopping or unplanned releases the design, operation and maintenance of the drilling LWF includes:

- All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this.
- Maintenance as per the CMMS or equivalent Maintenance Management System.

Review of incident data indicates that there have been no events where the Disposal Water tanks have overtopped. Given this, the existing management measures are considered appropriate.

5.2.4 Risk assessment and management measures summary

A summary of the risk assessment, including associated management measures, for potential impacts from Solid and Liquid Waste – storage and handling (including transport on island).
 Table 5-1: Risk assessment summary – storage and handling (including transport on island)

Environmental						R	esidual risk	
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
Soil and Landform Surface and Groundwater Flora and Vegetation Terrestrial Fauna Marine Fauna Subterranean Fauna	 Injury or mortality to fauna Direct loss of vegetation and habitat Create fire hazards 	Failure to effectively segregate solid or liquid waste, resulting in fire	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 To ensure waste activities are managed effectively, overarching operational procedures include: All worksite personnel and visitors are to be inducted regarding waste management and hazardous materials requirements A dedicated waste management resource will be available for Barrow Island waste management. Waste is managed in accordance with the Waste Hierarchy principles of: eliminate, reduce, re-use, recycle/recover, treat, and dispose in an environmentally responsible manner. Unidentified wastes will be regarded as hazardous waste for storage, treatment, and disposal. Washout of concrete and vacuum trucks will occur in allocated washdown areas. Inspections of the waste management facilities as per the ABU OE Assurance Plan (Level 2). Maintenance of the waste management facilities as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1). 	Solid and liquid waste managed in accordance with Legislative requirements utilising the proposed management measures or similar environmentally appropriate options to reduce the risk of inappropriate segregation of solid or liquid waste and prevent impacts outside of the TDF.	2	6	Low
	 Soil, surface water and groundwater contamination, loss of stygofauna. Impacts to marine environment Injury or mortality to fauna or attract and alter fauna behaviour Direct loss of vegetation and habitat Generate windblown waste 	Failure to appropriately store, handle, and/or transport solid waste (non-hazardous and hazardous materials) resulting in fauna attraction or spills/releases.	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid waste.	 To reduce fauna attraction to terrestrial facilities, site protocols will include: Waste receptacles that may attract fauna or generate windblown rubbish will be covered or closed. To reduce the risks of spills and releases of waste from receptacles, operational procedures will include: Fit-for-purpose for intended contents and appropriately labelled to identify contents. Inspected and maintained (including certification where required) to verify integrity. Securely stored and contained during transport. To ensure the ongoing effective storage and handling of hazardous materials, operational procedures shall include: Legal requirements pertaining to hazardous materials and substances adhered to for packaging, segregating, storing, transporting, transferring, and handling. An inventory of hazardous materials stored at work sites is maintained. To reduce the risks of spills and releases of hazardous materials to soil, surface and groundwater and subterranean fauna from unplanned releases, operational procedures will include: All spills will be recorded as per Chevron Incident Investigation and Reporting Process (Ref. 36). 	Solid wastes are stored, handled and transported utilising the proposed management measures or similar environmentally appropriate options to reduce the risk of spills and releases and impacts to fauna and prevent impacts outside the TDF.	5	4	Low

Environmental				Environmental performance	R	esidual risk		
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
			-	 Sufficient and appropriate equipment, materials, are available and maintained, to respond to a spill incident. Spill response will be conducted in accordance with the Procedure for Use of Spill Kits Located in Gorgon Operation Areas (Ref. 35), Gorgon Project Barrow Island Onshore Spill Contingency Plan (OSCP) (Ref. 37), SDS or equivalent procedure. 				
	 Soil, surface water and groundwater contamination, loss of stygofauna. Impacts to marine environment Injury or mortality to fauna Direct loss of vegetation and habitat 	Failure to appropriately store, handle, and/or transport liquid wastes (non-hazardous and hazardous materials) on Barrow Island resulting in spills/releases	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 Hazardous material storage is designed and constructed to reduce risks of spills and releases, including: Permanent and temporary bunds: Constructed using waterproof reinforced concrete, steel, or an alternative material, which is deemed to be appropriate for the specific application. Impervious and chemically resistant to the liquid contained. Bunds with the potential to collect flammable and combustible substances will be constructed of fireresistant materials. RO Plants are located within a bund. To reduce the risks of spills and releases of waste from receptacles, operational procedures will include: Fit-for-purpose for intended contents and appropriately labelled to identify contents. Inspected and maintained (including certification where required) to verify integrity. Securely stored and contained during transport. To ensure the ongoing effective storage and handling of hazardous materials, operational procedures will include: All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this. Hazardous liquids stored in isotainers will have spill protection under valves. Legal requirements pertaining to hazardous materials and substances adhered to for packaging, storing, transporting, transporting, and handling. An inventory of hazardous materials stored at work sites is maintained. To reduce the risks of spills and releases of hazardous materials for handling and transport activities, operational procedures will include: Active receptacle (including isotainers) being filled located within secondary containment. Where this is impractical for isotainers, duditional controls (e.g. spill trays and absorbent mats) will be implemented. Use of spill protection (e.g. spill trays and absorbent mats) under potential leak/release points (e.g. transfer and hose line connec	Liquid wastes are stored, handled and transported utilising the proposed management measures or similar environmentally appropriate options to reduce the risk of spills and releases and prevent impacts outside the TDF	4	4	Low

Environmentel					Environmental performance	Residual risk			
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk	
				 Avoiding hose transfers within 2 m of Class 3 stormwater drains. Where this is impracticable due to operational constraints, additional controls will be implemented. To reduce the risks of spills and releases of hazardous materials to soil, surface and groundwater and subterranean fauna from 					
				 unplanned releases, operational procedures will include: All spills will be recorded as per Chevron Incident 					
				 Sufficient and appropriate equipment, materials, are available and maintained to respond to a spill incident 					
				 Spill response will be conducted in accordance with the Procedure for Use of Spill Kits Located in Gorgon Operation Areas (Ref. 35), Gorgon Project Barrow Island Onshore Spill Contingency Plan (OSCP) (Ref. 37), SDS or equivalent procedure. 					
	 Soil, surface water and groundwater contamination, loss of stygofauna. Impacts to marine environment Injury or mortality to fauna or attract and alter fauna behaviour Direct loss of vegetation and habitat Generate windblown waste 	Failure to appropriately store and handle solid and liquid waste (hazardous and non hazardous materials) at the WTS resulting in fauna attraction or spills/releases	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 To reduce fauna attraction to the WTS, design, construction and operation includes: Waste receptacles that may attract fauna or generate windblown rubbish will be covered or closed Waste sorting (general and putrescible) general bin loading and putrescible compacting areas enclosed on three sides. Site is enclosed by a high fence to limit fauna access and inspected on a regular basis. Putrescible waste residue on the ground will be cleaned and removed on a regular basis (e.g. at the end of each working day). Putrescible waste either refrigerated, compacted or processed through food waste dyers to reduce odour then either transferred into sealed containers for disposal off island or reused as per the assessment process in this Plan. Hazardous material storage at the WTS is designed, operated and maintained to reduce risks of spills and releases, operational procedures will include: Permanent and temporary bunds: Constructed using waterproof reinforced concrete, steel, or an alternative material, which is deemed to be appropriate for the specific application. Impervious and chemically resistant to the liquid contained. Bunds with the potential to collect flammable and combustible substances will be constructed of fire-resistant materials. Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).* To reduce the risks of spills and releases of waste from receptacles at the WTS, operational procedures will include: Fit-for-purpose for intended contents and appropriately labelled to identify contents. Inspected and maintained (including certification where required) to verify integrity. 	WTS designed, constructed and operated with management measures or similar environmentally appropriate options to reduce the risk of spills and releases and prevent impacts outside the TDF	4	4	Low	

Environmentel	Environmental			Environmental performance	Residual risk			
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
				Securely stored and contained during transport.				
				To ensure the ongoing effective storage and handling of hazardous materials at the WTS, operational procedures will include:				
				 All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this. 				
				 Hazardous liquids stored in isotainers will have spill protection under valves. 				
				 Hazardous waste, including Special Waste Type 3 (PFAS impacted soils and other solid waste) stored within enclosed vessels.* 				
				• Legal requirements pertaining to hazardous materials and substances adhered to for packaging, segregating, storing, transporting, transferring, and handling.				
				An inventory of hazardous materials stored at work sites is maintained.				
				To reduce the risks of spills and releases of hazardous materials from handling and transport activities at the WTS, operational procedures will include:				
				Active receptacle (including isotainers) being filled located within secondary containment.				
				• Use of spill protection (e.g. spill trays and absorbent mats) under potential leak/release points (e.g. transfer and hose line connections and break points).				
				 Hazardous liquid waste and Special Waste Type 3 (PFAS impacted soils and other solid waste) handling, consolidation, sorting and storage within a bunded area* 				
				 Hoses used for transfer of hazardous materials will be fit-for- purpose, not outside design life limits, and regularly checked for damage to prevent leaks. 				
				 Avoiding hose transfers within 2 m of Class 3 stormwater drains. Where this is impracticable due to operational constraints, additional controls will be implemented. 				
				To reduce the risks of spills and releases of hazardous materials at the WTS to soil, surface and groundwater and subterranean fauna from unplanned releases, operational procedures will include:				
				All spills will be recorded as per Chevron Incident Investigation and Reporting Process (Ref. 36).				
				• Sufficient and appropriate equipment, materials, are available and maintained, to respond to a spill incident.				
				Spill response will be conducted in accordance with the Procedure for Use of Spill Kits Located in Gorgon Operation Areas (Ref. 35), Gorgon Project Barrow Island Onshore Spill Contingency Plan (OSCP) (Ref. 37), SDS or equivalent procedure.				
	 Soil, surface water and groundwater contamination, loss of stygofauna. 	Failure to appropriately store and handle liquid wastes (hazardous material) at the LWFs resulting in fauna attraction or spills/releases	To ensure that the Proposal does not cause Material or Serious Environmental	Disposal Water Tanks design and operation includes removal of solids and hydrocarbons to manage the wastewater prior to disposal via the PWD:	LWF designed, constructed and operated with management measures or similar environmentally appropriate	3	5	Low

Frazinanantal						R	esidual risk	
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
	 Impacts to marine environment Injury or mortality to fauna Direct loss of vegetation and habitat 		Harm outside the TDF due to liquid waste storage.	 Skimming arrangement to remove hydrocarbons Settlement of solids Chemical injection packages (e.g. biocide, scale inhibitor) to control scale and bacteria. To prevent overtopping or unplanned releases of hazardous materials the design, operation and maintenance of the Disposal Water Tanks will include: An alarm system that is maintained that activates in the event of: high tank levels tank overflows* Location within bunded area. Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).* To prevent overtopping or unplanned releases the design, operation and maintenance of the drilling dewatering LWF will include: All hazardous liquids will be stored within secondary containment (excluding isotainers) and routine inspections to confirm this. Maintenance as per the CMMS or equivalent Maintenance Management System. To reduce the risks of spills and releases of hazardous materials at the WTS to soil, surface and groundwater and subterranean fauna from unplanned releases, operational procedures will include: All spills will be recorded as per Chevron Incident Investigation and Reporting Process (Ref. 36). Sufficient and appropriate equipment, materials, are available and maintained, to respond to a spill incident. Spill response will be conducted in accordance with the Procedure for Use of Spill Kits Located in Gorgon Operation Areas (Ref. 35), Gorgon Project Barrow Island Onshore Spill Contingency Plan (OSCP) (Ref. 37), SDS or equivalent procedure. 	options to reduce the risk of releases and prevent impacts outside the TDF			

* Part V Licence (L9102/2017/1) condition

5.3 Environmental Aspect: Solid and Liquid Waste – Treatment Facilities

5.3.1 Description of activities

A key component of the solid and liquid waste aspect is treatment of waste via treatment facilities. Treatment facilities include, but are not limited to:

- WWTPs (Section 3.3.3.2)
- Oil/water separators (Section 3.3.3.1)
- Food waste dryers (Section 3.3.3.3).

5.3.2 Potential impact / consequence summary

An incident or unplanned event at the waste treatment facilities, e.g. through an overtopping event, containment breach from storage tanks or a release of solid waste may result in discharges to the environment. In addition, failure to treat the effluent, may impact downhole disposal (Section 3.4.2). Specifically, potential impacts from treatment of waste include:

- Soil, surface water and groundwater contamination, loss of stygofauna
- Direct loss of vegetation and habitat
- Injury or mortality to fauna.

5.3.3 Residual Risk and Key Management Measures

To prevent overtopping or unplanned releases of hazardous materials (liquids or solids) the design, operation and maintenance of the WWTPs includes:

- An alarm system that is maintained that activates in the event of:
 - high tank levels
 - tank overflows*.
- Located within bunded area.
- To reduce the risks of spills and releases of waste from receptacles, operational procedures will include:
 - Fit-for-purpose for intended contents and appropriately labelled to identify contents
 - Inspected and maintained (including certification where required) to verify integrity.
- Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).*

Monitoring of the WWTPs (via flowmeter monitoring point) to verify treatment and appropriate management includes:

- Continuous monitoring of inflow and outflow*
- Quarterly monitoring of select parameters of the treated effluent (i.e. pH, TSS, TRH, BOD5, TN, TP, anionic surfactants, *E. coli*).*

Review of incident data indicates that there have been no events where the WWTP tanks have overtopped. In addition, regular monitoring during commissioning of these WWTPs confirmed that the overall quality of the effluent met the target criteria (as

outlined within the Part V Licence DWER Decision Report (Ref. 53). Quarterly monitoring of treated effluent during Operations, completed in accordance with the Part V licence (L9102/2017/1) indicates that overall water quality meets the target criteria. As such, the existing management measures are considered appropriate.

5.3.4 Risk assessment and management measures summary

A summary of the risk assessment, including associated management measures, for potential impacts from Solid and Liquid Waste – treatment facilities.

Table 5-2: Risk assessment summary – treatment facilities

Environmontal					Environmental Performance	Residual risk			
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk	
Soil and Landform Surface and Groundwater Flora and Vegetation Terrestrial Fauna Marine Fauna Subterranean Fauna	 Soil, surface water and groundwater contamination, loss of stygofauna. Direct loss of vegetation and habitat Injury or mortality to fauna 	Failure to appropriately store and handle solid and liquid waste (hazardous materials) at waste treatment facilities resulting in fauna attraction or spills/releases	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 To prevent overtopping or unplanned releases of hazardous materials (liquids or solids) the design, operation and maintenance of the WWTPs includes: An alarm system that is maintained that activates in the event of: high tank levels tank overflows.* Located within bunded area Receptacle operational procedures will include: Fit-for-purpose for intended contents and appropriately labelled to identify contents. Inspected and maintained (including certification where required) to verify integrity. Maintenance as per the CMMS or equivalent Maintenance Management System and in accordance with the Part V licence (L9102/2017/1).* Monitoring of the WWTPs (via flowmeter monitoring point) to verify treatment and appropriate management includes: Continuous monitoring of inflow and outflow* Quarterly monitoring of select parameters of the treated effluent (i.e. pH, TSS, TRH, BOD5, TN, TP, anionic surfactants, <i>E. coli</i>).* 	Waste treatment facilities designed, constructed and operated with management measures or similar environmentally appropriate options to reduce the risk of spills and releases and prevent impacts outside the TDF	4	4	Low	

* Part V Licence (L9102/2017/1) condition

5.4 Environmental Aspect: Solid and Liquid Waste – Disposal on Barrow Island

5.4.1 Description of activities

Waste disposal activities on Barrow Island are a key component of the solid and liquid management. These include, but are not limited to:

- Downhole disposal wells (PWD and TWIP)
- Disposal to land surface/near surface
- Disposal to marine waters surrounding Barrow Island.

Disposal to land and marine waters is not considered further in this section or risk assessed. RO discharges are covered in the MEQMP (Ref. 20) and therefore out of scope of this Plan. In addition Section 3.5.4 outlines the process used to assess ad-hoc discharges to the terrestrial or marine environment and includes an activity specific risk assessment in accordance with the Waste Re-use and Disposal on Barrow Island: Environmental Assessment Procedure (Ref. 28).

5.4.2 Potential Impact / consequence summary

5.4.2.1 Downhole disposal wells

The liquid waste is injected into the Upper Barrow Group a depth of ~1000 m beneath Barrow Island at both the PWD and TWIP wells. The Upper Barrow Group is substantially below the lower limit of the stygofauna habitat in the superficial aquifer, which reside in the Tertiary Carbonates. There are no environmental criteria applicable for the Upper Barrow Group. Formation water (in the Upper Barrow Group) is highly alkaline and saline. The formation has no beneficial use and does not support any significant environmental values. As outlined in Section 3.4.2, acceptability of liquid waste discharge to the Upper Barrow Group is based on target criteria to ensure that the mechanical integrity of the wells is maintained.

The shallow surface formations and the water table identified as subterranean fauna habitat are hydraulically isolated from the deeper Upper Barrow Group by several geological sealing formations including the ~300 m thick regionally extensive Muderong Shale. Under normal operating conditions, factors that could cause impact to the characteristics of the shallow aquifer and the stygofauna present during deep well injection include:

- Mechanical integrity failure in wells (either below or above ground level)
- Fracturing of the overlaying confining units, resulting in penetration of liquid waste into the near-surface aquifer.

The above factors and release of wastewater into the superficial aquifer has the potential to cause:

- soil, surface water and groundwater contamination
- impacts to vegetation, fauna, troglofauna and stygofauna.

5.4.3 Residual risk and key management measures

The risk ranking was determined on the worst-case credible scenario which is well integrity failure. Fracturing of the overlying confining units is included as a hazard but has not been risk assessed as the worst case credible risk.

5.4.3.1 Maintaining well integrity

To maintain well integrity, it is important to avoid corrosion or scaling of the well, blocking perforation tunnels, clogging formation porosity, and to maintain interconnected permeability. Parameters such as pH, TSS and TPH are monitored to support integrity and efficient operation of the PWD wells.

To prevent infrastructure failure resulting in an emission to the surface or near-surface groundwater where stygofauna are known to be present, the wells are designed and operated to ensure mechanical integrity is maintained and failures are identified.

5.4.3.2 Avoiding fracturing of the overlaying confining units

Fracturing the overlaying confining units has the potential to allow liquid waste to migrate out of the receiving formation and into sensitive environments.

Fracturing is not expected in the Barrow Group Formation under normal operating conditions of the Water Disposal Tanks and PWD wells.

Injection pressures are expected to remain below fracture propagation pressure during normal operations due to exceptionally high permeability in the receiving formation. The mineralogy of the formation is stable, with low potential for adverse reactions between the injected water and the sandstone matrix. The porosity and permeability of the formation are not expected to be reduced through precipitation or deposition of minerals from the injected water. In addition, modelling indicated that fracturing of the receiving formations and confined layers is not likely except when the temperature of injection water is low (i.e. 10 °C). Under normal operating conditions the temperature of the injection water is expected to approximately range from 25 to 40 °C and therefore fracturing due to low temperatures is unlikely. Ensuring the receiving environment is isolated

The Barrow Group Formation characteristics (large pore space and extent over a large regional area) ensures its suitability for injecting liquid waste. The sands within the formation behave as a single hydraulically connected unit that extends well beyond Barrow Island. The mineralogy of the formation is stable, with very low potential for adverse reactions between the injected waste and the sandstone. Porosity and permeability of the formation are not expected to be reduced through precipitation or deposition of minerals from the injected waste.

The formation is hydraulically separated from any permeable formations and has been used for water supply and disposal for WA Oil asset on Barrow Island for several decades.

5.4.3.3 Monitoring of well performance

Monitoring of well performance includes continuous monitoring of PWD well head pressure; A and B Annulus pressures and flowline temperature and daily monitoring of TWIP well head pressure and A Annulus pressure. The monitoring provides data on well performance and any deviations from expected well behaviour can be detected and investigated promptly to ensure well integrity is maintained.

For the PWD wells, monitoring of the A annulus pressure is one of the most immediate and reliable indicators of a loss of integrity in the injection tubing (primary barrier). Should a leak develop in any part of the tubing string, the fluid in the tubing will encounter fluid in the A annulus (secondary barrier). The tubing and A annulus will then be hydraulically connected, and the annulus pressure will rise. This will be immediately detectable by the pressure gauge on the A annulus. This being the case, a high pressure alarm threshold for the A annulus pressure has been set to allow deviations to be quickly recognised so that corrective action can be initiated. Any non-routine operations where the injected fluid temperature is significantly different to normal may cause the annulus pressure to change. This will be considered when investigating any indications of high annulus pressure.

Analysis of reservoir pressure trends as a function of cumulative injection volume assists with confirming the size and connectivity of the injection reservoir. Spot sampling occurs on a monthly basis for pH, total suspended solids and total petroleum hydrocarbons with targets set for parameters deemed essential to maintaining the integrity of the wells

5.4.3.4 PWD wells

The following is a summary of the key design and testing measures undertaken for the PWD wells to maintain integrity and prevent formation fracture:

- Well and completion design (three casing strings and injection tubing).
- Outer casing cemented and protected by cathodic protection system
- Material selection of well tubing appropriate to contain anticipated process fluid characteristics as per original Basis of Design
- Wells clay stabilisation treatment during installation
- Wellhead corrosion resistant metallurgy
- Pressure testing during well completion to verify design to withstand pressure for life of well
- Real-time continuous pressure and temperature transducer/indicators to measure annulus pressures, tubing pressures and temperature and detect deviations from expected well behaviour.
- Injection tubing and A Annulus pressure alarms.

Operation, monitoring and maintenance of the PWD Wells to maintain integrity and prevent fracture of the formation, includes management measures such as:

- ABU Operational Performance Standard CWI Gorgon Producing Well Integrity (Ref. 29) which includes Life of Facility Assurance and Acceptance Criteria requirements.
- Setting of safe injection pressure limits and Well Operating Envelope to prevent fracture of the formation and integrity failure.
- Continuous monitoring of injection rate, wellhead pressure, A and B Annulus pressures, flowline temperature downstream of choke, flowline pressure downstream of choke* and injectivity performance to identify any well mechanical issues or potential fracturing indicators and address any deviations.
- Management of non-routine wastewater streams prior to downhole disposal via the PWD wells in accordance with the DDA Process and sampling to confirm the PWD well specified targets will be met.
- Well discharge locations monitored continuously for volumetric flow rate sampled monthly for total recoverable hydrocarbons (TRH), pH and Total Suspended Solids (TSS)*.
- Regular reviews (e.g. quarterly and annual) of injectivity performance and well integrity issue indicators.

- Maintenance as per the CMMS (e.g. annual well head) and in accordance with the Part V licence (L9102/2017/1).* e.g.:
 - Wellhead and tree visual inspections
 - Wellhead maintenance program.

Groundwater monitoring undertaken to date has not detected any impacts to the surface or near-surface groundwater where stygofauna are known to be present, from the PWD wells. Ongoing monitoring, undertaken in accordance with the TSEMP (Ref. 21), will continue to inform CAPL's understanding of groundwater in the vicinity of the PWD wells. Given this, the existing management measures are considered appropriate.

5.4.3.5 TWIP wells

Design, operation, monitoring and maintenance of the TWIP Wells to maintain integrity and prevent fracture of the formation, includes management measures such as:

- ABU Operational Performance Standard CWI Gorgon Producing Well Integrity (Ref. 29) which includes Life of Facility Assurance and Acceptance Criteria requirements.
- Well and completion design (two casing strings and injection tubing)
- Outer casing cemented and protected by cathodic protection system
- Daily monitoring of injection rate, wellhead pressure and A Annulus pressure* and injectivity performance to identify any well mechanical issues or potential fracturing indicators and address any deviations.
- Well discharge locations monitoring continuously for volumetric flow rate and monthly sampling for TRH, pH and Total Suspended Solids TSS.*
- Regular reviews (e.g. quarterly and annual) of injectivity performance and well integrity issue indicators.
- Maintenance as per the CMMS e.g.:
 - Wellhead and tree visual inspections
 - Wellhead maintenance program.

Groundwater monitoring undertaken to date has not detected any impacts to the surface or near-surface groundwater where stygofauna are known to be present. Ongoing monitoring, undertaken in accordance with the TSEMP (Ref. 21), will continue to inform CAPL's understanding of groundwater in the vicinity of the TWIP wells. Given this, the existing management measures are considered appropriate.

Work is currently underway to reduce the residual risk ranking identified in Table 5-3: Risk assessment summary – Disposal on Barrow Island. This will involve installation of continuous A Annulus pressure monitoring infrastructure on the TWIP wells to further reduce the likelihood. Continuous monitoring improves the ability to identify any deviations from expected well behaviour and also allows implementation of additional controls such as alarms and dashboards which can further improve detections and response times.

5.4.4 Risk assessment and management measures summary

A summary of the risk assessment, including associated management measures, for potential impacts from Solid and Liquid Waste – Disposal on Barrow Island

Table 5-3: Risk assessment summary – Disposal on Barrow Island

Environmontal					Environmontal porformanco	R	esidual risk	
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
Surface and Groundwater Flora and Vegetation Terrestrial Fauna Subterranean Fauna	 Soil, surface water and groundwater contamination, loss of stygofauna. Direct loss of vegetation and habitat Injury or mortality to fauna 	Mechanical integrity failure in the wells resulting in liquid wastes discharged to ground or the near surface aquifer (worst-case credible scenario) Fracturing of the receiving formations and overlying confining units, resulting in penetration of liquid wastes into the near surface aquifer	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 Design and testing of the PWD wells included control measures to maintain integrity and prevent formation fracture, includes: Well and completion design (three casing strings and injection tubing) Outer casing cemented and protected by cathodic protection system Material selection of well tubing appropriate to contain anticipated process fluid characteristics as per original Basis of Design Wells clay stabilisation treatment during installation Wellhead corrosion resistant metallurgy Pressure testing during well completion to verify design to withstand pressure for life of well Real-time continuous pressure and temperature transducer/indicators to measure annulus pressures, tubing pressures and temperature and detect deviations from expected well behaviour. Injection tubing and A Annulus pressure alarms. Operation, monitoring and maintenance of the PWD Wells to maintain integrity and prevent fracture of the formation, includes management measures such as: ABU Operational Performance Standard CWI – Gorgon Producing Well Integrity (Ref. 29) which includes Life of Facility Assurance and Acceptance Criteria requirements. Setting of safe injection pressure limits and Well Operating Envelope to prevent fracture of the formation and integrity failure. Continuous monitoring of Wellhead pressure, A and B Annulus pressures, flowline temperature downstream of choke, flowline pressure downstream of choke and injectivity performance to identify potential fracturing indicators and address any deviations. Management of non-routine wastewater streams prior to downhole disposal via the PWD wells in accordance with the DDA Process and sampling to confirm the PWD well specified targets will be met. Well discharge locations monitoring continuously for volumetric flow rate and monthly sampling for total recoverable hydrocarbons (TRH), pH and Total Suspended Solids (TSS)*. Regular reviews (e	PWD wells operated with management measures or similar environmentally appropriate options to prevent mechanical integrity failure of the wells and fracturing of the receiving formations and prevent impacts outside the TDF	3	5	Low

Environmentel						R	esidual risk	
factor	Potential impacts	Hazards	EPOs	Management measure	standard	Consequence	Likelihood	Residual risk
Surface and Groundwater Flora and Vegetation Terrestrial Fauna Subterranean Fauna	 Soil, surface water and groundwater contamination, loss of stygofauna. Direct loss of vegetation and habitat Injury or mortality to fauna 	Mechanical integrity failure in the wells resulting in liquid wastes discharged to ground or the near surface aquifer (<i>worst-case</i> <i>credible scenario</i>) Fracturing of the receiving formations and overlying confining units, resulting in penetration of liquid wastes into the near surface aquifer	To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to solid and liquid waste.	 Operation, monitoring and maintenance of the TWIP Wells to maintain integrity and prevent fracture of the formation, includes management measures such as: ABU Operational Performance Standard CWI – Gorgon Producing Well Integrity (Ref. 29) which includes Life of Facility Assurance and Acceptance Criteria requirements. Well and completion design (two casing strings and injection tubing). Outer casing cemented and protected by cathodic protection system Daily monitoring of Wellhead pressure and A Annulus pressure* and injectivity performance to identify potential fracturing indicators and address any deviations. Well discharge locations monitoring continuously for volumetric flow rate and monthly sampling for total recoverable hydrocarbons (TRH), pH and Total Suspended Solids (TSS).* Regular reviews (e.g. quarterly and annual) of performance trends to detect any potential fracturing or well integrity issue indicators Maintenance as per the CMMS e.g. Wellhead and tree visual inspections Wellhead maintenance program. 	TWIP wells operated with management measures or similar environmentally appropriate options to prevent mechanical integrity failure of the wells and fracturing of the receiving formations and prevent impacts outside the TDF	3	3	Medium

* Part V Licence (L9102/2017/1) condition

6 Implementation

6.1 Operational Excellence Management System

CAPL's operations are managed in accordance with the Operational Excellence Management System (OEMS), which is a comprehensive management framework that supports the corporate commitment to protect the safety and health of people and the environment. The OEMS aligns with ISO 14001:2015 Environmental management systems – Requirements with guidance for use (Ref. 19).

OE systematically manages workforce safety and health, process safety, reliability, and integrity, environment, efficiency, security, and stakeholders to meet the OE objectives and ensure safe operations of CAPL facilities and projects. The OEMS comprises the following key components (Figure 6-1):

- leadership and OE culture through the OEMS, CAPL leaders engage employees and contractors to build and sustain the OE culture and deliver OE performance
- management system cycle (MSC)—by applying the MSC, CAPL leaders make riskbased and data-driven decisions, prioritise activities, and direct improvements
- focus areas and OE expectations (including common expectations) focus areas are categories of OE risks and include workforce safety and health, process safety reliability and integrity, environment, efficiency, security, and stakeholder engagement; OE expectations guide the design, management, and assurance of the presence and effectiveness of safeguards.

The OEMS outlines the process for identifying, establishing, and maintaining safeguards, and to provide assurance that they are in place, functioning as intended, and comply with legal and OE requirements.

The ABU OE Risk Management Process (Ref. 33) assesses and identifies safeguards, which are the hardware and human actions designed to directly prevent or mitigate an incident or impact. The ABU OE Assurance Process (Ref. 46) provides the verification and validation that the safeguards are in place and functioning as intended.



An overview of the Chevron Corporation OEMS is shown in Figure 6-1.

Figure 6-1: Overview of Chevron Corporation's OEMS

6.2 OE roles and responsibilities

CAPL leaders are responsible for:

- providing clear direction on OE roles
- confirming people are equipped with the technical, functional, and OE leadership competencies and skills to execute their OE roles
- monitoring, coaching, and holding people accountable on their OE roles
- providing resources to effectively and efficiently execute the OEMS
- directing and monitoring compliance with legal requirements
- building partnerships, creating OE alignment, and accessing functional expertise.

Operational Excellence Leadership Teams (OELTs) steward the MSC for their organisation and confirm that the full scope of the OEMS is effective.

The roles and accountability within the OEMS extend beyond leadership to the workforce in general, which contributes to the OE culture and performance. As such, the entire workforce is responsible for:

- maintaining a sense of vulnerability
- understanding the hazards and risks of the work being undertaken
- ensuring safeguards are in place and functioning
- following required practices and procedures
- applying the Tenets of Operation
- performing start-work checks
- exercising stop-work responsibility.

The roles and responsibilities of personnel in charge of the environmental management of the Project are detailed in Table 6-1.

Table 6-1: Roles and responsibilities – environmental management

Roles	Responsibilities
Barrow Island Operations Manager	 Accountable for implementation and adherence to legislative requirements, permits and approvals, including commitments in this Plan
	• Manage the Operations team, including developing the desired workforce culture that aligns with The Chevron Way (which explains who we are, what we believe, how we achieve, and where we aspire to go)
	Lead the implementation of OE in Operations
	Provide leadership and strategic direction and ensure resources are in place to meet business goals
	• Ensure delivery of high-quality and reliable hydrocarbon products in a safe, efficient, and cost-effective manner
Gorgon Production Manager	 Manage the day-to-day operations on Barrow Island, ensuring work is executed in a manner that complies with all relevant environmental procedures and adheres to legislative requirements, permits and approvals, including commitments in this Plan Manage Operations in alignment with CAPL OEMS Processes
	Implement effective management for emergency response on Barrow Island
Barrow Island HSE	Support implementation of, and monitor compliance with, the OEMS
Manager	Lead the Gorgon HSE team

Roles	Responsibilities
	Ensure all personnel are made aware of HSE requirements relevant to their role
Gorgon Maintenance and Reliability Manager	Lead and reinforce HSE requirements in support of OEMS in all aspects of maintenance, reliability, and turnarounds
	• Ensure the Surface Equipment Reliability and Integrity Process (SERIP) is followed.
	Lead the team responsible for the Gorgon CMMS.
	Actively support the IIR process
	Plan, manage, and direct all incident-free maintenance activities
Supply Chain Operations Manager	Lead the Gorgon Supply Chain Team
	 Responsible for the safe transportation and storage of all goods and materials to and from BWI
	 Responsible for site services on BWI, including operation of accommodation village and waste management services
ABU Environment Manager	 Ensure environmental monitoring and reporting requirements are completed in accordance with legislative requirements, permits and approvals
	• Ensure environmental plans are implemented and updated to ensure compliance with applicable environmental regulations, permits and approvals.
Major Capital Project Manager	Ensure required environmental approvals, permits and licences are in place for project scope
	 Ensure environmental requirements are addressed in project execution plans, including within Contractor procedures and plans
	Provide adequate HSE resource to support delivery of the project scope
All personnel	 Comply with all HSE requirements outlined in inductions, procedures, and other work authorisations
	Ensure that all incidents are reported to CAPL

6.3 Training and competency

All personnel (including contractors and subcontractors) are required to attend Health, Safety and Environmental inductions relevant to their role on the Gorgon Gas Development. Training and induction programs facilitate the understanding personnel have of their environmental responsibilities, and increase their awareness of the management and protection measures required to reduce potential impacts on the environment.

The ABU Competency Assurance and Development Process (Ref. 38) details the systematic, consistent, and structured framework to ensure organisational capability, and individual competency, in support of CAPL's business objectives, assurance expectations, and regulatory commitment, for OE-critical roles.

6.3.1 Contractor competency management

Contractors are required to meet the training and competency requirements documented in each scope of work and the ABU Contractor Training Matrix (Ref. 57) and contract. Contractors are required to join MyPass and provide evidence of required training prior to mobilisation to site. The MyPass training records will be available for the Business Owner, Contractor Personnel and Site to validate required training has taken place. Both the CAPL Business Owner and Contractor are responsible for validating training compliance prior to mobilisation.

6.3.2 Inductions

Personnel working on the Gorgon Gas Development, as well as any visitors, must undertake an induction. Inductions advise employees and visitors of any hazards they may encounter and describe the associated HSE management procedures intended to minimise the risk to people and the environment.

This induction fosters environmental stewardship amongst all personnel and ensures that they are aware of the management measures implemented to minimise the potential impact on the environment. The induction includes:

- an overview of environmental sensitivities of Barrow Island
- quarantine requirements
- fauna awareness and restrictions on handling fauna
- waste management and hazardous materials housekeeping requirements
- incident reporting requirements.

6.4 Emergency management

CAPL's emergency management arrangements outline a systematic approach for prevention, preparedness, response to and recovery from emergency events and are intended to provide a standardised corporate management and response structure that details emergency management documentation, systems, Emergency Response Organisation (ERO), facilities, equipment, and training and exercise arrangements.

The ERO consists of Emergency Response Teams (ERTs) and Emergency Management Teams (EMTs). The teams are organised in a manner consistent with the principles of the Incident Command System (ICS) as follows:

- Emergency Response Teams (ERT)
- Installation Emergency Management Teams (IEMT)
- Perth Emergency Management Team (PEMT)
- ABU Crisis Management Team (CMT).

The ERO provides a standardised management and response structure for all emergency events. Personnel filling roles within this structure may include full-time professionals, technical specialists and part-time volunteers drawn from across the workforce.

The system used to organise CAPL's emergency management teams (EMTs) is based on the US National Incident Management System (NIMS) produced by the Federal Emergency Management Agency (FEMA) and uses ICS to provide a standardised approach to the coordination of an emergency response (Ref. 63). This system is compatible with the Australasian Inter-service Incident Management System (AIIMS).

6.4.1 Emergency management process

The ABU Emergency Management OE Execution Manual (Ref. 39) is CAPL's system for emergency management. The process ensures CAPL is prepared to respond immediately and effectively to all emergencies involving contractor- or CAPL-owned or operated assets as defined in their scope of work.

The Process comprises the following elements:

- emergency scenarios, including worst case, have been identified; these scenarios are based on the findings from risk assessments of significant safety, health and environmental hazards and other sources (e.g. historical incidents)
- emergency response plans (ERPs) are developed and maintained to address emergency scenarios
- a reliability program for inspection, testing and preventative maintenance of critical emergency response equipment and systems supporting emergency response plans
- an incident management system (IMS) is in place capable of immediately and effectively managing all emergencies
- a training and exercise program, including minimum training and exercise requirements to establish and maintain emergency response capability
- crisis management plans to address a potential crisis or significant events.
- business continuity plans (BCP) are maintained to support the response to a potential crisis or significant event.

6.4.2 Emergency Response Organisation (ERO)

The Barrow Island Emergency Response Organisation (ERO) prescribes a tiered response model, using a standardised incident command structure. The ERO structure is flexible and easily adapted to different incident response scenarios. Initiated at first response, the ERO is a tool to command, control, and coordinate emergency response and recovery operations.

CAPL's Barrow Island Emergency Response Plan (BWI ERP) (Ref. 64) describes the capability to provide timely and effective response to emergency situations for both the Gorgon Gas Development and Barrow Island as a whole. The BWI ERP provides guidance on the management of an incident, including activation, incident response, communications and post-incident actions. It includes direction to event-/facility-specific incident management guides and inventories of emergency (including firefighting) resources.

Barrow Island has access to 24/7 emergency response capability which is equipped with appropriate firefighting equipment. During an emergency, first response capability is provided by one or more Onsite Response Teams under the local command of the On-Scene Commander. The On-Scene Commander is primarily responsible for establishing site control and commanding at-the-scene tactical response operations (e.g. offensive and/or defensive actions taken at the site of an incident to directly attack the source of and effects of the incident), regardless of the nature or size of the incident. The ORT is led by an On-Scene Commander (OC) who operates out of a Command Post located close to but a safe distance away from the site of an incident.

The Barrow Island Installation Emergency Management Team (IEMT) will determine response priorities and strategies for managing fire events, based upon the risk posed to personnel, the environment or assets.

Incidents that are moderate or complex in nature involve the mobilisation of the IEMT who operate from the Emergency Command Centre. The IEMT is responsible for the overall management of response operations and for providing direction to, and support for, tactical response operations.

The Installation Emergency Management Team (IEMT) is led by an Incident Commander who operates out of an Emergency Command Centre (ECC).

6.4.3 Roles and responsibilities for emergency response

Figure 6-2: EMT organisation chart outlines the organisational chart of the On-site Response Teams (ORTs) and EMTs. The Crisis Management Teams (CMTs), which focus on the business implications of incidents and events, are further described in the ABU Crisis Management Plan (Ref. 40).



Figure 6-2: EMT organisation chart

The EMT structure consists of sections with functional responsibilities to ensure a streamlined approach to managing emergencies. As an incident escalates and the workload of each section increases, it may be necessary to delegate additional functional roles. These roles will support the response by fulfilling tasks under their area of responsibility to maintain control of the incident. Table 6-2 provides additional information the responsibilities of team members during emergency response.

Table 6-2: Roles and res	ponsibilities – emergeno	y events and response

Role	Re	sponsibilities	
On-Site Response Team (ORT)			
On-Scene Commander (OC)	•	Organises and manages tactical response operations in a safe and effective manner Keeps the EMT informed about the nature and status of the incident, on-site response operations, and equipment and personnel support requirements	
Emergency Response Team	•	Comprises trained emergency services responders responsible for on-scene tactical response operations during an incident.	
Installation Emergency Management Team (IEMT)			
Incident Commander (IC)	•	Responsible for the overall management of Level 1B incidents The Perth Emergency Management Team (PEMT) may be activated in a support role to assist the site IEMT with logistics, personnel, notifications, and support services.	
Operations Section Chief	•	Responsible for the management of all operations of onsite response teams in execution of the reactive Incident Action Plan. Primary IEMT contact for OC	
Planning Section Chief	•	Responsible for the collection, evaluation, dissemination, and use of incident information and maintaining status of assigned resources.	

Role	Responsibilities	
Logistics Section Chief	 Responsible for providing facilities, services, people, and material in support of the incident. 	
Safety Officer	 Responsible for developing and recommending measures for assuring personnel safety, and to assess and/or anticipate hazardous and unsafe situations. Responsible for coordinating notifications to internal and external stakeholders. 	
Emergency Management Advisor	Coordinates and supports incident response arrangements and provides subject matter expertise on the emergency management process	
Central Control Room Unit Leader	 Primary IEMT point of contact with the Central Control Room. Management of process control and fixed firefighting systems in collaboration with OSC to safely mitigate the effects of fire events 	
Medical Unit Leader (MUL)	• Responsible for the development of the Medical Plan; providing medical care and overseeing health aspects of response personnel; obtaining medical aid and transportation for injured and ill incident personnel; coordinating with other functions to resolve health and safety issues; and report/record preparation. Responsible as primary IEMT point of contact with the Paramedics and Medical Centre	
Muster Coordinator	Responsible for coordinating the muster of workforce.	
Technical Specialists	Responsible for providing subject matter expertise to the IEMT	
Documentation Unit Leader (DUL) (also known as the Scribe)	Responsible for maintaining the incident log and collating relevant incident information	

6.5 Asset integrity

The objectives of Asset Integrity Management (AIM) are to maintain the integrity of equipment, structures, and protection devices for preventing and mitigating potential incidents; analyse failure modes and effects; and complete necessary inspection and testing programs.

The ABU Surface Equipment Reliability and Integrity Process (SERIP) (Ref. 41) is CAPL's standardised approach to reliability and integrity activities and applies across all CAPL facilities. It is designed to implement recognised best practices and improve equipment performance and organisational effectiveness. SERIP applies to:

- fixed equipment
- pipeline systems
- rotating equipment
- instrumented protective systems
- instrument and electrical system
- subsea systems
- floating systems
- response and egress systems
- structural systems.

AIM focuses on the assurance of Integrity Critical Elements (ICE), which includes environmental components. ICEs are managed in accordance with Performance Standards (PS), which set out the performance requirements for Integrity Critical Asset (ICA) to meet their objectives in terms of controlling potential Major Incident Events (MIE). Asset integrity plans within AIM include integrity critical tasks (i.e. tasks performed to confirm and/or to sustain the safeguarding functionality of an ICA, such as inspections, tests, and preventive maintenance). These are also known as assurance tasks in the Operational Performance Standards (OPS). The asset integrity plans also include frequencies assigned to these tasks to confirm that ICAs remain suitable for their intended application throughout their service life.

CAPL is planning a structured transition from SERIP (Ref. 41) to the Corporate Standard for Facilities Integrity and Reliability Management Process (FIRM 01000; FIRM Process; Ref. 42) for completion by 2024. The FIRM Process will apply to CAPL facilities. The transition will be subject to appropriate change management processes.

6.5.1 Computerised maintenance management system

CAPL uses a computerised maintenance management system (CMMS) for permanent infrastructure to support asset integrity management and reliability management through a rigorous, detailed register of inspection and maintenance tasks and data records, including maintenance planning and scheduling. Each item (down to component level) is assessed, has a criticality assigned based on importance, performance standards (including those based on manufacturers' specifications or similar), and a start date and frequency for inspections and maintenance. Items of high criticality are to be completed on time, or adequately managed under the deviation process. For temporary and some supporting infrastructure, a similar approach is applied using an equivalent Maintenance Management System.

CAPL uses the CMMS to ensure the facilities and, specifically, Integrity Critical Assets (ICAs), are inspected and maintained in accordance with Operational Performance Standards and legislative requirements, commensurate with good industry practice and appropriate risk management. The underlying philosophy is to manage inspection and preventive maintenance to meet integrity and serviceability requirements.

Associated infrastructure is managed as per the above i.e. assigned a criticality as per AIM and the applicable performance standard. The CMMS is then used to schedule the required Work Orders to meet the identified Management Measures and Environmental Performance Standards. i.e. the work order task identifies the activity defined in the Management Measures and Environmental Performance Standard. The CMMS also provides reference to the work instruction that is applicable to the particular activity being completed. Labour routes are included within the work order to ensure all required tasks are completed as per the work instructions. After the work order is completed, details of the outcomes and any follow-up required are entered in the CMMS. The CMMS then generates a separate corrective work order for the follow-up, which would be scheduled, completed, and any records captured in the CMMS.

6.5.2 Work Management Sub-Process

The Work Management Sub-process helps prioritise, plan, schedule, and complete the necessary maintenance for structures, equipment, and protective devices. The Sub-process is supported by the CMMS.

ICAs are components, structures, or equipment with a function that contributes to an ICE. ICAs are identified through Equipment Criticality Assessments (ECAs), which consider safety, environmental and regulatory aspects.

All ICAs and their associated PSs are identified in the CMMS and have mandatory inspection or planned maintenance activities associated with them at appropriate frequencies. Inspection and maintenance tasks not conducted within the specified time frames are managed through technical deviation management (see below).

The ABU Asset Integrity Program (Ref. 43) describes the roles and responsibilities to implement and maintain the AIM program, and details the measurement and verification activities designed to monitor asset integrity and to promote continual improvement.

6.5.3 Deviation management

The ABU Deviation Management Procedure (Ref. 44) addresses any integrity critical tasks on ICAs that will not be performed by the due date, and any ICAs that have failed to meet the safeguarding functionality defined in the relevant OPS. This procedure applies to all ICAs within the CAPL AIM program.

The Deviation Management Procedure describes a method for establishing a forwardlooking process and tracking completion of asset integrity plans so that integrity critical tasks are performed by the scheduled due date. If it is anticipated that an asset integrity plan task will not be completed by the scheduled due date, or such a task is already overdue, an appropriate analysis will be performed, and appropriate level of management involvement and approval obtained to authorise an extension of the scheduled due date.

The Deviation Management Procedure also details how to address operating without the assurance of safeguarding functions (i.e. deficiencies against OPSs). If structures or equipment are planned to be operated without the assurance of safeguarding functions (i.e. outstanding deficiencies), an appropriate analysis and level of management involvement and approval must be obtained before placing the equipment back into operation. Interim measures will be considered, if available and appropriate.

6.5.4 Operational readiness

Operational readiness reviews are conducted before start-up for all new and modified facilities, including:

- A review to confirm adherence to standards and the suitability for start-up; when change has occurred or as an operational check sometime after the Pre–Start-up Safety Review (PSSR).
- A PSSR to confirm compliance with applicable Technical Codes and Standards and that applicable process safety systems are in place, equipment is in safe condition, and people are competent to execute a safe start-up.

PSSRs are conducted in accordance with the ABU Facilities Engineering Pre-Start-up Safety Review Guideline (Ref. 58). This Guideline specifies the objectives, the process, and the roles and responsibilities for completing PSSR, and provides guidance on the scope and timing of the PSSR. In brief, a PSSR is required when:

- permanent or temporary changes occur that are covered by the Management of Change for Facilities and Operations Process (Ref. 45)
- an intrusive inspection or major repair has been conducted
- a mothballed system is being restarted
- a new complex system is being put into operation for the first time.

6.6 Information management

The ABU OE Information Management (OEIM) Process (OE-03.02.01; Ref. 59) defines the requirements for properly maintaining critical OE information throughout its lifecycle. The Process is supported by:

- ABU Records Management Standard (OE-03.02.125; Ref. 60) which provides a framework for the management of CAPL Company records throughout the information lifecycle and ensures records are correctly identified, captured, protected, retained and destroyed in accordance with Chevron Policy 566 – Information Retention, compliance with state, national and international legislation, government regulations, and Chevron, ABU and joint venture partner business controls and facilitates efficient search and retrieval to aid business operation and decision making and support information requirements in the event of audit, litigation or divestment.
- ABU Records Retention Schedule (OE-03.02.113; Ref. 61) defines the retention schedule for each record retention category.

In accordance with Condition 24 of EPBC Reference: 2003/1294 and 2008/4178, CAPL shall maintain accurate records of activities associated with the conditions of approval and make them available on request by the DCCEEW. Such documents may be subject to audit by DCCEEW and used to verify compliance with the conditions of approval.

6.7 Assurance

Within the OEMS, assurance is a common expectation that supports the OE objective of each focus area. The ABU OE Compliance and Assurance Process (Ref. 46) enables CAPL to deliver assurance that safeguards are established and functioning; it details:

- a framework for managing verification activities that assure that CAPL complies with applicable legal, regulatory and OEMS requirements
- a process to identify, report and resolve non-compliance
- the minimum qualifications and organisational capability to execute this process.

To support the implementation of the ABU OE Compliance and Assurance Process, CAPL have developed an ABU integrated assurance system (Figure 6-3), which integrates and leverages assurance activities across the various levels of CAPL business through to the corporate level—to provide confidence that safeguards are in place and functioning as intended. This integrated assurance system includes:

- Level 1 Monitoring, testing and frontline assurance: ongoing, routine, planned verifications of safeguards specific for the asset/facility (e.g. inspections, preventive maintenance, emergency drills and exercises).
- Level 2 OE assurance: OE assurance activities (e.g. assessments, reviews, audits, inspections) that verify safeguards are in place and functioning, and validate that L1 assurance is effective. These assurance activities monitor weaknesses in the management system and compliance with regulatory requirements, and input learnings into the management system cycle.
- Level 3 Corporate and functional assurance: Assurance activities undertaken by Chevron, CAPL's functional groups (e.g. HSE, Drilling and Completions, base business) or third parties. These assurance activities test effectiveness of the focus area's complete assurance system and how associated safeguards are being sustained.


Figure 6-3: ABU integrated assurance system

The ABU OE Assurance Plan (Ref. 47) documents the CAPL ABU integrated assurance system and associated assurance activities. The ABU OE Assurance Plan is reviewed and approved annually and identifies OE assurance priorities based on risk, providing a framework for the scheduling of assurance activities across assets and projects.

Assurance activities focus on in-field activities and administrative processes, depending on the activities being undertaken and assurance priorities, in order to provide sufficient demonstration that environmental performance outcomes and environmental performance standards have been met. A record of assurance activities undertaken, and the outcomes, are maintained and applicable actions are tracked until closure.

In accordance with Conditions 4.1 and 4.2 of MS 800 and MS 769, CAPL maintains a Compliance Assessment Plan (CAP; Ref. 48) which outlines the approach and timing of compliance assessments and the retention of compliance assessments. The approach outlined in the CAP is aligned with the ABU OE Compliance and Assurance Process described above.

Assurance activities to assess implementation and effectiveness of this Plan will be undertaken in accordance with the ABU OE Compliance and Assurance Process (Ref. 46) and the Gorgon CAP.

In accordance with Condition 23 of EPBC Reference: 2003/1294 and 2008/4178, CAPL shall, upon the direction of the Minister, ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.

In accordance with Condition 24 of EPBC Reference: 2003/1294 and 2008/4178, CAPL shall maintain accurate records of activities associated with conditions of approval and make them available on request by the DCCEEW. Such documents may be subject to audit by DCCEEW and used to verify compliance with the conditions of approval.

6.8 Environmental performance review, reporting, adaptive management and plan review

6.8.1 Environmental performance review

CAPL applies a number of processes to routinely review environmental performance. These include the MSC, Asset Review and Annual Reporting Cycle.

6.8.1.1 Management system cycle (MSC)

As outlined in Section 6.1, the MSC is a key element of the OEMS. The MSC is a systematic approach to set and align objectives; identify, prioritise and close gaps; strengthen safeguards and improve OE results. The MSC is managed by OELTs who have the authority and the accountability to execute the OEMS effectively. The MSC is coordinated at various levels in the company for effective and efficient management of OE risks, including environment. The MSC comprises of three steps:

- Establish or validate objectives
- Conduct assessment to assess current performance and identify and gaps
- Develop plan to address any identified gaps.

Execution and review of the MSC is considered an ongoing activity; OELTs direct scope, frequency and rigour based on risk. Whilst it is an ongoing activity, there is a dedicated review cycle which includes targeted focus on environmental performance at an ABU level as well for each Asset. This performance review identifies any new environmental risks and where appropriate a plan to address these risks is developed. Progress against this plan is then monitored by the OELT.

6.8.1.2 Asset review

In addition to the above, there is a more tactical review of Environmental Performance at an Asset level through the annual identification of metrics and the routine capture and review of metrics, KPIs, incidents and incident investigations outcomes. Section 6.8.2.3 provides further details on incident investigation. This Asset level review enables trends and focus areas for improvement to be identified.

6.8.1.3 Annual environmental reporting cycle

As outlined in Sections 6.8.1 and 6.8.2 below, the annual reporting cycle provides another mechanism for review of environmental performance. This reporting cycle supports a thorough review and assessment of performance in relation to both compliance and results of ecological monitoring programs. Outcomes of the annual reporting cycle are also fed into the MSC.

6.8.2 Reporting

6.8.2.1 Compliance reporting

Condition 4 of MS 800 and MS 769 and Condition 2 of EPBC Reference: 2003/1294 and 2008/4178 requires CAPL to submit a Compliance Assessment Report annually to address the previous 12-month period. In accordance with Conditions 2-1 and 2-2 of MS 965, compliance assessment and compliance reporting will be carried out on a joint basis with MS 800.

In accordance with Condition 4.5 of MS 800 and MS 769, any non-compliance with approval conditions will be reported to the Chief Executive Officer of DWER as soon as practicable. Non-compliances with provisions in the Plan that do not affect the meeting

of the Plan's objectives are reported annually in the Compliance Assessment Report, along with any corrective and preventative actions taken.

6.8.2.2 Environmental performance reporting

Condition 5.1 of MS 800 and MS 769, and Condition 4 of EPBC Reference: 2003/1294 and 2008/4178 require that CAPL submits an annual Environmental Performance Report (EPR) to the Western Australian Minister for the Environment and to the DCCEEW respectively, for the previous 12-month period.

In addition, under Condition 5.3 of MS 800 and MS 769, and Condition 4.2 for EPBC Reference: 2003/1294 and 2008/4178 every five years from the date of the first annual Report, CAPL shall submit to the Western Australian Minister for the Environment an EPR covering the previous five-year period. In accordance with Conditions 2-1 and 2-2 of MS 965, performance reporting will be carried out on a joint basis with MS 800.

Specific details on the content of the EPR are defined in Condition 5.2 and Schedule 3 of MS 800, Condition 5.2 of MS 769, and Schedule 3 of EPBC Reference: 2003/1294 and 2008/4178. The content of the EPR includes the results of the monitoring undertaken as per the TSEMP (Ref. 21) including where applicable any measurable impacts on the terrestrial and subterranean environment state from the Project, changes from baseline or mitigation measures applied.

MS 800 Schedule 3 Condition 6 (iii) and EPBC Reference: 2003/1294 and 2008/4178 Schedule 3 Condition 5 (iii) requires the Annual Performance Report to contain information on the results of environmental monitoring and identified Material or Serious Environmental Harm, if any, resulting from the seepage of injected CO_2 to the surface or near surface environments including those which may support subterranean fauna (including the Barrow Cave Gudgeon (*Milyeringa justitia*)³).

6.8.2.3 Incident reporting

Incident investigation and reporting (IIR) expectations are to identify, report, record and investigate incidents, analyse trends, correct deficiencies, and share and adopt relevant lessons learned.

The IIR Execution Manual (Ref. 36) defines the requirements to report, classify, record, and investigate incidents and near misses, including but not limited to injury, occupational illness, environmental impact, compliance, reliability, business disruption, and community concern.

The IIR process includes these requirements:

- training for employees and contractors to recognise and report events
- internal and external notification of events
- investigating incidents at the probable level of consequence, with the rigor of investigation based upon learning opportunity and incident severity
- allocating an incident management sponsor for selected investigations
- sharing alerts, lessons learned, and bulletins
- tracking recommended actions to closure
- analysing event trends.

³ Species was previously listed as M. veritas

Table 6-3lists the environmental incident reporting requirements, including timing, specific to this Plan.

Table 6-3: Incident reporting requirements

Incident	Reporting to	Timing
Waste management events (attributable to the Gorgon Gas Development) resulting in Material or Serious Environmental Harm outside the TDF	DWER and DCCEEW	Within 48 hours of detection ¹
Non-compliance with approval conditions	DWER	As soon as practicable

1 Detection of ecological change may only become apparent following receipt of monitoring data analysis.

6.9 Adaptive management and plan revision

CAPL is committed to conducting activities in an environmentally responsible manner and aims to implement reviews of its environmental management actions as part of a program of continuous improvement. This commitment to continuous improvement means that CAPL will apply an adaptive management approach by routinely reviewing matters such as the overall design and effectiveness of the Plan, progress in environmental performance, changes in environmental risks, changes in business conditions, and any relevant emerging environmental issues. Changes may also be identified through the EPR reporting process (Section 6.8.2.2) or the incident response process.

If the Plan no longer meets the aims, objectives or requirements of the Plan, if works are not appropriately covered by the Plan, or measures are identified to improve the Plan, CAPL will submit an amendment or addendum to the Plan to the State Minister for Environment for approval under Condition 36.2 of MS 800, Condition 21 of MS 769 and Condition 25 of EPBC Reference: 2003/1294 and 2008/4178.

In addition to any updates as a result of adaptive management reviews, outlined above, this Plan will be reviewed and updated every ten years as a minimum as required by Condition 3.2A of EPBC Reference 2003/1294 and 2008/4178 or as directed by either the Western Australian Minister for the Environment or the Commonwealth Minister for the Environment in accordance with Condition 36.2 of MS 800 and Condition 21 of MS 769 or Condition 25 of EPBC Reference: 2003/1294 and 2008/4178, respectively.

7 Acronyms and abbreviations

Terminology used in this document is listed in Table 7-1. These terms align with those defined in:

- Schedule 2 of MS 800
- Schedule 2 of MS 769
- EPBC Reference: 2003/1294 and 2008/4178.

Table 7-1: Terminology

Term	Definition				
ABU	Australian Business Unit				
Additional Support Area	Gorgon Gas Development Additional Construction, Laydown, and Operations Support Area				
AIIMS	Australasian Inter-service Incident Management System				
AIM	Asset Integrity Management				
ALARP	As low as reasonably practicable—where it is demonstrated that the cost of implementing further control measures is disproportionate to the benefit gained, the risk is considered to be ALARP. Cost includes financial cost, time or duration, effort, occupational health and safety risks, or environmental impacts associated with implementing the control.				
All waste streams	All waste generated during the construction and operation phases of the Gorgon Gas Development. These wastes can be broadly classified under the categories of general waste, recyclable waste, solid and liquid hazardous waste, and quarantine-risk material.				
At risk Being at risk of Material Environmental Harm or Serious Environmental Harm and/o purposes of the EPBC Act relevant listed threatened species, threatened ecological communities and listed migratory species, at risk of Material Environmental Harm or Environmental Harm.					
BOD5	5-day Biochemical Oxygen Demand				
BTEX	Benzene, toluene, ethylbenzene, and xylene compounds				
BWI	Barrow Island				
CAP	Compliance Assessment Plan				
CAPL	Chevron Australia Pty Ltd				
CMMS	Computerised maintenance management system				
Construction	Construction includes any Proposal-related construction and commissioning activities within the Terrestrial and Marine Disturbance Footprints, excluding investigatory works such as, but not limited to, geotechnical, geophysical, biological and cultural heritage surveys, baseline monitoring surveys and technology trials.				
Cth	Commonwealth of Australia				
CWI	Chevron Well Integrity				
DBCA	Western Australian Department of Biodiversity, Conservation and Attractions				
DC	Drill Centre				
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water				
DDA	Drainage Discharge Approval				
Deep wells	In the context of liquid waste disposal, refers to injection wells completed in the Barrow Island Group (a well-defined geological formation ~1000 to 1800 m below the surface).				
DEMIRS	Western Australian Department of Energy, Mines, Industry Regulation and Safety				
DG	Dangerous Goods				

Term	Definition			
DSDMP	Dredging and Spoil Disposal Management and Monitoring Plan			
DWER	Western Australian Department of Water and Environmental Regulation			
Effluent	Wastewater—treated or untreated—that originates from a treatment plant or sewer, such sewage treatment plant discharge.			
EIS	Environmental Impact Statement			
EMP	Environmental Management Plan			
EMT	Emergency Management Team			
Environmental Harm	Has the meaning given by Part 3A of the Environmental Protection Act 1986 (WA).			
Environmental Quality Criteria	Numerical values or narrative statements that serve as benchmarks to determine whether a more detailed assessment of environmental quality is required, or whether a management response is required.			
EP Act	Western Australian Environmental Protection Act 1986			
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999			
EPBC Reference: 2003/1294	Commonwealth Ministerial Approval (for the Gorgon Gas Development) as amended or replaced from time to time.			
EPBC Reference: 2005/2184	Commonwealth Ministerial Approval (for the Jansz Feed Gas Pipeline) as amended or replaced from time to time.			
EPBC Reference: 2008/4178	Commonwealth Ministerial Approval (for the Revised Gorgon Gas Development) as amended or replaced from time to time.			
EPR	Environmental Performance Report			
EQO	Environmental Quality Objective.			
	A specific management goal for a part of the environment; it is either ecologically based by describing the desired level of health of the ecosystem or socially based by describing the environmental quality required to maintain specific human uses.			
ERMP	Environmental Review and Management Programme			
ERO	Emergency Response Organisation			
EV	Environmental Values.			
	As per the definition in the <i>Environmental Protection Act 1986</i> (WA): a beneficial use; or an ecosystem health condition.			
	In the context of the Environmental Quality Framework developed by the EPA: Particular value or use of the marine environment that is important for a healthy ecosystem or for public benefit, welfare, safety, or health and which requires protection from the effects of pollution, waste discharges, and waste deposits.			
FIRM	Facilities Integrity and Reliability Management			
General waste	Waste material that is free of any apparent or actual pathological/infectious, radioactive, or hazardous chemical contamination.			
GJV	Gorgon Joint Ventures			
Gorgon Gas Development	The Gorgon Gas Development and Jansz Feed Gas Pipeline as approved under MS 800, MS 769, and EPBC Reference: 2003/1294 and 2008/4178 as amended or replaced from time to time.			
GTP	Gas Treatment Plant			
Hazardous waste	Components of the waste stream that pose a threat or risk to public health, safety, or the environment (includes substances that are toxic, infectious, mutagenic, carcinogenic, teratogenic, explosive, flammable, corrosive, oxidising, and radioactive)			

Term	Definition			
Hazardous waste – Liquid	Used or waste liquids that have the potential to harm the environment or living organisms. Examples include, but are not limited to, oil, lubricants, paint, acids, mercury, paint, sewage, and coolants.			
Hazardous waste – Solid	Used or waste solids that have the potential to harm the environment or living organisms. Examples include, but are not limited to, oily rags, mercury contaminated material, and hydrocarbon-contaminated soil.			
HDPE	High-density polyethylene			
HSE	Health, Safety and Environment			
IC	Incident Commander			
ICA	Integrity Critical Asset			
ICE	Integrity Critical Element			
IIR	Incident investigation and reporting			
IMS	Incident management system			
ISO	International Organization or Standardization			
km	Kilometre			
Liquid Waste	Material that does not meet the definition of solid waste e.g. sediments, sludges.			
LNG	Liquefied Natural Gas			
LWF	Liquid Waste Facility			
m	Metre			
Marine Disturbance Footprint	The area of the seabed to be disturbed by construction or operations activities associated with the Marine Facilities listed in Condition 14.3 of MS 800 and Condition 12.3 of MS 769, and Condition 11.3 in EPBC Reference: 2003/1294 and 2008/4178 (excepting that area of the seabed to be disturbed by the generation of turbidity and sedimentation from dredging and dredge spoil disposal) as set out in the Coastal and Marine Baseline State Report required under Condition 14.2 of MS 800, Condition 12.2 of MS 769, and Condition 11.2 of EPBC Reference: 2003/1294 and 2008/4178.			
MARPOL	The International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. Also known as MARPOL 73/78.			
Material Environmental Harm	Environmental harm that is neither trivial nor negligible			
MEQMP	Marine Environmental Quality Management Plan			
MIE	Major Incident Events			
MNES	Matters of National Environmental Significance			
MS	(Western Australian) Ministerial Statement			
MS 1002	Western Australian Ministerial Statement 1002, issued for the Gorgon Gas Development Fourth Train Expansion Proposal, as amended from time to time.			
MS 748	Western Australian Ministerial Statement 748 (for the Gorgon Gas Development) as amended from time to time [superseded by Ministerial Statement 800].			
MS 769	Western Australian Ministerial Statement 769 (for the Jansz Feed Gas Pipeline) as amended from time to time.			
MS 800	Western Australian Ministerial Statement 800, issued for the Revised and Expanded Gas Development, as amended from time to time. MS 800 supersedes the Gorgon Gas Development as originally approved by MS 748. The conditions of MS 800 also apply to the Additional Support Area under MS 965, and the Fourth Train Expansion Proposal under MS 1002.			

Term	Definition
MS 865	Western Australian Ministerial Statement 865, issued to establish a restart mechanism for dredging, as amended from time to time.
MS 965	Western Australian Ministerial Statement 965, issued for the Additional Support Area, as amended from time to time.
MSC	Management System Cycle
NES	[Matters of] National Environmental Significance, as defined in Part 3, Division 1 of the EPBC Act.
NORM	Naturally Occurring Radioactive Material
OC	On-Scene Commander
OE	Operational Excellence
OEIM	OE Information Management
OELT	Operational Excellence Leadership Teams
OEMS	Operational Excellence Management System
Operations	In relation to MS 800 and EPBC Reference: 2003/1294 and 2008/4178, for the respective LNG trains, this is the period from the date on which the Gorgon Joint Venture participants issue a notice of acceptance of work under the Engineering, Procurement and Construction Management contract, or equivalent contract entered into in respect of that LNG train of the Gas Treatment Plant; until the date on which the Gorgon Joint Venturers commence decommissioning the LNG train.
OPS	Operational Performance Standards
ORT	On-Site Response Team
OSCP	Onshore Spill Contingency Plan
OWS	Oily Water Sump
PER	Public Environmental Review
Performance standards	Are matters that are developed for assessing performance, not compliance, and are quantitative targets or where that is demonstrated to not be practicable, qualitative targets, against which progress towards achievement of the objective of conditions can be measured.
PFAS	Per- and polyfluoroalkyl substances
рН	Measure of acidity or basicity of a solution
PP(E)R	Petroleum Pipelines (Environment) Regulations 2012
Practicable	For the purposes of MS 769 and MS 800 means reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge.
	For the purposes of EPBC Reference: 2003/1294 and 2008/4178, when considering whether the plan meets the requirements of these conditions, the Commonwealth Minister will determine what is 'practicable' having regard to local conditions and circumstances including, but not limited to, personnel safety, weather or geographic conditions, costs, environmental benefit, and the current state of scientific and technical knowledge.
Process water	Hydrocarbon contaminated water managed by the oil recovery system at the plant site.
Produced water	Water that is produced as a by-product during the recovery of gas from the gas fields.
PS	Performance Standards
PSSR	Pre-Start-up Safety Review
Putrescible waste	Component of the waste stream likely to become putrid. Examples include, but are not limited to, food scraps and green waste.

Term	Definition					
Putrescible- contaminated materials	Waste that is contaminated with components that are likely to become putrid. Examples include, but are not limited to, food-contaminated paper.					
PWD	Permanent Wastewater Disposal					
QMS	Quarantine Management System					
Quarantine-risk material	Any material that has a higher probability than general freight and cargo of harbouring non- indigenous species					
Recyclable waste	Waste material that is re-used in the same or another process after being reprocessed, or its calorific value is recovered. Examples include, but are not limited to, plastic, paper, aluminium.					
RO	Reverse Osmosis					
ROBDOOEMMP	Reverse Osmosis Brine Disposal via Ocean Outfall Environmental Management and Monitoring Plan					
SDS	Safety Data Sheet					
Serious Environmental	Environmental harm that is:					
Harm	 irreversible, of a high impact or on a wide scale; or 					
	 significant or in an area of high conservation value or special significance and is neither trivial nor negligible. 					
SERIP	Surface Equipment Reliability and Integrity Process					
SLWMP	Solid and Liquid Waste Management Plan					
Solid Waste	Material that:					
	(a) has an angle of repose of greater than 5 degrees; and					
	(b) does not contain, or is not comprised of, any free liquids; and					
	when the waste is transported;					
	(d) does not become free flowing at or below 60 degrees Celsius or when it is transported; and					
	(e) is generally capable of being moved by a spade at normal temperatures (i.e. is spadeable).					
Spadeable	A physical state of a material where the material behaves sufficiently like a solid (as described above) to be moved by a spade at normal outdoor temperatures.					
SWHP	Stormwater Holding Pond					
TAPL	Texaco Australia Pty Ltd					
TDF	Terrestrial Disturbance Footprint					
Terrestrial Disturbance Footprint	The area to be disturbed by construction or operations activities associated with the Terrestrial Facilities listed in Condition 6.3 of MS 800, Condition 6.3 of MS 769, and Condition 5.2 in EPBC Reference: 2003/1294 and 2008/4178.					
Terrestrial Facilities	 In relation to MS 800 and EPBC Reference: 2003/1294 and 2008/4178, the terrestrial facilities are the: GTP Carbon Dioxide Injection System Associated Terrestrial Infrastructure forming part of the Proposal Areas impacted for seismic data acquisition Onshore Feed Gas Pipeline System and terrestrial component of the Shore Crossing. Terrestrial Facilities also include those defined in Schedule 1 of MS 965 (the Additional Support Area) 					
TN	Total nitrogen					

Term	Definition
ТР	Total phosphorus
ТРН	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TSBSEIR	Terrestrial and Subterranean Baseline State and Environmental Impact Report
TSEMP	Terrestrial and Subterranean Environment Monitoring Program
TSEPP	Terrestrial and Subterranean Environmental Protection Plan
TSS	Total Suspended Solids
TWIP	Temporary Wastewater Injection Package
UDR	Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)
WA	Western Australia
WAO	WA Oil
Waste Management Facility	Permanent and/or long-term waste facilities that store, treat, or dispose of solid and/or liquid waste generated on Barrow Island and its surrounding waters.
Wastewater	Liquid wastes originating as stormwater or associated with construction or operation activities. Examples include, but are not limited to, hydrotest water, RO brine, chlorinated seawater from the emergency fire system, and condensate water.
Waters surrounding Barrow Island	The waters of the Barrow Island Marine Park and Barrow Island Marine Management Area (~4169 ha and 114 693 ha respectively) as well as the port of Barrow Island representing the Pilbara Offshore Marine Bioregion, which is dominated by tropical species that are biologically connected to more northern areas by the Leeuwin Current and the Indonesian Throughflow resulting in a diverse marine biota that is typical of the Indo-West Pacific flora and fauna.
WTS	Waste Transfer Station
WWTP	Wastewater Treatment Plant

8 References

The following documentation is either directly referenced in this document or is a recommended source of background information.

Table 8-1: References

Ref. No.	Description	Document ID
1.	Government of Western Australia, Minister for the Environment, David Templeman MLA. 2008. Statement that a Proposal may be Implemented – Jansz Feed Gas Pipeline: Barrow Island Nature Reserve (Ministerial Statement 769), 28 May 2008. Perth, Western Australia.	
2.	Commonwealth Government of Australia, Assistant Secretary Environmental Assessment Branch, Anne-Marie Delahunt. 2006. Decision to Approve the taking of an Action – Jansz Feed Gas Pipeline (EPBC Reference: 2005/2184), 22 March 2006. Canberra, Australian Capital Territory.	
3.	Government of Western Australia, Minister for the Environment, Youth, Donna Faragher JP MLC. 2009. Statement that a Proposal may be Implemented – Gorgon Gas Development Revised and Expanded Proposal: Barrow Island Nature Reserve (Ministerial Statement 800), 10 August 2009. Perth, Western Australia.	
4.	Government of Western Australia, Minister for the Environment, David Templeman MLA. 2007. Statement that a Proposal may be Implemented – Gorgon Gas Development: Barrow Island Nature Reserve (Ministerial Statement No. 748), 6 September 2007. Perth, Western Australia.	
5.	Commonwealth Government of Australia, Minister for the Environment, Water, Heritage and the Arts, Peter Garrett. 2009. <i>Approval – Gorgon</i> <i>Gas Development (EPBC Reference: 2008/4178), 26 August 2009.</i> Canberra, Australian Capital Territory.	
6.	Commonwealth Government of Australia, Minister for the Environment and Water Resources, Malcolm Turnbull. 2007. <i>Approval – Gorgon Gas</i> <i>Development (EPBC Reference: 2003/1294), 3 October 2007</i> . Canberra, Australian Capital Territory.	
7.	Government of Western Australia, Minister for the Environment; Heritage. Albert P. Jacob JP MLA. 2014. <i>Statement that a Proposal may be</i> <i>Implemented – Gorgon Gas Development Additional Construction</i> <i>Laydown and Operations Support Area (Ministerial Statement 965).</i> Perth, Western Australia.	
8.	Government of Western Australia, Minister for the Environment; Water, Hon Bill Marmion MLA. 2011. <i>Statement to Amend Conditions Applying to</i> <i>a Proposal – Gorgon Gas Development Revised and Expanded Proposal:</i> <i>Barrow Island Nature Reserve (Ministerial Statement 865), 8 June 2011.</i> Perth, Western Australia.	
9.	Government of Western Australia, Minister for the Environment; Heritage. Albert Jacob MLA. 2015. <i>Statement that a Proposal may be Implemented</i> – Gorgon Gas Development Fourth Train Expansion Proposal (Ministerial Statement 1002). Perth, Western Australia.	
10.	Chevron Australia. 2015. Gorgon Gas Development and Jansz Feed Gas Pipeline: Reverse Osmosis Brine Disposal via Ocean Outfall Environmental Management and Monitoring Plan. Chevron Australia, Perth, Western Australia.	G1-NT-REPX0001483
11.	Chevron Australia. 2011. <i>Gorgon Gas Development and Jansz Feed Gas Pipeline: Dredging and Spoil Disposal Management and Monitoring Plan.</i> Chevron Australia, Perth, Western Australia.	G1-NT-PLNX0000373

Ref. No.	Description	Document ID
12.	Chevron Australia. 2014. Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Marine Quarantine Management System. Chevron Australia, Perth, Western Australia.	G1-PP-QRT-GDL-0001
13.	Chevron Australia. 2015. <i>Gorgon Gas Development Revised and Jansz Feed Gas Pipeline: Fire Management Plan</i> . Chevron Australia, Perth, Western Australia.	GOR-COP-01238
14.	Chevron Australia. 2014. Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Subterranean Environment Protection Plan. Chevron Australia, Perth, Western Australia.	G1-NT-PLNX0000294
15.	International Maritime Organization. 1997. International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 relating thereto (MARPOL). International Maritime Organization, London.	
16.	Chevron Australia. 2014. Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Subterranean Baseline State and Environmental Impact Report. Chevron Australia, Perth, Western Australia.	G1-TE-H-0000-REPX027
17.	Chevron Australia. 2012. Gorgon Gas Development and Jansz Feed Gas Pipeline: Coastal and Marine Baseline State and Environmental Impact Report. Chevron Australia, Perth, Western Australia.	G1-NT-REPX0001838
18.	Chevron Australia. 2005. Draft Environmental Impact Statement/Environmental Review and Management Programme for the Proposed Gorgon Gas Development. Chevron Australia, Perth, Western Australia.	
19.	Standards Australia/Standards New Zealand. 2004. <i>ISO</i> 14001:2004 <i>Environmental Management Systems – Requirements with Guidance for</i> <i>Use.</i> Standards Australia/Standards New Zealand, Sydney/Wellington.	
20.	Chevron Australia. 2016. Gorgon Gas Development Marine Environmental Quality Management Plan. Chevron Australia, Perth, Western Australia.	GOR-COP-01110
21.	Chevron Australia. 2014. Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Subterranean Environment Monitoring Plan. Chevron Australia, Perth, Western Australia.	G1-NT-PLNX0000309
22.	Department of Water and Environmental Regulation. 2021. Amended Licence and Amendment Report for Gorgon LNG Plant Licence, Division 3, Part V Environmental Protection Act 1986.	DER2017/001839
23.	Chevron Australia. 2024. Gorgon Project Carbon Dioxide Injection System Pipeline and Wells Operations Environment Management Plan.	GOR-COP-01489
24.	Chevron Australia. 2023. Carbon Dioxide Injection System Well Maintenance Environment Plan	GOR-COP-02232
25.	DWER. 2019. Guideline Industry Regulation Guide to Licensing	
26.	Chevron Australia. 2024. Barrow Island Joint Venture Environment Plan	030240006
27.	Chevron Australia. 2023. Carbon Dioxide Injection System Pressure Management Wells Drilling and Construction Environment Plan	CO2-0000-RGL-PLN-CVX- 000-00002-00
28.	Chevron Australia. 2017. Gorgon Operations Waste Re-use and Disposal on Barrow Island: Environmental Assessment Procedure	GOR-COP-02121
29.	Chevron Australia. 2022. Operational Performance Standard (CWI) Gorgon Producing Well Integrity	GOR-0000-PRO-0020
30.	Government of Western Australia, Minister for Environment; Climate Action. Hon Reece Whitby MLA. 2022. <i>Statement to amend the</i> <i>implementation conditions applying to a proposal – Gorgon Gas</i> <i>Development Revised and Expanded Proposal: Barrow Island Nature</i>	

Ref. No.	Description	Document ID	
	<i>Reserve (Ministerial Statement 1198), 20 October 2022.</i> Perth, Western Australia.		
31.	Commonwealth Government of Australia, 2016. Assistant Secretary Assessment (WA, SA, NT) and Air Branch. <i>Approval – Gorgon Gas</i> <i>Development – Fourth Train Expansion (EPBC 2011/5942), 12 May 2016.</i> Canberra, Australian Capital Territory		
32.	Chevron Australia. 2021. Gorgon Project Carbon Dioxide Disposal Management Plan. Perth, Western Australia.	G1-NT-REPX0001721	
33.	Chevron Australia. 2018. A <i>BU OE Risk Management Process</i> . Rev. 12.0. Chevron Australia, Perth, Western Australia.	OE-03.01.01	
34.	Standards Australia. 2012. <i>Handbook 203:2012 Managing Environment-</i> <i>related Risk</i> . Sydney, Australia.		
35.	Chevron Australia. 2017. Procedure for Use of Spill Kits Located in Gorgon Operation Areas.	GOR-COP-0097	
36.	Chevron Australia. 2022. <i>II&R Execution Manual ABU Incident Investigation and Reporting.</i> Rev. 20.0. Chevron Australia, Perth, Western Australia.	OE-09.00.01	
37.	Gorgon Project Barrow Island Onshore Spill Contingency Plan	GOR-COP-02978	
38.	Chevron Australia. 2023. <i>ABU Competency Development and Assurance</i> – <i>ABU Standardised OE Process.</i> Rev. 9.0. Chevron Australia, Perth, Western Australia.	OE-03.13.01	
39.	Chevron Australia. 2018. <i>ABU Emergency Management Standardized OE Process.</i> Rev. 7.0. Chevron Australia, Perth, Western Australia.	OE-03.13.01	
40.	Chevron Australia. 2019. <i>ABU Crisis Management Plan.</i> Rev. 20.0. Chevron Australia, Perth, Western Australia.	OE-11.01.10	
41.	Chevron Australia. 2018 Surface Equipment Reliability and Integrity Process (SERIP) – ABU Standardised OE Process	OE-05.03.01	
42.	Corporate Standard for Facilities Integrity and Reliability Management Process	FIRM 01000	
43.	Chevron Australia. 2019. ABU Asset Integrity Program – ABU Standardised OE Procedure	OE.05.03.160	
44.	Chevron Australia. 2021. ABU Deviation Management Procedure	ABU-COP-0205	
45.	Chevron Australia. 2022. ABU Management of Change for Facilities and Operations Process	OE-04.00.01	
46.	Chevron Australia. 2022. ABU OE Compliance and Assurance Process. Rev. 3.0.	OE-03.13.01	
47.	Chevron Australia. 2022. <i>ABU OE Assurance Plan</i> . Chevron Australia, Perth, Western Australia.	ABU161100798	
48.	Chevron Australia. 2018. <i>Gorgon Compliance Assessment Plan</i> . Rev. 4.0. Chevron Australia, Perth, Western Australia.	ABU171001656	
49.	Chevron Australia. 2014. Weed Hygiene Common User Procedure. Perth, Western Australia.	G1-PP-HES-PRC-0016	
50.	Chevron Australia. 2018. Gorgon Gas Development and Jansz Feed Gas Pipeline: Long-term Marine Turtle Management Plan. Rev. 1.0. Chevron Australia, Perth, Western Australia.	GOR-COP-01728	
51.	Chevron Australia. <i>Gorgon Major Hazard Facility Safety Report</i> . Perth, Western Australia.	G1-NT-REPX0004799	

Ref. No.	Description	Document ID
52.	Chevron Australia. 2008. Gorgon Gas Development Revised and Expanded Proposal Public Environmental Review. Chevron Australia, Perth, Western Australia.	
53.	DWER. 2018. Application for Licence Part V Licence DWER Decision Report	DER2017/001839
54.	Standards Australia/Standards New Zealand. 2009. <i>ISO 31000:2018 Risk Management – Principles and Guidelines</i> . Sydney, Australia.	
55.	Commonwealth of Australia 2024. <i>Environmental Management Plan Guidelines.</i> Canberra, Australia.	
56.	Environmental Protection Authority 2021, <i>Instructions on how to prepare</i> <i>Environmental Protection Act 1986 Part IV Environmental Management</i> <i>Plans</i> , EPA, Western Australia	
57.	Chevron Australia. ABU Contractor Training Matrix Perth, Western Australia	ABU-COP- 01503
58.	Chevron Australia. 2021. ABU Facilities Engineering Pre-Start-up Safety Review Guideline	ABU-COP-0027
59.	ABU OE Information Management Process	OE-03.02.01
60.	ABU Records Management Standard	OE-03.02.125;
61.	ABU Records Management Schedule	OE-03.02.113
62.	Chevron Australia. 2018. Barrow Island Terminal Regulations Manual. Chevron Australia, Perth, Western Australia.	GOR-COP-0174
63.	US Department of Homeland Security. <i>National Incident Management System (NIMS)</i> Third Edition October 2017. Accessed 26 March 2024	
64.	Chevron Australia. 2023. <i>Emergency Response Plan – Barrow Island</i> . Rev. 8.0. Chevron Australia, Perth, Western Australia.	ABU-COP-02319

Appendix A Chevron Integrated Risk Prioritisation Matrix

Chevron Chevron Integrated Risk Prioritization Matrix 2022 Revision										
Likelihood Descriptions & Index					Legend (Where Likelihood is with confirmed and verified safeguards.	Risk Levels 1-4: Elev Risk Level 5: Risk re- management approv	vels 1-4: Elevated Risk. Risk reduction required. vel 5: Risk reduction is required. If risk reduction action cannot be reasonably taken, BU ement approval must be obtained.			
Descriptions	Li	kelihood Ir	ndices		without safeguards)	without safeguards) Risk Levels 6-10: Manage confirmed and verified safeguards. Further risk reduction unless unrea				inless unreasonable.
Espected to occur	1	Likely			6	5	4	3	2	1
Conditions may allow to occur	2	Occasional	poo		7	6	5	4	3	2
Exceptional conditions may allow to occur	3	Seldom	Likelih		8	7	6	5	4	3
Reasonable to expect will not occur	4	Unlikely	creasing		9	8	7	6	5	4
Has occurred once or twice in the industry	5	Remote	Dec		10	9	8	7	6	5
Rare or unheard of	6	Rare			10	10	9	8	7	6
	Con	Consequence Indices			6	5	4	3 3	2	1
					Incidental	Minor	Moderate	Major	Severe	Catastrophic
Consequence Descriptions & Index (without safeguards)	IS	Worki Health 8	force Safety		One or more illnesses or injuries resulting in limited treatment	One or more illnesses or injuries requiring treatment but not severe	One or more severe illnesses or injuries	One to four illnesses with significant life shortening effects or fatalities	Multiple illnesses resulting in significant life shortening effects or multiple fatalities (5-50)	Multiple illnesses resulting in significant life shortening effects or multiple fatalities (>50)
	Consequence Descriptio	Public H Safe	icalth & ety		One or more illnesses or injuries not resulting in treatment	One or more illnesses or injuries resulting in limited treatment	One or more linesses or injuries requiring treatment but not severe	One or more severe illnesses or injuries	One to ten illnesses with significant life shortening effects or one to ten fatalities	Multiple illnesses resulting in significant life shortening effects or multiple fatalities (>10)
		Enviro	nment		Limited impact	Localized, short-term impact	Localized, long-term impact or widespread, short-term impact	Localized, persistent impact or widespread, long-term impact	Widespread, persistent impact or landscape- scale, long-term impact	Landscape-scale, persistent impact
The above legend applies to HSE risks. For risks that may result in regulatory impacts, facility damage, business interruption, loss of product, the "Business & Reputation" and "Asset" categories below should be used. Asset risk reduction is at the discretion of management. Business & Reputation risk reduction is performed as per the Stakeholder Engagement & Issues Management (SEIM) process. Under no circumstances may a direct or indirect translation of Asset or Business & Reputation loss to HSE consequences, or between any discrete categories of HSE consequences be inferred.										

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Appendix B Identification and risk assessment of terrestrial and subterranean Matters of National Environmental Significance (NES)



SLWMP Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat

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1 Introduction

This Appendix provides the following information as required by approval conditions under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Reference: 2003/1294 and 2008/4178 (Ref. 1, Ref. 2):

- i. a description of the EPBC listed species and their habitat likely to be impacted by the components of the action which are the subject of that plan, report, program or system (however described)
- ii. an assessment of the risk to these species from the components of the action the subject of that plan, relevant to that plan, report, program or system (however described).

Species listed as Matters of National Environment Significance (NES) and species listed as Other Matters Protected by the EPBC Act are included in Table 2-1 for Barrow island, with further information provided in Section 2.1 for any species or habitat that is potentially impacted by the Gorgon Gas Development.

Species listed as Matters of NES and species listed as Other Matters Protected by the EPBC Act are included in Table 3-1 for the mainland Onshore Domestic Gas Pipeline. The Onshore Domestic Gas Pipeline is out of scope of the TSEPP, however have been included in this appendix for completeness.

Habitat was considered 'significant' in the Draft EIS/ERMP (Ref. 3) where it was identified as:

- supporting an unusually high species richness or abundance compared to other parts of Barrow Island.
- containing faunal habitats not well represented in other parts of the Island.
- containing habitat for site-restricted fauna of high conservation significance.
- being in a location where development impacts may extend beyond the boundaries of the site and the impacts may lead to the disruption of ecological processes.

Applying these criteria, the habitats identified as being significant on Barrow Island are:

- Boodie warrens habitat for Boodies (*Bettongia lesueur*), which are fauna of high conservation significance.
- Termite mounds that support high species richness.
- Nests of raptors (birds of prey), which are not represented on the Island in high numbers, and which provide habitat for fauna of high conservation significance.
- Flatback Turtle nesting beaches Inga, Bivalve and Terminal.

Given boodie warrens and raptor nests are specific to the associated species, these habitats have been considered as part of the species description and risk assessment.

Using the same criteria, there is no 'significant' habitat associated with the mainland areas associated with the Onshore Domestic Gas Pipeline that will be affected by the Gorgon Gas Development.

An assessment of risk to these species is presented in Section 4.

2 EPBC Act listed species on Barrow Island

Terrestrial and subterranean EPBC Act listed species that are identified on Barrow Island using the Department of Climate Change Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (Ref. 4) include:

- 19 listed threatened species (10 birds, 7 mammals, 1 reptile and 1 subterranean fauna) that are matters of NES.
- 26 migratory bird species (marine, terrestrial or wetland) that are matters of NES, of which some are also listed under the threatened species category.
- three listed sea bird species that are classified as Other Matters Protected by the EPBC Act (the White-bellied Sea Eagle, Silver Gull and Lesser Crested Tern).
- 16 listed marine species (marine turtles, sea snakes, cetaceans, sharks etc.).

Table 2-1 provides information on the species abundance and habitat distribution of these listed EPBC species and those potentially impacted by the Gorgon Gas Development.

An additional 25 listed species, from those returned via the DCCEEW Protected Matters Search Tool, are known to occur on, or visit, Barrow Island and have been included in Table 2-1 for completeness.

Twenty-one of the species returned via the DCCEEW Protected Matters Search Tool are not known to occur on Barrow Island. These species are discussed further in Section 2.1.6 and listed in Table 2-2.

Table 2-1: EPBC species abundance and	I habitat/distribution on Barrow Island
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	Species	Abundance on Barrow Island	Habitat / distribution on Barrow Island	Species or habitat potentially impacted
	Wedge-tailed Shearwater ¹ Bridled Tern ³	High	Breeding colonies on Double Islands and Boodie Island (Wedge- tailed Shearwaters)	No
Sea Birds	Silver Gull ² Gull-billed Tern ³ Caspian Tern ¹ Lesser Crested Tern ² Crested Tern ³ Roseate Tern ¹ Common Tern ³ Little Tern ¹ Australian Fairy Tern ¹	Low – High	Concentrated on Barrow Island around coastal areas	No
	White-winged Black Tern ³ Australian Pelican ³ Lesser Noddy ³	Low	Concentrated on Barrow Island around coastal areas	No
	White-winged Fairy- wren (Barrow Island) ¹	High	Widespread across vegetation communities	Yes
Land Birds	Sacred Kingfisher ³	Low	Restricted to mangroves / heavily vegetated creek lines	No
	Tree Martin ³	Rare	Coastal areas (but not actual beaches) with	No

SLWMP Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat

	Species	Abundance on Barrow Island	Habitat / distribution on Barrow Island	Species or habitat potentially impacted
			some extension into claypan areas	
	Welcome Swallow	High	Widespread	No
Raptors	Spotted Harrier ³ Brahminy Kite ³ Osprey ¹ White-bellied Sea- eagle ² Australian Kestrel ³	Low	Widespread around the coastal margin of the island	Yes
Littoral Birds	Eastern Reef Egret ³ Nankeen Night Heron ³ Black-tailed Godwit ³ Whimbrel ³ Eastern Curlew ¹ Common Greenshank ¹ Terek Sandpiper ³ Common Sandpiper ¹ Grey-tailed Tattler ³ Ruddy Turnstone ³ Great Knot ³ Red Knot ¹ Sanderling Calidris ³ Red-necked Stint ³ Sharp-tailed Sandpiper ¹ Curlew Sandpiper ¹ Pacific Golden Plover ³ Grey Plover ³ Lesser Sand Plover ¹	High	Concentrated on Barrow Island, many around Bandicoot Bay on south coast	No
Littoral Birds	Bar-tailed Godwit ¹	Low	Concentrated on Barrow Island around Bandicoot Bay on south coast	No
Mammals	Burrowing Bettong ¹ / Boodie Golden Bandicoot (Barrow Island) ¹ Spectacled Hare- wallaby (Barrow Island) ¹ Barrow Island Euro ¹	High	Widespread across landforms and vegetation communities	Yes
	Black-flanked Rock- wallaby ¹	Low	Restricted to the deeply incised valleys on the west coast of Barrow Island	No
Reptiles	Flatback Turtle	High	Flatback nesting beaches Inga, Bivalve and Terminal in proximity to MOF and LNG Jetty	Yes
	Hawksbill Turtle ¹ Green Turtle ¹	High	Concentrated to West Coast Beaches and Islands off East Coast.	No

	Species	Abundance on Barrow Island	Habitat / distribution on Barrow Island	Species or habitat potentially impacted
Subterranean	Barrow Cave Gudgeon ^{1,4}	Unknown	Subterranean aquifer	Yes
fauna	Blind Eel ³	Unknown	Subterranean aquifer	Yes

Notes:

1 Matters of NES (Ref. 3)

2 Other Matters Protected by the EPBC Act (Ref. 3)

3 Listed EPBC species and believed or known to occur on Barrow Island, but not identified during the EPBC Act Protected Matters search

4 Pending EPBC classification

2.1 EPBC listed species and habitats potentially impacted by the Gorgon Gas Development

2.1.1 Mammals

2.1.1.1 Barrow Island Euro

The Barrow Island Euro (*Osphranter robustus isabellinus*) is listed as Vulnerable under the EPBC Act. The species is widespread over Barrow Island and observed in all habitats. Barrow Island Euros are more numerous in the vicinity of cliffs, roadside vegetation and infrastructure that provide shade and windbreaks.

The Barrow Island Euro has been monitored annually from 2008 to 2022. Results, discussion and conclusions from the monitoring program are described in the annual Gorgon Environmental Performance Report. A key conclusion described in the 2023 Gorgon Environmental Performance Report (Ref. 5) was that, despite variability evident in the At Risk and Reference zones, abundance estimates indicate a stable, whole of island population of Euros, with no evidence of impacts attributable to the Gorgon Gas Development.

2.1.1.2 Golden Bandicoot (Barrow Island)

The Golden Bandicoot (Barrow Island) (*Isoodon auratus barrowensis*) is listed as Vulnerable under the EPBC Act. This species is known to use the shelter of limestone crevices, spinifex tussocks and termite mounds across most of Barrow Island and is known to rapidly occupy artificial habitats.

The Golden Bandicoot (Barrow Island) has been monitored annually from 2008 to 2017, and again in 2021 with results, discussion and conclusions described in the subsequent Gorgon Environmental Performance Reports. As described in the 2022 Gorgon Environmental Performance Report (Ref. 6), key conclusions included:

- The 2021 monitoring identified a marked increase in the estimated density and population size of Golden Bandicoots across Barrow Island and within both the At Risk and Reference zones when compared to all previous monitoring data.
- Increased densities in the overall population were likely to be the result of greater than average rainfall in the preceding six to seven months, despite the three years of below average annual rainfall from 2018–2020.
- There appear to be no impacts attributable to the Gorgon Gas Development on Golden Bandicoots in 2021 as the At Risk to Reference density ratio is within control limits.

2.1.1.3 Burrowing Bettong or Boodie (Barrow and Boodie Islands subspecies)

The Burrowing Bettong (Barrow and Boodie Islands subspecies) (*Bettongia Lesueur*) or Boodie is listed as Vulnerable under the EPBC Act.

Repeated surveys have been undertaken for Burrowing Bettong warrens across Barrow Island since at least 1989 (Ref. 7). The Draft EIS/ERMP documented the method for surveying for these warrens in the vicinity of the Gorgon Gas Development Footprint and the Onshore Feed Gas Pipeline route (Ref. 3).

Burrowing Bettong burrows are usually in well-drained limestone cap rock or caves, and are often associated with fig trees, which provide food. No warrens have been located in dune habitats or drainage lines in the absence of rocks, as cap rock most likely provides structural stability as well as insulation for the burrows.

The Burrowing Bettong has been monitored annually from 2008 to 2022. Results, discussion and conclusions from the monitoring program are described in the annual Gorgon Environmental Performance Report. Key conclusions described in the 2023 Gorgon Environmental Performance Report (Ref. 5) included:

- Although the number of individuals caught at each warren has varied considerably (some warrens have remained relatively stable while others have shown recent recovery), most warrens have shown a continued decline over the years of monitoring. This is reflected in a significant decline in Burrowing Bettong abundance of the monitored warrens over time in both the At Risk and Reference zones. There was a high correlation between the two zones, suggesting that the declines are likely due to similar factors acting across all warrens.
- Outcomes suggest the detected changes in the abundance of Burrowing Bettongs may be linked to more localised factors and do not appear attributable to Gorgon Gas Development. However, drivers affecting the abundance of Burrowing Bettong and correlations across both the At Risk and Reference zones will continue to be closely monitored to better understand trends.

2.1.1.4 Spectacled Hare-wallaby (Barrow Island)

The Spectacled Hare-wallaby (Barrow Island) (*Lagorchestes conspicillatus conspicillatus*) is listed as Vulnerable under the EPBC Act. This species uses a range of habitats and is widespread across landforms and vegetation communities on Barrow Island. This species uses tall spinifex as daytime refuge from both predators and heat.

The Spectacled Hare-wallaby (Barrow Island) has been monitored annually from 2008 to 2022. Results, discussion and conclusions from the monitoring program are described in the annual Gorgon Environmental Performance Report. A key conclusion described in the 2023 Gorgon Environmental Performance Report (Ref. 5) was that the whole of Island population estimate for Spectacled Hare-wallabies has varied considerably over the years, as has the ratio of density estimates. No impacts on the abundance of Spectacled Hare-wallabies appear to be attributable to the Gorgon Gas Development in 2022—the At Risk to Reference density ratio remained within control limits, and there were no significant trends in density estimates over time within each zone.

2.1.2 Land birds (White-winged Fairy-wren (Barrow Island))

The White-winged Fairy-wren (Barrow Island) (*Malurus leucopterus edouardi*; WWFW) is listed as Vulnerable under the EPBC Act. *Melaleuca cardiophylla* shrubland has not been included as a significant habitat although it was indicated in the Draft EIS/ERMP that it may be critical habitat for the White-winged Fairy-wren (Barrow Island) (Ref. 3). On Barrow Island this species nests in tall spinifex and a range of shrubs and occurs

and breeds in many vegetation associations where *Melaleuca cardiophylla* is not present.

The White-winged Fairy Wren (Barrow Island) has been monitored annually from 2008 to 2022. Results, discussion and conclusions from the monitoring program are described in the annual Gorgon Environmental Performance Report. Key results and conclusions from the monitoring program described in the 2023 Gorgon Environmental Performance (Ref. 5) include:

- Linear modelling indicates that WWFW density has declined, generally, over time within both zones but that the declines do not differ significantly between zones. This suggests that the declines are more likely due to broad environmental conditions across Barrow Island rather than any Project-related effects in the At Risk zone.
- Overall, results indicate the variation in WWFW abundance is likely driven by variability in rainfall and other environmental conditions, with no evidence of impacts attributable to the Gorgon Gas Development.

2.1.3 Raptors

EPBC listed 'marine' raptors typically establish nests along the Barrow Island coastline. Of 54 raptor nests recorded in 2006, 35 nests were more than 2 km from the Gorgon Gas Development Footprint. The distribution of nests is likely to be reflected in the observed distributions of these birds with Brahminy Kites nests scattered along the coast, Osprey nests regularly spaced along the coast and White-bellied Sea-eagles as occasional visitors (and nesting pairs observed on the southern coast). (Ref. 8).

2.1.4 Reptiles

2.1.4.1 Flatback Turtles

Flatback Turtles are known to nest on the coastal islands located between Barrow Island and the mainland, with low to moderate levels of body pits or tracks recorded on Great Sandy Island, North Sandy Island, Passage Island and Angle Island in 2002 (Ref. 19) Internesting Flatback Turtles from Barrow Island are known to use the shallow waters between Barrow Island and the mainland (Ref.20, Ref. 21) On the mainland, nesting by Flatback Turtles is considered widespread, occurring on beaches from Mundabullangana near Port Hedland, to Broome in the Kimberley region.

Flatback Turtle hatchlings emerge from their nests six to eight weeks after eggs are laid and are then present on beaches and in the waters around nesting beaches. The peak hatching period occurs in February and March (Ref.18). Little is known about the behaviour of Flatback Turtle hatchlings after they leave their natal beaches (Ref.18); however, it is known that they grow to maturity in shallow coastal waters close to their natal beaches, remaining within the Australian continental shelf waters (Ref. 22). Flatback Turtles are carnivorous and forage primarily on soft-bodied invertebrates such as soft corals, sea pens, and holothurians (Ref. 23). Further information on flatback turtle distribution and habitat is available in The Recovery Plan for Marine Turtles in Australia (Ref. 24).

2.1.5 Subterranean fauna

2.1.5.1 Barrow Cave Gudgeon

The Barrow Cave Gudgeon (*Milyeringa justitia*) was previously reported as the Blind Gudgeon (*Milyeringa veritas*), which is known extensively from Cape Range on the mainland, but was reclassified in 2013 (Ref. 9). The Barrow Cave Gudgeon is a Threatened species under the Western Australian *Biodiversity Conservation Act 2016*.

Larson *et al.* (Ref. 9) reports that habitat suitable to support the Barrow Cave Gudgeon may extend over ~7,800 ha (~35%) of Barrow Island, with records primarily from the central parts of the Island where the freshwater aquifer is thickest (Ref. 10; Ref. 11).

The taxonomic revision of *M. veritas* has yet to be adopted under the EPBC Act. However, for the purposes of this report *M. justitia* has been included as a matter of NES consistent with *M. veritas*, which is listed as Vulnerable under the EPBC Act.

2.1.5.2 Blind Cave Eel

The blind eel (*Ophisternon* sp.) has not been identified to species level but, given the wide range of *Ophisternon candidum* in stygal ecosystems in the Pilbara, the single blind eel found on Barrow Island is taken to be *Ophisternon candidum* for the purposes of conservation status (Ref. 12). *Ophisternon candidum* is listed as Vulnerable under the EPBC Act.

2.1.6 Listed Species not known to occur on Barrow Island

Table 2-2 presents the EPBC listed species that were reported using the DCCEEW Protected Matters Search Tool, however, are not known to occur on Barrow Island.

	Species	Distribution	
	Southern Giant-Petrel ¹	The extreme northern extent may include Barrow Island. Is common in the Southern Ocean.	
	Streaked Shearwater ¹	Northern Australia from Exmouth to Queensland and New South Wales	
	Sooty Tern ²	Predominantly Western Australia, south of Shark Bay with scattered potential distribution across southern Australia	
Sea Birds	Lesser Frigatebird ¹	Coastal regions of Australia from Kalbarri to Sydney	
	Common Noddy ¹	In Australia, the Common Noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast.	
	White-tailed Tropicbird ¹	Breeds on islands throughout the tropics of the northern Indian Ocean. The species feeds close to Christmas Island, but also disperse as far as the continental shelf off northern Western Australia.	
Raptors	Grey Falcon ¹	Widespread across Australia (except Tasmania)	
Land Birds	Rainbow Bee-eater ²	Widespread across Australia (except Tasmania)	
Mammala	Ghost Bat ¹	Occurs throughout the Pilbara, Kimberley, Northern Territory and Queensland.	
Mammais	Pilbara Leaf-nosed Bat1	common in the Southern Ocean.ad Shearwater1Northern Australia from Exmouth to Queensland and New South Wales"ern2Predominantly Western Australia, south of Shark Bay with scattered potential distribution across southern AustraliaFrigatebird1Coastal regions of Australia from Kalbarri to Sydneyon Noddy1In Australia, the Common Noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast.ailed Tropicbird1Breeds on islands throughout the tropics of the northern Indian Ocean. The species feeds close to Christmas Island, but also disperse as far as the continental shelf off northern Western Australia.alcon1Widespread across Australia (except Tasmania)w Bee-eater2Widespread across Australia (except Tasmania)a3at1Occurs throughout the Pilbara, Kimberley, Northern Territory and Queensland.Leaf-nosed Bat1Occurs throughout the Pilbara in cave and artificial (mine site) habitats.n CtenotusKnown only from a small area of mallee south of Shark Bay. 	
Reptiles	Hamelin Ctenotus	Known only from a small area of mallee south of Shark Bay. Searches at additional sites with suitable habitat have yielded no new records. (Ref. 4).	
	Australian Painted Snipe ¹	All of Australia except the arid interior and parts of the southern coast and Tasmania.	
Litterel Dinde	Fork-tailed Swift ¹	All states and territories of Australia (non-breeding visitor)	
Littoral Birds	Barn Swallow ¹	Northern Australia from Carnarvon to north Queensland.	
	Grey Wagtail ¹	Widespread across Australia except south-eastern Australia and Tasmania	

Table 2-2: EPBC Species not known to occur on Barrow Island

SLWMP Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat

	Species	Distribution
	Yellow Wagtail ¹	Widespread across Australia except southwestern Australian and Tasmania
	Pectoral Sandpiper ¹	Widespread across Australia
	Oriental Plover/Dotterel ¹	Widespread across north-western Australia, the Northern Territory down to South Australia.
	Oriental Pratincole ¹	North-western Australia, the Northern Territory and into parts of Queensland
	Asian Dowitcher ¹	Coastal distribution along northern Australia from Shark Bay to Brisbane
	Northern Siberian Bar-tailed Godwit OR Russkoye Bar-tailed Godwit ¹	Coastal distribution around Western Australia

Notes:

1 Matters of NES (Ref. 3)

2 Other Matters Protected by the EPBC Act (Ref. 3)

3 EPBC Act Listed Species on the Mainland

EPBC Act listed species including matters of NES that are identified on the mainland and may occur in the vicinity of the Onshore Domestic Gas Pipeline using the Protected Matters Search Tool (Ref. 17) include:

- 16 listed threatened species (12 birds, 3 mammals, 1 reptile) that are matters of NES.
- 22 migratory bird species (marine, terrestrial or wetland) that are matters of NES, of which some are also listed under the threatened species category.
- one listed bird species, the White-bellied Sea Eagle, is classified as Other Matters Protected by the EPBC Act.
- 38 listed marine species (marine turtles, sea snakes, cetaceans, sharks etc.) have not been included, as this Appendix refers to terrestrial and subterranean species only.

Table 3-1 provides information on the species abundance and habitat distribution of these listed EPBC species occurring on the mainland. No species were identified as being potentially impacted by the Gorgon Gas Development.

Table 3-1: EPBC species abundance and habitat/distribution on Mainland

	Species	Abundance and/or distribution in Australia	Species or habitat potentially impacted
Seabirds	Streaked Shearwater ¹ Australian Fairy Tern ¹ Little Tern ¹ Australian Pelican ¹ Least Frigatebird ¹ White-tailed Topicbird ¹ Indian Yellow-nosed Albatross ¹ Common Noddy ¹ Southern Giant-Petrel ¹	Widespread along coastal areas and occasional inland water bodies	No
	Rainbow Bee- eater ¹	All of Australia except Tasmania	No
	Pallid Cuckoo ¹	Widespread throughout, except Nullarbor Plain.	No
Land Birds	Black-eared Cuckoo ¹	Widespread	No
	Richard's Pipit ¹	Widespread	No
	Night Parrot ¹	Occurs across all Australia States except Tasmania.	No
	Nankeen Kestrel ¹	Abundant and widespread in Australia	No
Durture	Osprey ¹	Common and distributed along Australian coastlines	No
kaptors	Brahminy Kite ¹ Grey Falcon ¹ Red Goshawk ¹ White-bellied Sea Eagle ²	Widespread, and common to abundant in northern Australia.	No
Littoral Birds	Eastern Reef Egret ¹ Red Knot ¹ Curlew Sandpiper ¹	Widespread along coastal areas and occasional inland water bodies	No

Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat

	Species	Abundance and/or distribution in Australia	Species or habitat potentially impacted
	Greater Sand Plover ¹		
	Northern Siberian Bar-tailed Godwit ¹		
	Australian painted Snipe ¹		
	Fork-tailed Swift ¹		
	Barn Swallow ¹		
	Grey Wagtail ¹		
	Yellow Wagtail ¹		
	Common Sandpiper ¹		
	Sharp-tailed Sandpiper ¹		
	Pectoral Sandpiper ¹		
	Oriental Plover ¹		
	Oriental Pratincole ¹		
	Asian Dowitcher ¹		
	Bar-tailed Godwit ¹		
	Whimbrel ¹		
	Eastern Curlew ¹		
	Common Greenshank ¹		
	Cattle Egret ¹		
	Northern Quoll ¹	Occurs throughout the Pilbara, Kimberley, Northern Territory and Queensland.	No
Mammals	Ghost Bat ¹	Occurs throughout the Pilbara, Kimberley, Northern Territory and Queensland.	No
	Pilbara Leaf-nosed Bat ¹	Occurs throughout the Pilbara	No
Reptiles	Olive Python (Pilbara subspecies) ¹	Occurs throughout the Pilbara	No

Notes:

1 Matters of NES (Ref. 3)

2 Other Matters Protected by the EPBC Act (Ref. 3)

4 **Risk assessment**

4.1 Overview

The risk assessment for this Plan was undertaken in accordance with the ABU OE Risk Management Process (Ref. 13) using Chevron Corporation's Integrated Risk Prioritization Matrix (Appendix B). This approach generally aligns with the processes outlined in ISO 31000:2018 Risk Management – Principles and Guidelines (Ref. 14) and Handbook 203:2012 Managing Environment-related Risk (Ref. 15)

Numerous risk assessments have been undertaken for the scope of the SLWMP, from initial environmental assessment and approval stage through to current operations. The risk assessment was revised and revalidated during the current revision of this Plan, considering the nature of current and future activities. The risk assessment process and evaluation involved numerous consultations and workshops with environmental, health, safety, project and engineering personnel. Risks considered and covered in this Plan were identified and informed by:

- experience gained during previous stages of the Project
- mapping and monitoring studies undertaken for the Project
- review of historical significant environmental incidents
- expertise and experience of CAPL personnel
- stakeholder engagement.

4.2 Potential impacts and residual risks

The potential impacts associated with the Gorgon Gas Development are described in detail in the Draft EIS/ERMP (Ref. 3). The major additional environmental issues investigated during the environmental assessment process for the Revised Proposal included cumulative air, light and noise emissions impacts. In the Draft EIS/ERMP, the cumulative risk for the terrestrial environment on Barrow Island was ranked as Medium (with mitigation safeguards in place when assessing consequence) (Ref. 3). This risk level was related to the remote likelihood of a combination of threats that together are critical threats (i.e. widespread, long-term impact on population or extinction of Barrow Island race of a listed species) to terrestrial fauna and flora on Barrow Island.

The cumulative risk for the subterranean environment on Barrow Island was also ranked as Medium (with mitigation safeguards in place when assessing consequence) (Ref. 3). This risk level was related to the remote likelihood of a critical threat to a subterranean fauna population such as through a catastrophic release of CO_2 into the superficial aquifer, leading to the loss of local populations of listed fauna.

The conclusions of the risk assessment completed for the current revision of the Solid and Liquid Waste Management Plan have been summarised along with the residual risk levels in Table 4-1. The risk assessment presents the risks for each terrestrial and subterranean MNES related to solid and liquid waste

Risk assessment for environmental aspects outside the scope of the SLWMP are included in the respective scope specific management plan e.g. risk assessment for each terrestrial and subterranean MNES related to the environmental aspect of fire is/will be included within an appendix to the Gorgon Fire Management Plan.

As documented in the Terrestrial and Subterranean Baseline State and Environmental Impact Report (Ref. 16), investigations of the environmental impacts of the Onshore Domestic Gas Pipeline indicated that risks are generally low due to the degraded environment along the pipeline easement. The Onshore Domestic Gas Pipeline route runs directly to the Dampier–Bunbury Natural Gas Pipeline and is located adjacent to an existing gas pipeline, which reduces the potential for significant environmental impacts.

Table 4-1: Residual risks associated with terrestrial and subterranean Matters of NES

Terrestrial/ subterranean MNES	Environmental aspect	Hazard	Potential impacts	Management measures	Residual risk
Mammals: Barrow Island Euro Golden Bandicoot (Barrow Island) Burrowing Bettong or Boodie (including Boodie warren habitat) Spectacled Hare- wallaby (Barrow Island) White-winged Fairy- wren (Barrow Island) Raptors (including raptor habitat): Australian Kestrel Brahminy Kite Osprey Spotted Harrier White-bellied Sea-eagle	Solid and Liquid Waste	 Failure to effectively segregate solid or liquid waste, resulting in fire Failure to appropriately store, handle, and/or transport solid waste (non-hazardous and hazardous materials) resulting in fauna attraction or spills/releases. Failure to appropriately store, handle, and/or transport liquid wastes (non-hazardous and hazardous materials) on Barrow Island resulting in spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous and non hazardous materials) at the WTS resulting in fauna attraction or spills/releases Failure to appropriately store and handle liquid wastes (hazardous material) at the LWFs resulting in fauna attraction or spills/releases Failure to appropriately store and handle liquid wastes (hazardous material) at the LWFs resulting in fauna attraction or spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous material) at the LWFs resulting in fauna attraction or spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous materials) at waste treatment facilities resulting in fauna attraction or spills/releases Mechanical integrity failure in the wells resulting in liquid wastes discharged to ground or the near surface aquifer. 	 Injury or mortality to fauna or attract and alter fauna behaviour Generate windblown waste 	Refer to management measures described in Table 5.2, 5.3 and 5.4 of the Solid and Liquid Waste Management Plan	Low
Subterranean Fauna: • Barrow Cave Gudgeon • Blind Cave Eel	Solid and Liquid Waste	 Failure to appropriately store, handle, and/or transport solid waste (non-hazardous and hazardous materials) resulting in fauna attraction or spills/releases. Failure to appropriately store, handle, and/or transport liquid wastes (non-hazardous and hazardous materials) on Barrow Island resulting in spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous and non hazardous materials) at the WTS resulting in fauna attraction or spills/releases Failure to appropriately store and handle liquid wastes (hazardous and non hazardous materials) at the WTS resulting in fauna attraction or spills/releases Failure to appropriately store and handle liquid wastes (hazardous material) at the LWFs resulting in fauna attraction or spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous material) at the LWFs resulting in fauna attraction or spills/releases Failure to appropriately store and handle solid and liquid waste (hazardous materials) at waste treatment facilities resulting in fauna attraction or spills/releases Mechanical integrity failure in the wells resulting in liquid wastes discharged to ground or the near surface aquifer. Fracturing of the receiving formations and overlying confining units, resulting in penetration of liquid waste into the near surface aquifer 	Groundwater contamination leading to loss of stygofauna.	Refer to management measures described in Table 5.2, 5.3 and 5.4 of the Solid and Liquid Waste Management Plan	Medium
Flatback Turtle	Solid and Liquid Waste	 Discharge of waste water to marine environment from vessels Solid non-hazardous waste lost overboard or from terrestrial/marine facilities 	 Potential reduction in water quality affecting turtles 	Refer to management measures described in Table 5.2, 5.3 and 5.4 of the Solid and Liquid Waste Management Plan	Low

5 Acronyms and abbreviations

Table 5-1 defines the acronyms and abbreviations used in this document.

Table 5-1: Acronyms and abbreviations

Acronym / abbreviation	Definition
ABU	Australian Business Unit
CAPL	Chevron Australia Pty Ltd
DCCEEW	Department of Climate Change Energy, the Environment and Water
EIS/ERMP	Environmental Impact Statement/Environmental Review and Management Programme (for the Proposed Gorgon Development dated September 2005) as amended or supplemented from time to time.
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPBC Reference: 2003/1294	Commonwealth Ministerial Approval (for the Gorgon Gas Development) as amended or replaced from time to time.
EPBC Reference: 2008/4178	Commonwealth Ministerial Approval (for the Revised Gorgon Gas Development) as amended or replaced from time to time.
ISO	International Organization for Standardization
MNES	Matters of National Environmental Significance
NES	National Environmental Significance
OE	Operational Excellence
SLWMP	Solid and Liquid Waste Management Plan
TSEPP	Terrestrial and Subterranean Environmental Protection Plan
WTS	Waste Transfer Station
WWFW	White-winged Fairy-wren (Barrow Island)

6 References

The following documentation is either directly referenced in this document or is a recommended source of background information.

Table 6-1: References

Ref No	Description	Document ID
1.	Commonwealth Government of Australia, Minister for the Environment and Water Resources, Malcolm Turnbull. 2007. <i>Approval – Gorgon Gas Development (EPBC Reference: 2003/1294), 3 October 2007</i> . Canberra, Australian Capital Territory.	
2.	Commonwealth Government of Australia, Minister for the Environment, Water, Heritage and the Arts, Peter Garrett. 2009. <i>Approval</i> – <i>Gorgon Gas Development (EPBC Reference:</i> 2008/4178), 26 August 2009. Canberra, Australian Capital Territory. Available from: https://australia.chevron.com/-/media/australia/our- businesses/documents/epbc_reference_2008_41782003_1294.pdf	
3.	Chevron Australia. 2005. Draft Environmental Impact Statement/Environmental Review and Management Programme for the Proposed Gorgon Gas Development. Chevron Australia, Perth, Western Australia. Available from: https://australia.chevron.com/- /media/australia/our-businesses/documents/Draft-EIS-ERMP_full-report.pdf	
4.	Department of Climate Change, Energy, The Environment and Water. 2023. Protected Matters Search Tool - Barrow Island Polygon Search around the island with 0 km Buffer https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool Accessed 9 March 2023.	
5.	Chevron Australia. Gorgon Gas Development and Jansz Feed Gas Pipeline: Environmental Performance Report 2023.	ABU230800217
6.	Chevron Australia. Gorgon Gas Development and Jansz Feed Gas Pipeline: Environmental Performance Report 2022.	ABU220700410
7.	Short, J., Turner, B. and Cale, P. 1989. The Distribution and Relative Abundance of Rare Macropods and Bandicoots on Barrow and Dorre Island. Unpublished report by CSIRO for Australian National Parks and Wildlife Service, Sydney, New South Wales.	
8.	Pruett-Jones, S. and O'Donnell, E.O. 2004. Land Birds on Barrow Island: Status, Population Estimates, and Responses to an Oil-field Development. Journal of the Royal Society of Western Australia, 87: 101–108.	
9.	Larson, H.K., Foster, R., Humphreys, W.F. and Stevens, M.I. 2013. A new species of blind cave gudgeon Milyeringa (Pisces: Gobioidei, Eleotridae) from Barrow Island, Western Australia, with a redescription of M. veritas Whitley. Zootaxa, 3616(2): 135–150. Available from: https://www.researchgate.net/publication/261837465_A_new_species_of_the_blind_cave_gudgeon_Milyeringa_Pisces_Gobioidei_Eleotridae_from_Barrow_Island_Western_Australia a_with_a_redescription_of_M_veritas_Whitley [DOI:http://doi.org/10.11646/zootaxa.3616.2.3]	
10.	Humphreys, W.F. 2001. The Subterranean Fauna of Barrow Island (Northwestern Australia). Memoires de Biospeologie (International Journal of Subterranean Biology). 28 107-127.	
11.	Biota Environmental Sciences. 2007. Barrow Island Gorgon Gas Development: Summary of 2004–2006 Subterranean Fauna Surveys. Report prepared for Gorgon Joint Venture, Perth, Western Australia.	
12.	Humphreys, G., Alexander, J., Harvey, M.S. and Humphreys, W.F. 2013. The Subterranean Fauna of Barrow Island, Northwestern Australia: 10 years on. Records of the Western Australian Museum Supplement 83:145–158.	
13.	Chevron Australia. 2018. ABU OE Risk Management Process. Rev. 12.0. Chevron Australia, Perth, Western Australia.	OE-03.01.01
14.	Standards Australia/Standards New Zealand. 2018. ISO 31000:2018 Risk Management – Principles and Guidelines. Sydney, Australia.	

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Ref No	Description	Document ID
15.	Standards Australia. 2012. Handbook 203:2012 Managing Environment-related Risk. Sydney, Australia.	
16.	Chevron Australia. 2014. Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Subterranean Baseline State and Environmental Impact Report. Rev. 3, Amendment 1. Chevron Australia, Perth, Western Australia. Available from: https://australia.chevron.com/-/media/australia/ourbusinesses/documents/gorgon-emp- terrestrial-and-subterranean-baseline-stateand-environmental-impact-report.pdf	G1-TE-H-0000- REPX027
17.	Department of Climate Change, Energy, The Environment and Water. 2023. Protected Matters Search Tool – Onshore Domestic Gas Pipeline polygon search https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool Accessed 11 March 2023.	
18.	Chevron Australia. 2018. Gorgon Gas Development and Jansz Feed Gas Pipeline: Long- term Marine Turtle Management Plan. Rev. 1.0. Chevron Australia, Perth,	GOR-COP- 01728
	Western Australia. Available from: https://australia.chevron.com//media/australia/our- businesses/	
19.	Whittock, P.W., Pendoley, K.L.P. and Hamann, M. 2014. Internesting distribution of Flatback Turtles (Natator depressus) and industrial development in Western Australia. Endangered Species Research, 26: 25–38.	
20.	Pendoley Environmental. 2010. Gorgon Gas Development: Satellite Tracking of Flatback Turtles from Barrow Island and Mundabullangana Station 2004–2009. Unpublished Report for Chevron Australia, Perth, Western Australia.	
21.	Pendoley Environmental. 2010. Gorgon Gas Development: Marine Turtle Surveys Satellite Transmitter Attachment Program Satellite Tracking of Flatback Turtles from Barrow Island and Mundabullangana Station 2009–20109. Unpublished Report for Chevron Australia, Perth, Western Australia.	
22.	Musick, J.A. and Limpus, C.J. 1996. Habitat utilisation and migration in juvenile sea turtles. In: P.L. Lutz and J.A. Musick (eds) The Biology of Sea Turtles, Vol. 1: 137–163. CRC Press, Boca Raton, Florida.	
23.	Chevron Australia. 2008. Gorgon Gas Development Revised and Expanded Proposal Public Environmental Review. Chevron Australia, Perth, Western Australia.	
24.	Department of Climate Change, Energy, the Environment and Water. 2017. Recovery Plan for Marine Turtles in Australia. Recovery Plan for Marine Turtles in Australia 2017–2027 (dcceew.gov.au). [Accessed 27 May 2024].	