



# Gorgon Gas Development and Jansz Feed Gas Pipeline Fire Management Plan

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## 1.0 Introduction

### 1.1 Proponent

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

- Chevron Australia Pty Ltd
- Chevron (TAPL) Pty Ltd
- Shell Development (Australia) Pty Ltd
- Mobil Australia Resources Company Pty Ltd
- Osaka Gas Gorgon Pty Ltd
- Tokyo Gas Gorgon Pty Ltd
- Chubu Electric Power Gorgon Pty Ltd.

### 1.2 Project

Chevron Australia is developing the gas reserves of the Greater Gorgon Area. The gas will be processed in a gas treatment plant on Barrow Island, which is located off the Pilbara coast 85 km north-north-east of Onslow in Western Australia (WA) (Figure 1-1).

Subsea gathering systems and pipelines deliver feed gas from the Gorgon and Jansz–Io 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 Gas Treatment Plant (GTP) is located. The GTP includes natural gas trains that produce liquefied natural gas (LNG) as well as condensate and domestic gas. Carbon dioxide, which occurs naturally in the feed gas, is separated during the production process and injected into deep rock formations below Barrow Island. The LNG and condensate is 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.

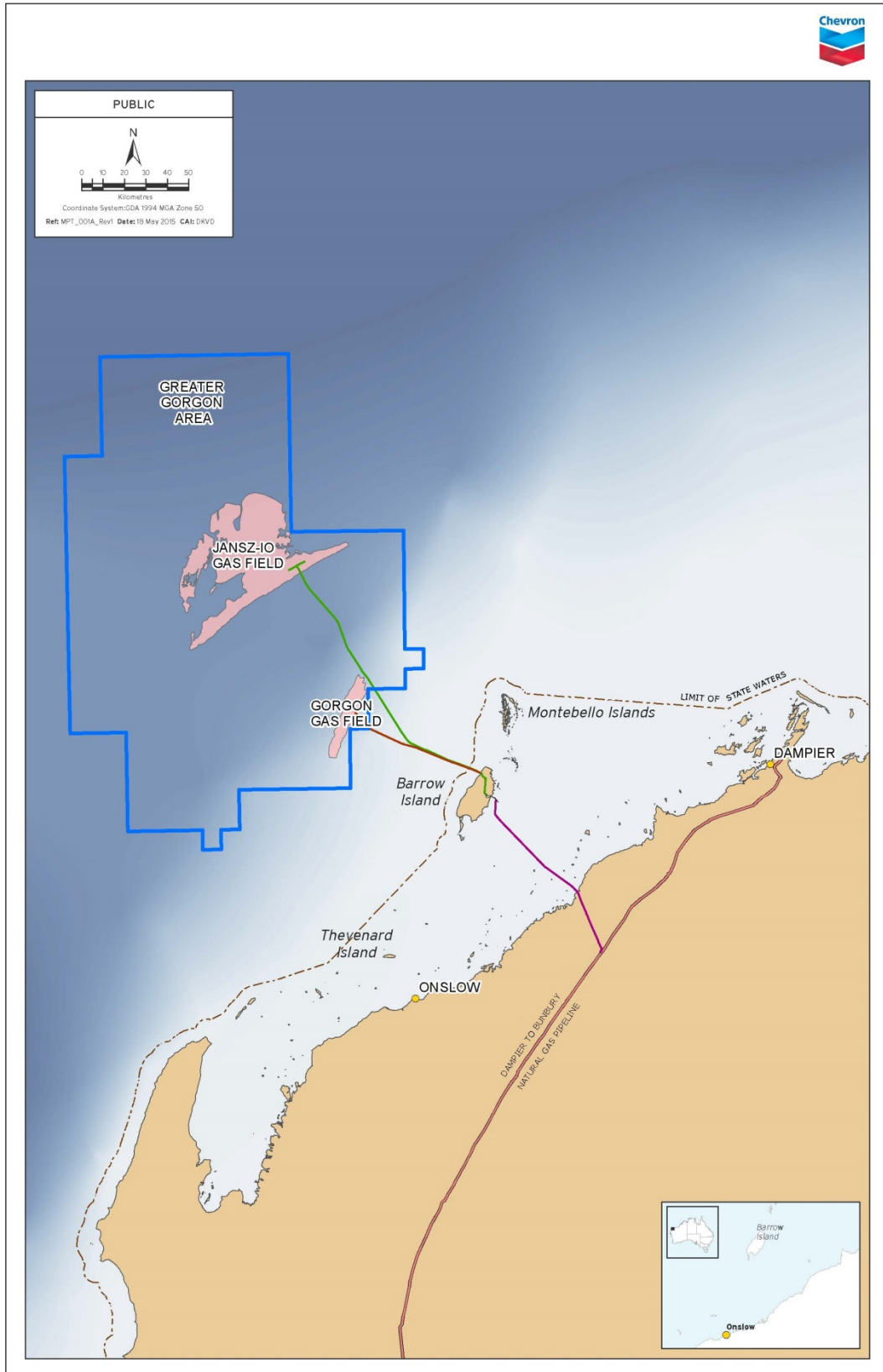


Figure 1-1: Location of Barrow Island and the Greater Gorgon Area

### 1.3 Environmental Approvals

Table 1-1 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 1-1: 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 2 LNG Trains – MS 748 (Ref. 9). This was superseded by MS 800.  6 September 2007	Initial Gorgon Gas Development comprising 2 LNG Trains – EPBC Reference: 2003/1294 (Ref. 5).  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 (comprising 3 LNG Trains).  This statement supersedes MS 748.  10 August 2009	The Revised and Expanded Gorgon Gas Development (EPBC Reference: 2008/4178 [Ref. 4]) was approved, and the conditions for the initial Gorgon Gas Development (EPBC Reference: 2003/1294 [Ref. 5]) were varied.  26 August 2009
Dredging Amendment	MS 865 (Ref. 7) 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. 6) 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. 5]).and for the Revised and Expanded Gorgon Gas Development (EPBC Reference: 2008/4178 [Ref. 4]) were varied.  15 April 2014
Gorgon Gas Development Fourth Train Expansion <sup>1</sup>	MS 1002 (Ref. 8) applies the conditions of MS 800 to the Fourth Train Expansion, and has additional conditions.  30 April 2015	EPBC Reference: 2011/5942. Approval pending (at time of publishing).

<sup>1</sup> Fourth Train Expansion is not currently being implemented, and is not within the scope of this Plan.

## 1.4 Purpose of this Plan

### 1.4.1 Requirement for this Plan

#### 1.4.1.1 State Environmental Approval Requirement

This Plan is required under Condition 12.1 of MS 800:

*Prior to commencement of construction of any terrestrial facilities identified in Condition 6.3, the Proponent shall prepare and submit a Fire Management Plan (the Plan) to the Minister that meets the aim and objectives set out in Condition 12.4 and the requirements of Condition 12.5, as determined by the Minister, unless otherwise allowed in Condition 12.2, consistent with the requirements of the Occupational Safety and Health Act 1984 (WA).*

This Plan is also required under Condition 11.1 of MS 769:

*Prior to commencement of construction of any terrestrial facilities identified in Condition 6.3 the Proponent shall prepare and submit a Fire Management Plan (the Plan) that meets the aim and objectives set out in Condition 11.4 and the requirements of Condition 11.5, as determined by the Minister, unless otherwise allowed in Condition 11.2, consistent with the requirements of the Occupational Safety and Health Act 1984 (WA).*

#### 1.4.1.2 Commonwealth Environmental Approval Requirement

This Plan satisfies the requirements of Condition 9.1 of EPBC Reference: 2003/1294 and 2008/4178:

*Prior to commencement of construction of any terrestrial facilities identified in Condition 5.2 the person taking the action must prepare and submit a Fire Management Plan (the Plan) to the Minister, for approval, that meets the objectives set out in Condition 9.4 [of EPBC Reference: 2003/1294 and 2008/4178] and the requirements of Condition 9.5, as determined by the Minister, unless otherwise allowed in Condition 9.2, consistent with the requirements of the Occupational Safety and Health Act 1984 (WA).*

### 1.4.2 Objectives of this Plan

The stated objectives of this Plan in Condition 12.4 of MS 800, Condition 11.4 of MS 769, and Condition 9.4 of EPBC Reference: 2003/1294 and 2008/4178, are to ensure that:

- *the Proposal (action) does not cause serious or material environmental harm outside the Terrestrial Disturbance Footprint (TDF) due to fire*
- *fire risk-reduction measures are built into the design of the facilities to protect the Proponent's (person taking the action's) assets from the impact of fire on Barrow Island.*

### 1.4.3 Contents of this Plan

Table 1-2 lists the State and Commonwealth Condition requirements of this Plan and the sections in this Plan that fulfil those requirements.

#### Table 1-2: 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 Decision	Condition No.	Condition Requirement	Section in this Plan
MS 800	12.1	Fire Management Plan to be consistent with the requirements of the <i>Occupational Safety and Health Act 1984</i> (WA).	Section 4.0
MS 769	11.1		
EPBC 2003/1294 EPBC 2008/4178	9.1		
MS 800	12.3	The Proponent (person taking the action) shall consult with the Department of Environment and Conservation (DEC), Conservation Commission, the Department of Environment, Water, Heritage and Arts, the Barrow Island Coordination Council (BICC) Participants and the Department of Minerals and Petroleum (DMP) in the preparation of the Plan.	Section 1.5
MS 769	11.3		
EPBC 2003/1294 EPBC 2008/4178	9.3		
MS 800	12.5 (i)	The Plan shall (must) include a fire risk assessment of all [terrestrial] Proposal (action) infrastructure, and measures to protect [terrestrial] Proposal (action) infrastructure and the surroundings from fires on Barrow Island.	Section 3.0 and Appendix B
MS 769	11.5 (i)		
EPBC 2003/1294 EPBC 2008/4178	9.5 (i)		
MS 800	12.5 (ii)	The Plan shall (must) include ongoing management of infrastructure for fire prevention, suppression and management including incident control systems so that fires do not escape from the Terrestrial Disturbance Footprint.	Section 4.0
MS 769	11.5 (ii)		
EPBC 2003/1294 EPBC 2008/4178	9.5 (ii)		
MS 800	12.5 (iii)	The Plan shall (must) include Performance Standards against which achievement of the objectives of this condition can be determined.	Section 5.0
EPBC 2003/1294 EPBC 2008/4178	9.5 (iii)		
MS 800	12.5 (iv)	The Plan shall (must) include a description of the arrangements to identify, suppress and manage fires caused by the Proposal (action) outside the Terrestrial Disturbance Footprint.	Section 4.0
EPBC 2003/1294 EPBC 2008/4178	9.5 (iv)		
MS 800	12.8	In the event that a fire attributable to the Proposal (action) occurs outside the TDF and the Conservation Commission requires that site to be rehabilitated, the Proponent (person taking the action) shall develop and implement rehabilitation measures in consultation with the DEC, BICC and the Conservation Commission.	Section 4.3
MS 769	11.8		
EPBC 2003/1294 EPBC 2008/4178	9.8		
EPBC 2003/1294 EPBC 2008/4178	3.2.1	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.	Section 3.2
EPBC 2003/1294 EPBC 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 3.2
EPBC 2003/1294 EPBC 2008/4178	3.2.3	Details of the management measures proposed in relation to these species if it is a requirement of the Condition requiring that plan.	Section 4.0
EPBC 2003/1294 EPBC 2008/4178	3.2.5	Performance standards in relation to that species if it is a requirement of the condition requiring that plan, report, program, or system (however described).	Section 5.0



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

The sections in this Plan listed in Table 1-2 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 EPBC Reference: 2003/1294 and 2008/4178.

## 1.5 Stakeholder Consultation

This Plan was prepared in consultation with<sup>2</sup>:

- the former Western Australian Department of Environment and Conservation (DEC; now the Department of Parks and Wildlife [Parks and Wildlife] and the Department of Environment Regulation [DER])
- the former Commonwealth Department of the Environment, Water, Heritage and the Arts (now Department of the Environment [DotE])
- the Western Australian Conservation Commission
- the DMP
- the Barrow Island Coordination Council (BICC) participants.

Outcomes of these consultations, where relevant, were incorporated into this Plan.

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<sup>2</sup> The Western Australian Department of Commerce has advised Chevron Australia is no longer required to consult them on this Plan. For the purposes of consultation, Parks and Wildlife is considered to represent DEC.

## 2.0 Relevant Facilities and Activities

This Plan addresses potential fire risks and fire risk management for the construction and operation activities associated with the terrestrial facilities of the Gorgon Gas Development on Barrow Island, which are shown in Figure 2-1.

The Gorgon Gas Development terrestrial facilities are defined in Condition 6.3 of MS 800 and Condition 5.2 of EPBC Reference: 2003/1294 and 2008/4178 as 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). Specific activities associated with the construction and operation of terrestrial facilities and identified to represent a fire hazard during the risk assessment are described in Appendix B.

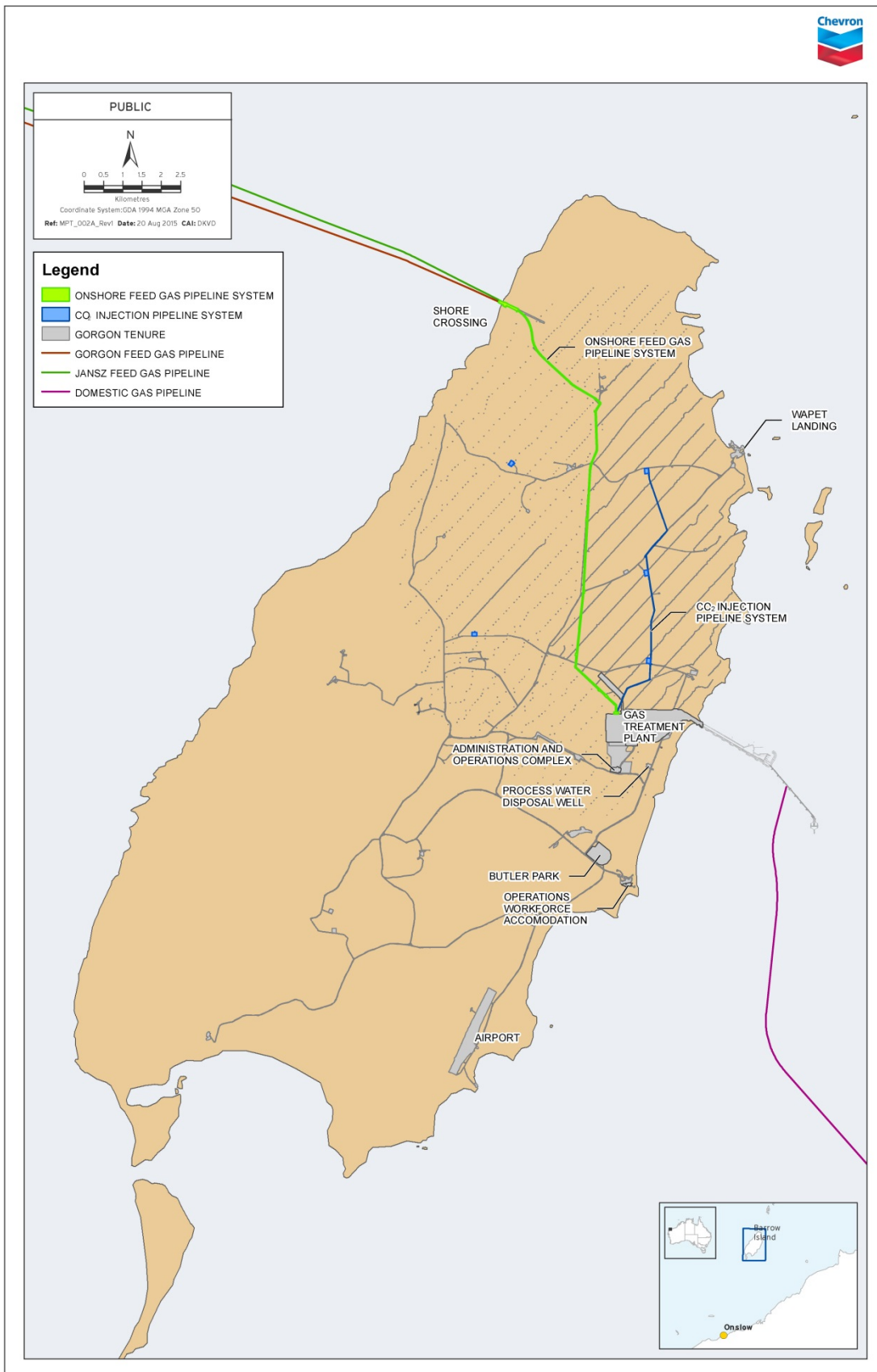
### 2.1 Fire Terrestrial Disturbance Footprint

The environmental approvals for the Gorgon Gas Development include the concept of a Terrestrial Disturbance Footprint (TDF), which encompasses the Gorgon Gas Development footprint and a zone beyond it that contains the area that may be disturbed by construction or operations activities associated with the terrestrial facilities. TDF boundaries are delineated in the Terrestrial and Subterranean Baseline State and Environmental Impact Report (TSBSEIR) (Ref. 11), as amended from time to time, unless an alternative delineation is approved in any particular environmental management plan. The TDF for fire is defined in this Plan.

This Plan delineates two TDF boundaries for the purpose of ensuring the objectives and requirement of the Plan are met. These boundaries contain the area of potential disturbance from fire attributable to the Gorgon Gas Development, and the area of potential disturbance on Barrow Island associated with fire emergency response actions, as described in the following sections.

#### 2.1.1 Fire Disturbance TDF

The boundary of the TDF for effects of a fire attributable to construction and operation of the Gorgon Gas Development is consistent with the TDF defined in the TSBSEIR (Ref. 11), as amended from time to time. It extends 100 metres (m) beyond the Gorgon Gas Development footprint for disturbance to non-mobile ecological elements, 1000 m for mobile ecological elements and 200 m for groundwater.



**Figure 2-1: Gorgon Gas Development Terrestrial Facilities on Barrow Island**

## 2.1.2 Fire Response TDF

If a fire occurs on Barrow Island, Chevron Australia may need to take emergency response actions and measures (Table 4-1) outside the Fire Disturbance TDF (Section 2.1.1) to suppress and manage the fire, to protect human safety and health, Chevron Australia assets and the environment of Barrow Island. Such emergency response actions may be required in response to a fire attributable to construction and operation of the Gorgon Gas Development, or a fire from natural or other sources on Barrow Island.

The nature and scale of fire response activities would be commensurate with the risk posed by the fire, as determined by the Emergency Management Team. However, reasonable response actions to suppress and manage a fire may cause disturbance outside of the Fire Disturbance TDF (potentially including environmental harm), and may be required at any location on Barrow Island. Therefore, the fire response TDF includes the whole of Barrow Island (ie to the low water mark).

### 3.0 Risk Assessment

Risk is the combination of the potential consequences arising from an environmental stressor together with the likelihood of the stressor occurring and resulting in the consequence. Chevron Australia has developed an internal risk management process using the Chevron Integrated Risk Prioritization Matrix (Appendix A). Table 3-1 summarises the risk assessments undertaken to date, and that have provided input to this Plan.

**Table 3-1: Risk Assessments Relevant to this Plan**

Scope of Risk Assessment	Documentation
Construction of the Gorgon Gas Development (all terrestrial infrastructure)	Fire Management Plan (2008 [Ref. 12]) Fire Management Plan (2013 [Ref. 13]) This Plan
Operation of the Gorgon Gas Development (all terrestrial infrastructure)	Fire Management Plan (2013 [Ref. 13]) This Plan

### 3.1 Methodology

The main components of the internal Chevron Australia risk assessment methodology include:

- **Specify causes:** Identify possible causes or conditions resulting in a stressor.
- **Determine potential consequences:** Determine the level of harm that could be associated with the stressor.
- **Identify and evaluate safeguards:** Identify design features and operating controls that either manage the stressor or otherwise prevent exposures that can result in harm.
- **Apply the Integrated Risk Prioritization Matrix:** Using the Chevron Integrated Risk Prioritization Matrix (Appendix A), assign consequence magnitude and likelihood indices to obtain a risk ranking:
  - **Consequence magnitude index:** Maximum level of harm that could be associated with the stressor – safeguards *are not* taken into account.
  - **Likelihood index:** Expected frequency of the consequence magnitude occurring – safeguards *are* taken into account.
- **Recommend further study or risk mitigation:** Apply qualitative risk criteria and risk management guiding principles to guide further risk reduction actions, if required.

### 3.2 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 listed species and their habitat likely to be impacted by the components of the action that is the subject of this Plan. That description is provided in the Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat, as amended from time to time (Ref. 14; Appendix C).

A detailed definition and description of the significant ecological elements on Barrow Island, which include relevant matters of NES, is contained in the TSBSEIR (Ref. 11) and the Draft EIS/ERMP (Ref. 15).

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

the risks to the listed species described in Ref. 14 (Appendix C). Section 4.0 describes measures developed to manage these risks.

### 3.3 Outcomes

Condition 12.5(i) of MS 800, Condition 11.5(i) of MS 769, and Condition 9.5(i) of EPBC Reference: 2003/1294 and 2008/4178 require:

*a fire risk assessment of all [terrestrial] Proposal (action) infrastructure, and measures to protect [terrestrial] Proposal (action) infrastructure and the surroundings from fires on Barrow Island.*

Appendix B describes the fire risks to the environment from activities associated with the construction and operation of the Gorgon Gas Development that were considered during the preparation of this Plan. This includes the outcomes from a risk assessment completed in February and March 2015.

The risk assessment found that with appropriate design and management, including the measures described in Section 4.0, the residual fire risk from construction and operation of the Gorgon Gas Development is tolerable and further risk reduction is not required.

## 4.0 Management Measures

This section describes the measures relevant to this Plan that Chevron Australia, in consultation with relevant stakeholders, has developed to prevent, suppress, and manage fires for the Gorgon Gas Development. These measures may be implemented for fire associated with construction and operation of the Gorgon Gas Development, or to protect Gorgon Gas Development personnel or assets from fire on Barrow Island.

The management measures that are to be implemented to prevent, suppress, and manage fire during construction and operation of the Gorgon Gas Development are detailed in Table 4-1. The management measures detailed in Table 4-1 include those that apply to the relevant matters of NES identified in Appendix C (Ref. 14).

Measures to prevent, suppress, and manage fires that are being implemented to address other legislative requirements are not included in Table 4-1 as compliance with these requirements is managed outside of this Plan; for example:

- establishing and maintaining firebreaks around facilities in accordance with the *Bush Fires Act 1954 (WA)* except where exemptions have been granted
- obtaining a *Bush Fires Act 1954 (WA)* Permit to Burn prior to burning vegetation
- storing and transporting flammable materials in accordance with the requirements of the *Dangerous Goods Safety Act 2004 (WA)*
- including fire risk-reduction measures in the facility design and operation (Section 4.1) to ensure workplace and public safety in accordance with the *Occupational Safety and Health Act 1984 (WA)*, *Petroleum Pipelines Act 1969 (WA)*, and *Dangerous Goods Safety Act 2004 (WA)*.

Physical design features that are in place to prevent, suppress, and manage fires are also not included in Table 4-1; for example:

- perimeter radiation shields on the ground flare to mitigate against heat and flames igniting vegetation
- multiple, spaced and staged flare burners to minimise heat plume intensity.

Where measures described in Table 4-1 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.

**Table 4-1: Fire Management Measures to Prevent, Suppress, and Manage Fire**

Activity	Management Measure	Phase
<b>Prevention</b>		
Fuel, chemical, and explosives transport and handling	Procedures will be implemented to manage fire ignition risk for the transport and handling of fuel and explosives.	All phases
Gas processing at GTP	A fire and gas leak detection system will be maintained for the GTP.	Operations
	An isolation and emergency depressurisation system will be maintained for the GTP.	Operations
Flaring of gas (ground flare) associated with commissioning and operation activities at the GTP	Vegetation regrowth will be cleared from within the ground flare boundary fence (including within the flare boxes) as required.	All phases
	Procedures will be implemented to minimise the risk of the	All phases

Activity	Management Measure	Phase
	ground flare system causing fire and explosion.	
Vehicle movements	Only diesel engine vehicles will be used on site. Any exception must be authorised internally.	All phases
Activities with potential ignition sources	Activities with the potential to ignite a fire will be completed in accordance with the requirements of an internal permit or equivalent (e.g. procedure).	All phases
Smoking	Smoking permitted only in designated smoking areas that have portable firefighting equipment, fixed point lighters, and butt disposal facilities.	All phases
Awareness sessions	Site-based personnel working on the Gorgon Gas Development will be made aware of smoking requirements and the location of firefighting equipment in their work area.	All phases
<b>Detection/Control/Mitigation</b>		
Emergency/fire response preparedness	Access to 24/7 emergency response capability, equipped with appropriate firefighting equipment.	All phases
	An emergency response plan will be in place and implemented in the event of a fire emergency.	All phases
	Site vehicles and earthmoving plant will carry a minimum of one fire extinguisher.	All phases
	Active fire protection systems will be maintained at the GTP, Butler Park, Administration and Operations Complex, and permanent warehouses.	All phases
	A communication system will be in place for emergency response.	All phases
	Activities with the potential to ignite a fire will have response measures in place as required by the internal permit or equivalent (e.g. procedure) for that activity.	All phases
Emergency/fire response activities	Emergency response to Gorgon Gas Development-attributable fires will be undertaken in accordance with a standardised Incident Command System. See Section 4.2 for details.	All phases
	The Barrow Island Emergency Management Team (EMT) will determine response priorities and strategies for managing fire events, based upon the risk posed to personnel or assets.	All phases
	Reasonable measures will be taken, including outside the fire disturbance TDF, to suppress and manage Gorgon Gas Development-attributable fires and other fires that threaten personnel or facilities on Barrow Island, which may include but not necessarily be limited to: <ul style="list-style-type: none"> <li>complying with directions given by officers authorised under the <i>Fire and Emergency Services Act 1998 (WA)</i>, <i>Bush Fires Act</i>, or the <i>Conservation and Land Management Act 1984 (WA)</i> or their delegates</li> <li>clearing firebreaks or fire access tracks</li> <li>burning a firebreak when another fire is already burning as directed, permitted or authorised by officers authorised under the <i>Fire and Emergency Services Act 1998 (WA)</i>, <i>Bush Fires Act</i>, or the <i>Conservation and Land Management Act 1984 (WA)</i> or their delegates</li> </ul>	All phases



Activity	Management Measure	Phase
	<ul style="list-style-type: none"> <li>• taking and applying alternative water sources (eg sea water, waterflood water) for fire suppression where freshwater sources are exhausted or not practicably available</li> <li>• using fire suppressants</li> <li>• implementing other fire management, suppression, or prevention measures as directed, permitted or authorised by officers authorised under the <i>Fire and Emergency Services Act 1998 (WA)</i>, <i>Bush Fires Act</i>, or the <i>Conservation and Land Management Act 1984 (WA)</i> or their delegates</li> </ul>	

## 4.1 Safety Report and Safety Cases

Fire risk-reduction measures for the Gorgon Gas Development facilities are identified in the basis of design for fire gas detection for each facility. These are documented in the Gorgon Project Concept Safety Case (Ref. 16), the Facility Safety Report (Ref. 17) required under the Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007, and the individual Safety Case Reports for each facility required under relevant petroleum legislation.

These documents provide assurance that the operator of the facility has a comprehensive and integrated safety management system in place that covers all activities at the facility. These documents are an auditable reference document that provides substantiation that a system is safe and shows that any risks associated with its operation, including risks to employee as well as public health and safety, have been reduced to a level that is as low as reasonably practicable (ALARP) and acceptable.

## 4.2 Emergency Response

The Chevron Australia Barrow Island Emergency Response Plan (BWI ERP) (Ref. 18) 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, and post-incident actions. It includes direction to event-/facility-specific response plans and inventories of emergency (including firefighting) resources.

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.

In 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.

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

Major incidents may see the mobilisation of Perth-based elements of the EMT and the Crisis Management Team to provide additional strategic management, long-term planning, and operational support.

### **4.3 Rehabilitation of Fire-affected Areas**

For areas outside the fire disturbance TDF (Section 2.1.1) affected by a fire attributable to Gorgon Gas Development activities, Chevron Australia will consult with the Conservation Commission to determine if that area requires active rehabilitation. If active rehabilitation is required, Chevron Australia will consult with Parks and Wildlife, BICC Participants and the Conservation Commission in developing and implementing appropriate rehabilitation measures.

## 5.0 Performance Objectives and Standards

Environmental performance is ‘the measurable results of an organisation’s management of its environmental aspects’ (Ref. 19). Chevron Australia measures environmental performance through:

- **Environmental performance objectives** – the environmental goals that Chevron Australia sets itself to achieve
- **Environmental performance standards** – the measures Chevron Australia uses to assess whether or not it is meeting its environmental performance objectives, comprising:
  - **Performance indicators** – indicators that provide information about Chevron Australia’s performance against an objective (e.g. percentage of employees who complete an induction)
  - **Performance targets** – the level that Chevron Australia is aiming for (e.g. 100% of employees complete an induction).

Table 5-1 lists the environmental performance objectives and standards that were developed to enable Chevron Australia to assess environmental performance for fire management, in accordance with Condition 12.5(iii) of MS 800 and Condition 9.5(iii) of EPBC Reference: 2003/1294 and 2008/4178.

The targets in Table 5-1 were developed specifically for assessing performance, not compliance. Failure to meet the targets does not represent failure to implement this Plan; rather, it indicates that a performance objective may not have been met and there may be a need for management action or review of the environmental performance objectives and standards.

**Table 5-1: Objectives and Performance Standards**

Objectives	Performance Standards	
	Indicator	Target
1. To ensure that the Proposal does not cause Material or Serious Environmental Harm outside the TDF due to fire	Number of fires per year resulting from Gorgon Gas Development construction and operations activities that cause Material or Serious Environmental Harm outside the TDF	Zero
2. To ensure that fire risk-reduction measures are built into the design of the facilities to protect Gorgon Gas Development assets from the impact of fire	Number of fires per year that cause impacts to Gorgon Gas Development assets that result in Material or Serious Environmental Harm outside the TDF	Zero

## 6.0 Incident Reporting

Table 6-1 lists the environmental incident reporting requirements, including timing, specific to this Plan.

**Table 6-1: Incident Reporting Requirements**

Incident	Report to	Timing
All bushfires detected by Gorgon Gas Development personnel	Parks and Wildlife Barrow Island Senior Reserves Officer	As soon as practicable
Fire events (attributable to the Gorgon Gas Development) resulting in Material or Serious Environmental Harm outside the TDF	WA Office of the Environmental Protection Authority, DER, and DotE	Within 48 hours of detection of Material or Serious Environmental Harm outside the TDF

## 7.0 Terminology

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
24/7	24 hours a day, 7 days a week (i.e. at all times)
Additional Support Area	Gorgon Gas Development Additional Construction, Laydown, and Operations Support Area
Administration and Operations Complex	The permanent operations facility and associated buildings, located near the GTP, outside the GTP boundary.
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 as low as reasonably practicable. Cost includes financial cost, time or duration, effort, occupational health and safety risks, or environmental impacts associated with implementing the control.
BICC	Barrow Island Coordination Council as established under Schedule 1 of the <i>Barrow Island Act 2003</i> (WA).
Bund	An area of containment, such as a dam, wall, or other artificial embankment.
Butler Park	Barrow Island accommodation village (formerly known as the Construction Village)
BWI	Barrow Island
Carbon Dioxide Injection System	The mechanical components required to be constructed to enable the injection of reservoir carbon dioxide, including but not limited to compressors, pipelines and wells.
CCTV	Closed-circuit Television
CO <sub>2</sub>	Carbon dioxide
Construction	Construction includes any Proposal-related (or action-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.
DEC	Former Western Australian Department of Environment and Conservation (now Parks and Wildlife and/or DER)
DER	Western Australian Department of Environment Regulation (formerly DEC)
DMP	Western Australian Department of Mines and Petroleum
DotE	Commonwealth Department of the Environment

Term	Definition
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).
EMT	Emergency Management Team
Environmental Harm	Has the meaning given by Part 3A of the <i>Environmental Protection Act 1986</i> (WA).
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
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.
EPBC Reference: 2011/5942	Commonwealth Ministerial Approval (for the Gorgon Gas Development Fourth Train Expansion Proposal) as amended or replaced from time to time.
ERO	Emergency Response Organisation
ERP	Emergency Response Plan
FeS	Iron sulfide
Firebreak	An area of land, free of combustible material, that provides an adequate break between activities and infrastructure and the surrounding undisturbed land to contain the spread of fire. Firebreaks serve to both contain fire within an operational area and prevent ingress of fire from external sources.
Gorgon Gas Development	The Gorgon Gas Development as approved under MS 800 and MS 965 and under EPBC Reference: 2003/1294 and 2008/4178 (as varied by the Commonwealth Environment Minister), as amended or replaced from time to time.
Gorgon Gas Development Footprint	Consists of the cleared areas and uncleared areas approved to be cleared on Barrow Island used for the construction and operation of the Gorgon Gas Development and Jansz Feed Gas Pipeline.
GTP	Gas Treatment Plant, which includes power generation, LNG trains, flare (ground and boil off gas), domestic gas production, condensate production and storage
HAZID	Hazard Identification
HES	Health, Environment, and Safety
Hot Work	Any activity in a restricted/designated area, which either uses or could generate a fire through a naked flame, heat or sparks.
EMT	Emergency Management Team
IR	Infra-red
ISO	International Organization for Standardization
Jansz Feed Gas Pipeline	The Jansz Feed Gas Pipeline as approved in MS 769 and EPBC Reference 2005/2184 as amended or replaced from time to time.
JHA	See Job Hazard Analysis

Term	Definition
Job Hazard Analysis	The purpose of a JHA is to ensure that the risk of each step of a task is reduced to ALARP. The analysis starts with defining a summary of the whole job and breaking it down into smaller step-by-step processes. The hazards involved in each step are identified and analysed, then the control measures to eliminate, reduce, or mitigate the identified hazards are formulated. By this means, every aspect of the whole process is analysed, and safe methods of work are determined.
km	Kilometre
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
m	Metre
Material Environmental Harm	Environmental harm that is neither trivial nor negligible.
MS	(Western Australian) Ministerial Statement
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.
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.
MS 1002	Western Australian Ministerial Statement 1002, issued for the Gorgon Gas Development Fourth Train Expansion Proposal, as amended from time to time.
NES	[Matters of] National Environmental Significance, as defined in Part 3, Division 1 of the EPBC Act.
Operations (Gorgon Gas Development)	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 Venturers 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 GTP, until the date on which the Gorgon Joint Venturers commence decommissioning that LNG train.
Parks and Wildlife	Western Australian Department of Parks and Wildlife
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 objectives of conditions can be measured.

Term	Definition
Practicable	<p>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.</p> <p>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.</p>
Pyrophoric	A material that automatically ignites on exposure to oxygen or oxygen-containing species
Serious Environmental Harm	<p>Environmental harm that is:</p> <ul style="list-style-type: none"> <li>• irreversible, of a high impact or on a wide scale; or</li> <li>• significant or in an area of high conservation value or special significance and is neither trivial nor negligible.</li> </ul>
TAPL	Texaco Australia Pty Ltd
TSBSEIR	Terrestrial and Subterranean Baseline State and Environmental Impact Report.
TDF	See Terrestrial Disturbance Footprint
Terrestrial Disturbance Footprint	<p>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, Schedule 1 of MS 965, and Condition 5.2 of EPBC Reference: 2003/1294 and 2008/4178. The TDF for fire, including fire response activities, is as set out in Section 2.1 of this Plan.</p>
Terrestrial Facilities	<p>In relation to MS 800 and EPBC Reference: 2003/1294 and 2008/4178, the terrestrial facilities are the:</p> <ul style="list-style-type: none"> <li>• GTP</li> <li>• Carbon Dioxide Injection System</li> <li>• Associated Terrestrial Infrastructure forming part of the Proposal</li> <li>• Areas impacted for seismic data acquisition</li> <li>• Onshore Feed Gas Pipeline System and terrestrial component of the Shore Crossing.</li> </ul> <p>Terrestrial Facilities also include those defined in Schedule 1 of MS 965 (the Additional Support Area).</p>
WA	Western Australia



## 8.0 References

The following documentation is directly referenced in this document.

**Table 8-1: References**

Ref. No.	Description
1.	Government of Western Australia, Minister for the Environment, David Templeman MLA. 2008. <i>Statement that a Proposal may be Implemented – Jansz Feed Gas Pipeline: Barrow Island Nature Reserve (Ministerial Statement 769)</i> , 28 May 2008. Perth, Western Australia.
2.	Commonwealth Government of Australia, Assistant Secretary Environmental Assessment Branch, Anne-Marie Delahunt. 2006. <i>Decision to Approve the taking of an Action – Jansz Feed Gas Pipeline (EPBC Reference: 2005/2184)</i> , 22 March 2006. Canberra, Australian Capital Territory.
3.	Government of Western Australia, Minister for the Environment, Youth, Donna Faragher JP MLC. 2009. <i>Statement that a Proposal may be Implemented – Gorgon Gas Development Revised and Expanded Proposal: Barrow Island Nature Reserve (Ministerial Statement 800)</i> , 10 August 2009. Perth, Western Australia.
4.	Commonwealth Government of Australia, Minister for the Environment, Water, Heritage and the Arts, Peter Garrett. 2009. <i>Approval – Gorgon Gas Development (EPBC Reference: 2008/4178)</i> , 26 August 2009. Canberra, Australian Capital Territory.
5.	Commonwealth Government of Australia, Minister for the Environment and Water Resources, Malcolm Turnbull. 2007. <i>Approval – Gorgon Gas Development (EPBC Reference: 2003/1294)</i> , 3 October 2007. Canberra, Australian Capital Territory.
6.	Government of Western Australia, Minister for the Environment; Heritage. Albert P. Jacob JP MLA. 2014. <i>Statement that a Proposal may be Implemented – Gorgon Gas Development Additional Construction Laydown and Operations Support Area (Ministerial Statement 965)</i> . Perth, Western Australia.
7.	Government of Western Australia, Minister for the Environment; Water, Hon Bill Marmion MLA. 2011. <i>Statement to Amend Conditions Applying to a Proposal – Gorgon Gas Development Revised and Expanded Proposal: Barrow Island Nature Reserve (Ministerial Statement 865)</i> , 8 June 2011. Perth, Western Australia.
8.	Government of Western Australia, Minister for the Environment; Heritage. Albert Jacob MLA. 2015. <i>Statement that a Proposal may be Implemented – Gorgon Gas Development Fourth Train Expansion Proposal (Ministerial Statement 1002)</i> . Perth, Western Australia.
9.	Environmental Protection Authority. 2008. <i>Change to Gorgon Gas Development on Barrow Island Nature Reserve – Ministerial Statement 748. Approval under section 45C of the Environmental Protection Act 1986. Approval letter issued 21 May 2008, EPA Ref: DEC Doc 48104</i> . Perth, Western Australia.
10.	Chevron Australia. 2008. <i>Gorgon Gas Development Revised and Expanded Proposal Public Environmental Review</i> . Chevron Australia, Perth, Western Australia.
11.	Chevron Australia. 2012. <i>Gorgon Gas Development and Jansz Feed Gas Pipeline: Terrestrial and Subterranean Baseline State and Environmental Impact Report</i> . Chevron Australia, Perth, Western Australia.
12.	Chevron Australia. 2008. <i>Gorgon Gas Development Revised and Jansz Feed Gas Pipeline: Fire Management Plan Revision 0</i> . Chevron Australia, Perth, Western Australia.
13.	Chevron Australia. 2013. <i>Gorgon Gas Development Revised and Jansz Feed Gas Pipeline: Fire Management Plan Revision 1</i> . Chevron Australia, Perth, Western Australia.
14.	Chevron Australia. 2010. <i>Gorgon Gas Development and Jansz Feed Gas Pipeline: Appendix: Identification of Terrestrial and Subterranean Matters of National Environmental Significance (NES) and their Habitat</i> . Chevron Australia, Perth, Western Australia.

Ref. No.	Description
15.	Chevron Australia. 2005. <i>Draft Environmental Impact Statement/Environmental Review and Management Programme for the Proposed Gorgon Gas Development</i> . Chevron Australia, Perth, Western Australia.
16.	Chevron Australia. 2009. <i>Draft Gorgon Project Concept Safety Case</i> . Chevron Australia, Perth, Western Australia.
17.	Chevron Australia. 2014. <i>Facility Safety Report</i> . Chevron Australia, Perth, Western Australia.
18.	Chevron Australia. 2014. <i>Barrow Island Emergency Response Plan</i> . Chevron Australia, Perth, Western Australia.
19.	Standards Australia/Standards New Zealand. 2004. <i>ISO 14001:2004 Environmental Management Systems – Requirements with Guidance for Use</i> . Standards Australia/Standards New Zealand, Sydney/Wellington.

# Appendix A Chevron Integrated Risk Prioritization Matrix

Likelihood Descriptions & Index (with confirmed safeguards)		Legend						
Likelihood Descriptions	Likelihood Indices	Legend applies to identified HES risks (see guidance documents for additional explanations) 1, 2, 3, 4 - Short-term, interim risk reduction required. Long term risk reduction plan must be developed and implemented. 5 - Additional long term risk reduction required. If no further action can be reasonably taken, SBU management approval must be sought to continue the activity. 6 - Risk is tolerable if reasonable safeguards / management systems are confirmed to be in place and consistent with relevant requirements of the Risk Mitigation Closure Guidelines. 7, 8, 9, 10 - Manage risk. No further risk reduction required. Risk reduction at management / team discretion.						
Consequence can reasonably be expected to occur in life of facility	1 Likely	Decreasing Likelihood 	6	5	4	3	2	1
Conditions may allow the consequence to occur at the facility during its lifetime, or the event has occurred within the Business Unit	2 Occasional		7	6	5	4	3	2
Exceptional conditions may allow consequences to occur within the facility lifetime, or has occurred within the OPCO	3 Seldom		8	7	6	5	4	3
Reasonable to expect that the consequence will not occur at this facility. Has occurred several times in industry, but not in OPCO	4 Unlikely		9	8	7	6	5	4
Has occurred once or twice within industry	5 Remote		10	9	8	7	6	5
Rare or unheard of	6 Rare		10	10	9	8	7	6
Consequence Descriptions & Index (without safeguards)	Consequence Indices		Decreasing Consequence/Impact					
			6	5	4	3	2	1
			Incidental	Minor	Moderate	Major	Severe	Catastrophic
	Consequence Descriptions	Safety	Workforce: Minor injury such as a first-aid. AND Public: No impact	Workforce: One or more injuries, not severe. OR Public: One or more minor injuries such as a first-aid.	Workforce: One or more severe injuries including permanently disabling injuries. OR Public: One or more injuries, not severe.	Workforce: (1-4) Fatalities OR Public: One or more severe injuries including permanently disabling injuries.	Workforce: Multiple fatalities (5-50) OR Public: multiple fatalities (1-10)	Workforce: Multiple fatalities (>50) OR Public: multiple fatalities (>10)
Health (Adverse effects resulting from chronic chemical or physical exposures or exposure to biological agents)		Workforce: Minor illness or effect with limited or no impacts on ability to function and treatment is very limited or not necessary AND Public: No impact	Workforce: Mild to moderate illness or effect with some treatment and/or functional impairment but is medically manageable OR Public: illness or adverse effect with limited or no impacts on ability to function and medical treatment is limited or not necessary.	Workforce: Serious illness or severe adverse health effect requiring a high level of medical treatment or management OR Public: illness or adverse effects with mild to moderate functional impairment requiring medical treatment.	Workforce (1-4): Serious illness or chronic exposure resulting in fatality or significant life shortening effects OR Public: Serious illness or severe adverse health effect requiring a high level of medical treatment or management.	Workforce (5-50): Serious illness or chronic exposure resulting in fatality or significant life shortening effects OR Public (1-10): Serious illness or chronic exposure resulting in fatality or significant life shortening effects.	Workforce (>50): Serious illness or chronic exposure resulting in fatality or significant life shortening effects OR Public (>10): Serious illness or chronic exposure resulting in fatality or significant life shortening effects.	
Environment		Impacts such as localized or short term effects on habitat, species or environmental media.	Impacts such as localized, long term degradation of sensitive habitat or widespread, short-term impacts to habitat, species or environmental media	Impacts such as localized but irreversible habitat loss or widespread, long-term effects on habitat, species or environmental media	Impacts such as significant, widespread and persistent changes in habitat, species or environmental media (e.g. widespread habitat degradation).	Impacts such as persistent reduction in ecosystem function on a landscape scale or significant disruption of a sensitive species.	Loss of a significant portion of a valued species or loss of effective ecosystem function on a landscape scale.	
The above legend applies only to HES risks, where risk levels 1-6 are actionable and mandatory. For risks that may result in facility damage, business interruption, loss of product, the "Assets" category below should be used. Asset risk reduction is at the discretion of management. Under no circumstances may a direct or indirect translation of Asset loss to HES consequences, or between any discrete categories of HES consequences be inferred.								
Consequence Descriptions & Index (without safeguards)	Consequence Indices		6	5	4	3	2	1
			Incidental	Minor	Moderate	Major	Severe	Catastrophic
Consequence Descriptions	Assets (Facility Damage, Business Interruption, Loss of Product)		Minimal damage. Negligible down time or asset loss. Costs < \$100,000.	Some asset loss, damage and/or downtime. Costs \$100,000 to \$1 Million.	Serious asset loss, damage to facility and/or downtime. Costs of \$1-10Million.	Major asset loss, damage to facility and/or downtime. Cost >\$10 Million but <\$100 Million.	Severe asset loss or damage to facility. Significant downtime, with appreciable economic impact. Cost >\$100MM but <\$1 billion.	Total destruction or damage. Potential for permanent loss of production. Costs >\$1billion
	This matrix is endorsed for use across the Company. It is not a substitute for, and does not override any relevant legal obligations. Under no circumstances should any part of this matrix be changed or modified, adapted or customized. This matrix identifies health, safety, environmental and asset risks and is to be used only by qualified and competent personnel. Where applicable it is to be used within the Riskman2 structure and governance of an OE Risk Management Process. If applied outside of these Processes, it is also mandatory to manage identified intolerable risks and comply with the Risk Mitigation Closure Guidelines.							

## Appendix B Fire Risk Assessment

Appendix Table B-1: Gorgon Fire Hazard Identification (HAZID) Spreadsheet Summary – Construction

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Vehicle movements</b>	Ignition of vegetation due to vehicle exhaust, spark from contact with rock, or vehicle collisions	Contact between ignition source created by the vehicle and vegetation; increased vehicle movements during construction phase	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Traffic management (including dedicated routes and internal permits)</li> <li>Driver competency (certificate)</li> <li>Vehicle maintenance</li> <li>Diesel vehicles only (unless otherwise authorised)</li> <li>High-clearance vibroseis trucks</li> <li>Raised awareness (eg In Vehicle Monitoring System [IVMS], inductions)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>All vehicles carry a minimum of one fire extinguisher</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	4	7
<b>Smoking</b>	Ignition of vegetation/fuel fire	Fires started by discarded cigarette butts, matches, or lighters	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Designated smoking areas (with fixed point lighters and designated cigarette disposal bins, fire extinguishers)</li> <li>Raised awareness (inductions etc.)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training) Fire extinguishers at designated smoking areas</li> </ul>	4	4	7
<b>Contact with existing infrastructure (e.g. power lines,</b>	Ignition due to electrical spark or hydrocarbon release,	Operator/driver distractions; lack of up-to-date information on the	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Access Chevron Australia records to identify existing underground services</li> </ul>	4	4	7

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
hydrocarbon lines, cables)	combustion, or explosion	location of existing infrastructure	<ul style="list-style-type: none"> <li>Internal permit to work</li> <li>Cross-checking between Joint Venture participants (as part of internal permit process)</li> <li>Field verification</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers</li> <li>Isolation procedures</li> </ul>			
Fuel storage and dispensing (e.g. diesel, liquefied petroleum gas [LPG])	Ignition during storage or dispensing	Personnel not following the correct procedures Equipment failure Smoking Electrical fault	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Designated refuelling locations and vehicles</li> <li>Designed and operated in accordance with relevant Australian Standards and licences (e.g. bunding, collection pits, fire protection equipment adjacent to facility)</li> </ul> <p>Work Procedures and Job Hazard Analysis (JHA)</p> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers</li> </ul>	4	5	8
Hot work: welding/ grinding/ flame cutting	Sparks from hot works may ignite vegetation	Personnel not following the correct procedures	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Internal permit to work</li> <li>Training of staff in use of firefighting equipment</li> <li>Work Procedures and Job Hazard Analysis (JHA)</li> <li>Equipment certification</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)Fire extinguishers</li> </ul>	4	4	7

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Fires in Buildings</b>	Fire ignition within a building	Electrical or mechanical fault, human error, and/or incorrect storage or handling of materials	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Buildings are designed in accordance with relevant Australian Standards and building codes (e.g. active fire protection system, separation distances)</li> <li>Training of staff in use of firefighting equipment</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers</li> </ul>	4	5	8
<b>Vegetation burning (controlled burning)</b>	Uncontrolled fire from vegetation burning	Loss of control of vegetation clearing via burning, spontaneous combustion of stockpiled vegetation material	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Burning to take place when weather conditions most suitable</li> <li>Burn vegetation in accordance with an approved Prescribed Fire Plan and Permit to Burn (as required under the <i>Bush Fires Act 1954</i>)</li> <li>Trained, competent personnel</li> <li>Internal permit</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>Fire suppression equipment will be on site to contain any outbreak outside cleared area</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers</li> </ul>	4	3	6
<b>Vegetation clearing including maintaining cleared corridors for construction access and infrastructure</b>	Sparks from earthmoving equipment		<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Spark arrestors on earthmoving equipment</li> <li>Internal permit</li> <li>Raised awareness (eg induction etc.)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>Fire extinguishers on earthmoving plant</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	4	7



Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Drilling and blasting – storage and use of explosives</b>	Explosive materials used in blasting; flammable material ejected during blasts	Uncontrolled blasting (e.g. unplanned detonation); non-compliance with storage procedures	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>• Internal and external permits</li> <li>• Trained, licensed personnel</li> <li>• Work procedures</li> <li>• Storage, use, and transport procedures in accordance with relevant Australian Standards.</li> <li>• Dedicated storage</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>• Appropriate fire suppression equipment on site during blasting where there is a risk of bushfire</li> <li>• BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	5	8
<b>Chemical transport/storage</b>	Chemical fires	Non-compliance with storage procedures; mixing of reactive chemicals	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>• Designed and operated in accordance with relevant Australian Standards (e.g. bunding, buffers, fire protection equipment adjacent to facility, trained personnel)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>• BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>• Fire extinguishers</li> </ul>	4	4	7

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Flaring (at rig) during drilling and completion of wells</b>	Fire from gas flaring ignites surrounding vegetation	Ignition of gas in flare box at drill site	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>No routine flaring (contingency only)</li> <li>Design, configuration, and location of flare box</li> <li>Location of wells – well planning and design to avoid hydrocarbon production</li> <li>Flow control</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>Trained personnel on site 24 hours</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	4	7
<b>Drilling and completion of wells</b>	Fire from loss of well control	Failure of pressure control with ignition of gas	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Restrictions on ignition sources</li> <li>Blowout preventers</li> <li>Competent personnel</li> <li>Location of wells – well planning and design to avoid hydrocarbon zones</li> <li>Size of drilling pad (separation from vegetation)</li> <li>Well control procedures</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>Trained personnel on site 24 hours</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	5	8



Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Displacement to Gas Treatment Plant of liquids from feed gas pipeline during commissioning and start-up</b>	Liquids carry over to ground flare system causing 'burning rain' outside flare boxes during flaring	Liquid levels introduced to plant exceed capacity of system	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Liquid storage capacity exceeds expected inputs</li> <li>Levels monitored and alarmed</li> <li>High-level trip on slug catcher</li> <li>Work procedures</li> <li>Design and configuration of flare (including 14 m high surrounding radiation shield)</li> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Active fire protection (e.g. fire hydrants, foam monitors, fire extinguishers)</li> <li>Fire and gas detection (e.g. triple infra-red [IR] flame detectors)</li> </ul>	4	5	8
<b>Flaring required for commissioning and start-up activities</b>	Bird/soot catches alight and ignites vegetation outside the ground flare boxes	Birds flying over the ground flare during flaring Carbon build-up in burners	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Start-up procedures developed to minimise flaring requirements</li> <li>Design, configuration, and location of ground flare (including 14 m high surrounding radiation shield)</li> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	4	7
	Updraft during flaring lifting vegetation off ground, or wind blows vegetation into ground flare, ignites and embers ignite vegetation	Dead vegetation in vicinity of ground flare drawn/blown into the ground flare	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Flaring requirements minimised</li> <li>Design, configuration, and location of ground flare (including 14 m high surrounding radiation shield)</li> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and</li> </ul>	4	5	8

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
	outside flare boxes		communications (with associated equipment and training)			
<b>Ethane and propane storage during commissioning</b>	Loss of containment and ignition of ethane, results in jet fire / explosion	Container failure due to external impact, fissure leak, or rupture	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Storage in appropriate licensed containers</li> <li>Use of cleared areas and minimum distances from nearest vegetation</li> <li>Collision protection in place</li> <li>Leak detection (e.g. visual inspections or gas detection)</li> <li>Transport and handling restrictions (e.g. speed limits, no forklifts)</li> <li>Ignition source control (hazardous area classification, internal permit system)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers at storage areas</li> <li>Fire extinguishers in trucks</li> </ul>	4	5	8

**Appendix Table B-2: Gorgon Fire HAZID Spreadsheet Summary – Operations**

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
GTP operations	Loss of containment (hydrocarbon gas or liquid release) and ignition leading to fire	Operator error, equipment failure, mechanical impact, corrosion/erosion	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Maintenance, inspection, and testing programs (e.g. leak detection and repair)</li> <li>Basis of design (e.g. relevant codes and standards including hydrocarbon containment standards, plant shutdown, blowdown capability, emergency depressurisation, pressure safety valve, separation distances)</li> <li>Training and competency system (e.g. operator competency assurance program)</li> <li>Operating and maintenance procedures (e.g. Permit to work procedures, JHAs, surface equipment reliability and integrity process, traffic management)</li> <li>Process control system (e.g. 24/7 monitoring, alarm management)</li> <li>Safety instrumented systems (e.g. detect trips and abnormal conditions)</li> <li>Footprint cleared of vegetation and has firebreaks</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>Fire and gas detection systems (e.g. manual call points, heat, smoke and gas detectors, alarms, sirens)</li> <li>Emergency shutdown system</li> <li>Passive fire and explosion protection (e.g. fireproofing of critical infrastructure, bunding, bollards)</li> <li>Active fire protection (e.g. deluge, monitors, hydrants, extinguishing systems)</li> <li>Standard detection/ control/mitigation safeguards:                             <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire breaks</li> </ul> </li> </ul>	4	5	8

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
			<ul style="list-style-type: none"> <li>Monitoring via closed-circuit television (CCTV) coverage (zoom and IR capability)</li> </ul>			
<b>Condensate storage</b>	Loss of containment and ignition leading to pool/spray fire	Operator error, equipment failure, mechanical impact, corrosion/erosion	<p>In addition to safeguards listed in GTP operations line item above:</p> <p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Domed roof covering and floating roof on condensate storage tanks</li> <li>Earthing on condensate tanks</li> <li>Condensate tanks are bunded (bunding is resistant to fire)</li> <li>Active fire protection (e.g. remote control fire monitors and fire hydrants, foam blanket system)</li> <li>Fire and gas detection (i.e. triple IR flame detectors, heat detectors in condensate tanks)</li> </ul>	4	5	8
<b>Flaring that may occur during GTP operations, maintenance activities, shutdowns, and turnarounds</b>	Loss of containment (hydrocarbon gas or liquid release) in ground flare and ignition leading to vapour cloud explosion and fire (i.e. catastrophic failure of ground flare system)	Equipment failure (i.e. gas leaks from flare tips, valves/flanges) Corrosion/erosion Operator error Mechanical impact	<p>In addition to preventative safeguards and standard detection/control/mitigation safeguards listed in GTP operations line item above:</p> <p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Fire and gas detection (e.g. triple IR flame detectors)</li> <li>Ignition source restrictions (pilots only) within ground flare</li> <li>Trains depressurised if pilot flame lost (emergency operating procedure)</li> </ul>	4	6	9
	Process upset (unit, system, subsystem, or equipment trip/failure) leading to liquid carry over to the ground flare and 'burning rain'	Equipment trip/failure Operator error Planned shutdown / turnaround activity	<p>In addition to preventative safeguards and standard detection/control/mitigation safeguards listed in GTP operations line item above:</p> <p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Liquid storage capacity exceeds expected demands</li> <li>Levels monitored and alarmed</li> <li>High-level trip on slug catcher</li> <li>Design and configuration of ground flare (including 14 m high surrounding radiation shield)</li> </ul>	4	5	8

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
			<ul style="list-style-type: none"> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> </ul>			
	Bird flying over ground flare (or present within flare boxes) catches alight during flaring and ignites vegetation outside the flare boxes	Birds flying through ground flare during flaring	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Design, configuration, and location of ground flare (including 14 m high surrounding radiation shield)</li> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>As per standard detection/control/mitigation safeguards listed in GTP operations line item above</li> </ul>	4	4	7
	Flaring lifting vegetation off ground, or wind blows vegetation into ground flare, ignites, and embers ignite vegetation outside the flare boxes	<p>Dead vegetation in vicinity of ground flare</p> <p>Build-up of dead vegetation/ debris inside ground flare over time (drawn/blown into the ground flare)</p>	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>No vegetation within the flare boxes (cleared)</li> <li>Design and configuration of ground flare (including 14 m high surrounding radiation shield)</li> <li>Perimeter (&gt;20 m) surrounding ground flare cleared of vegetation</li> <li>Operation of multiple flare boxes reduces updraught</li> <li>Visual monitoring of flare runners (CCTV)</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>As per standard detection/control/mitigation safeguards listed in GTP operations line item above</li> </ul>	4	6	9
	Boil-off Gas flare heat plume grounding causing ignition of surrounding vegetation	<p>Equipment trip/failure</p> <p>Operator error</p> <p>Planned warm LNG carrier cooldown</p>	<p>In addition to preventative safeguards and standard detection/control/mitigation safeguards listed in GTP operations line item above:</p> <p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Located away from GTP boundary</li> <li>Design –enclosed by 25m high surrounding radiation shield</li> </ul>	4	5	8

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Pyrophoric waste materials generated during maintenance activities, shutdowns and turnarounds</b>	Spontaneous combustion of pyrophoric materials leading to fire	Pyrophoric materials (i.e. FeS) generated during pigging or maintenance activities exposed to oxygen during turnaround or pigging (pig receivers)	In addition to safeguards listed in GTP operations line item above: <b>Prevention</b> <ul style="list-style-type: none"> <li>Internal permit to work</li> </ul>	4	6	9
<b>Operations at Administration and Operations Complex (including warehouses, workshops, and laboratories)</b>	Combustion of flammable materials (waste bins, paper, gas bottles, electrical etc.) or chemicals	Operator error, equipment failure, mechanical impact	<b>Prevention</b> <ul style="list-style-type: none"> <li>Footprint cleared of vegetation</li> <li>Designated chemical storage (e.g. at laboratory)</li> </ul> <b>Detection/Control/Mitigation</b> <ul style="list-style-type: none"> <li>Active fire protection (e.g. fire hydrants, portable fire extinguishers, sprinkler system)</li> <li>Fire and gas detection (e.g. smoke and heat detectors)</li> <li>Proximity to fire station</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>	4	5	8
<b>Vehicle movements – including road maintenance (light and heavy vehicles, plant and equipment)</b>	Operating vehicle (eg hot surface, exhaust spark), vehicle fire or collision, or rolled vehicle creating ignition source	Operator error, equipment failure, mechanical impact	<b>Prevention</b> <ul style="list-style-type: none"> <li>Traffic management (including dedicated routes and internal permits)</li> <li>Driver competency (eg certificate)</li> <li>Vehicle maintenance</li> <li>Spark arrestors on large plant</li> <li>Diesel vehicles only (unless otherwise authorised)</li> <li>High-clearance vibroseis trucks</li> <li>Raised awareness (eg IVMS, inductions)</li> </ul>	4	4	7

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
			<p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>One or more fire extinguishers in all vehicles</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>			
<b>Hot work: welding/ grinding/ flame cutting /other activities with potential ignition sources</b>	Sparks from hot works may ignite vegetation	Operator error Equipment failure	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Internal permit to work (governs all hot work activities and safeguards eg shielding, etc.)</li> <li>Work procedures</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>One or more fire extinguisher/s on site</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>	4	4	7
<b>Hydrocarbon/ chemical/explosives transport and transfers</b>	Loss of containment and ignition during hydrocarbon/chemical transfer	Operator error, equipment failure, mechanical impact	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Vehicle maintenance</li> <li>Procedures</li> <li>Traffic management ((including dedicated routes and internal permits))</li> <li>Transfers in designated areas cleared of vegetation and set up for purpose (e.g. bunding) where practicable</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>	4	5	9
<b>Workforce accommodation, kitchen, and living activities</b>	Loss of containment and ignition of LPG/fires in buildings	Operator error, equipment failure, mechanical impact, corrosion/erosion	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Footprint cleared of vegetation</li> <li>LPG bullets located in designated areas surrounded by bollards</li> <li>Operating and maintenance procedures (including tagging of</li> </ul>	4	5	9

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
			electrical equipment) <b>Detection/Control/Mitigation</b> <ul style="list-style-type: none"> <li>• Passive fire and explosion protection</li> <li>• Active fire protection</li> <li>• BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>• Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>			
<b>Smoking</b>	Cigarette butts / lighters creating ignition source	Human error	<b>Prevention</b> <ul style="list-style-type: none"> <li>• Raised awareness (inductions etc.) Designated smoking areas (with fixed point lighters and designated cigarette disposal bins, fire extinguishers)</li> <li>• Major Hazard Facility designation for GTP</li> </ul> <b>Detection/Control/Mitigation</b> <ul style="list-style-type: none"> <li>• Fire extinguishers</li> <li>• BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>• Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>	4	4	7
<b>Waste storage/handling (Waste Transfer Station, waste containers)</b>	Loss of containment (hydrocarbon/chemical gas or liquid release) and ignition leading to fire  Combustion of flammable (domestic) materials	Equipment failure Hazardous materials Corrosion/erosion Operator error Mechanical impact	<b>Prevention</b> <ul style="list-style-type: none"> <li>• No incineration of wastes</li> <li>• Waste management plan</li> <li>• Waste transfer station footprint cleared of vegetation</li> </ul> <b>Detection/Control/Mitigation</b> <ul style="list-style-type: none"> <li>• Active fire protection (including dedicated firewater system) at Waste Transfer Station</li> <li>• BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>• Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>	4	5	8
<b>Workover of wells associated with</b>	Electrical arcing associated with	Operator error, equipment failure	<b>Prevention</b>	4	4	7



Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Terrestrial Facilities</b>	existing wellhead equipment Cathodic protection system creating ignition source		<ul style="list-style-type: none"> <li>Internal permit to work</li> <li>Work procedures (e.g. isolation procedures)</li> <li>Wiring insulation</li> <li>Electrical standards</li> <li>Lease areas cleared of vegetation</li> <li><b>Detection/Control/Mitigation</b></li> <li>Fire extinguishers</li> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Monitoring via CCTV coverage (zoom and IR capability)</li> </ul>			
<b>Refuelling of drilling rig and compressor (heliported fuel)</b>	Loss of containment and ignition of fuel leading to fire	Error during refuelling Equipment failure (e.g. hoses)	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Use of purpose-built, double-skinned fuel tanks</li> <li>Refuelling procedures</li> <li>Spill contingency planning</li> <li>Spill kits</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> <li>Fire extinguishers</li> </ul>	4	4	7
<b>Drilling shotholes</b>	Ignition of flammable materials due to presence of ignition sources (electrical, mechanical friction, hot exhaust in proximity to vegetation) associated with drilling equipment	Unplanned event	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Location of equipment outside vegetated areas where possible</li> <li>Maintenance and inspection of electrical equipment</li> <li>Trained personnel</li> <li>Specialist equipment designed for use in remote/vegetated areas</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)Fire extinguishers</li> </ul>	4	4	7

Activity	Hazard Description (Top Event)	Causes	Safeguards	Risk Level		
			(Prevention/Detection/Control/Mitigation)	C	L	R
<b>Detonating seismic charge</b>	Detonator ignites vegetation	Unplanned detonation	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Licensed personnel</li> <li>Standard operating procedures for loading (e.g. including shunting detonator wires and securing under cap)</li> <li>Radio silence over 50 m radius during loading</li> <li>Non-static clothing and personal protective equipment for loaders/firers</li> <li>Undetonated charges left in place</li> <li>Large hole size relative to size of charge</li> <li>Detonators sourced from approved suppliers</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	4	7
<b>Helicopter operations for CO<sub>2</sub> injection monitoring</b>	Helicopter crash, arcing or loss of payload causing fire	Pilot error Equipment failure Fuel contamination	<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li>Trained personnel and Chevron Australia's / Civil Aviation Safety Authority's aviation standards</li> <li>Flight plans (including duty times for pilots)</li> <li>Controls on quality of fuel supplied (via refuelling at airport).</li> </ul> <p><b>Detection/Control/Mitigation</b></p> <ul style="list-style-type: none"> <li>BWI-wide emergency response procedures, personnel and communications (with associated equipment and training)</li> </ul>	4	5	8

## **Appendix C Identification of Terrestrial and Subterranean Matters of NES and Their Habitat**



# Gorgon Gas Development and Jansz Feed Gas Pipeline:

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

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## 1.0 EPBC Act (Cth) Listed Species

The terrestrial and subterranean matters of NES identified on Barrow Island and those potentially affected by the Gorgon Gas Development include five mammal species (listed as Threatened Species) and 68 bird species (39 species listed under the Japan–Australia Migratory Bird Agreement [JAMBA], China–Australia Migratory Bird Agreement [CAMBA] or Republic of Korea–Australia Migratory Bird Agreement [ROKAMBA] migratory treaties). Of the 68 protected bird species, 47 species are residents or regular migrants to the Island. The remainder are vagrants from the nearby mainland. Table 1.1 provides information on the species abundance and habitat distribution of these matters of NES occurring on Barrow Island.

**Table 1.1 EPBC Species Abundance and Habitat/Distribution on Barrow Island**

	Species	Abundance on Barrow Island	Habitat / Distribution on Barrow Island	Species or Habitat Potentially Impacted
<b>Land Birds</b>	White-winged Fairy-wren (Barrow Island)	High	Widespread across vegetation communities	Yes – Noise
	Sacred Kingfisher	Low	Restricted to mangroves / heavily vegetated creek lines	No
	Tree Martin	Rare	Coastal areas (but not actual beaches) with some extension into claypan areas.	No
	Wood Swallow	High	Widespread	No
<b>Littoral Birds</b>	Australian Pelican, Eastern Reef, Nankeen Night Heron, Black-tailed Godwit, Whimbrel, Eastern Curlew, Common Greenshank, Terek Sandpiper, Common Sandpiper, Grey-tailed Tattler, Ruddy Turnstone, Great Knot, Red Knot, Sanderling Calidris, Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper, Pacific Golden Plover, Grey Plover, Lesser Sand Plover, Greater Sand Plover, Silver Gull, Gull-billed Tern, Caspian Tern, Lesser Crested Tern, Crested Tern, Roseate Tern, Common Tern, Little Tern, Fairy Tern, White-winged Black Tern	High	Concentrated on Barrow Island around Bandicoot Bay on south coast	No
	Bar-tailed Godwit, Lesser Noddy	Low	Concentrated on Barrow Island around Bandicoot Bay on south coast	No

	Species	Abundance on Barrow Island	Habitat / Distribution on Barrow Island	Species or Habitat Potentially Impacted
<b>Raptors (Birds of Prey)</b>	Spotted Harrier, Brahminy Kite, Osprey, White-bellied Sea-eagle, Australian Kestrel	Low	Widespread around the coastal margin of the island	Yes – Vehicles
<b>Sea Birds</b>	Wedge Tailed Shearwater, Bridled Tern	High	Breeding colony on Double Island	Yes – Light
<b>Medium-sized Mammals</b>	Boodie, Golden Bandicoot, Spectacled Hare-wallaby, Barrow Island Euro	High	Widespread across landforms and vegetation communities	Yes – Vehicles
	Black-flanked Rock-wallaby	Low	Restricted to the deeply incised valleys on the west coast of Barrow Island	No
	Boodie, Golden Bandicoot, Spectacled Hare-wallaby, Barrow Island Euro	High	Widespread across landforms and vegetation communities	Yes – Vehicles
	Black-flanked Rock-wallaby	Low	Restricted to the deeply incised valleys on the west coast of Barrow Island	No
<b>Small Mammals</b>	Chestnut Mouse	High but variable between years	Widespread	No
<b>Stygal Vertebrates</b>	Blind Gudgeon	Low	Potentially widespread. Only two individuals recorded during Barrow Island sampling (see description below).	No

## 1.1 EPBC Species for Further Consideration

### 1.1.1 Mammals

#### 1.1.1.1 Barrow Island Euro (*Macropus robustus isabellinus*)

Barrow Island Euros are widespread over the Island, but tend to be more numerous in the vicinity of cliffs, which provide shade and windbreaks (WAPET 1989). This is supported in the Draft EIS/ERMP (Chevron Australia 2005) in that Northern Brushtail Possums were caught in higher numbers close to a cliff, which probably provided shelter for them in the form of cavities, screes and rock piles.

The Barrow Island Euro has been widely observed in habitats, including within existing oilfield operations.

Vehicle strike is the terrestrial stressor identified in the Draft EIS/ERMP (Chevron Australia 2005) as potentially impacting upon this species.

#### 1.1.1.2 Barrow Island Golden Bandicoot (*Isodon auratus barrowensis*)

The Barrow Island Golden Bandicoot is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth). 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.

Vehicle strike is the terrestrial stressor identified in the Draft EIS/ERMP (Chevron Australia 2005) as potentially impacting upon this species.

#### **1.1.1.3 Black-flanked Rock-wallaby (*Petrogale lateralis lateralis*)**

The Black-flanked Rock-wallaby is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth). The Black-flanked Rock-wallaby population on Barrow Island is remote from the Gorgon Gas Development Footprint. Black-flanked Rock-wallabies shelter in rocky cliffs along approximately 13 km of the west coast of Barrow Island and up to 3 km inland (Butler 1970). The total extent over which they range on Barrow Island has not been determined; however, they have been recorded 1.4 km from cliff habitat on Barrow Island (Burbidge 2008). The closely related taxon *Petrogale lateralis* MacDonnell Ranges race, in central Australia, has been reported as moving up to 4 km from rock piles but largely foraging within 200 m of shelter (Burbidge 2008). This restricted foraging range may reflect altered behaviour due to predation by foxes and dogs, which are not present on Barrow Island (Burbidge 2008).

This species uses rocky habitats, mainly on the western coast of Barrow Island and shelters amongst cliffs, caves and rocks. It is not often observed using artificial environments.

#### **1.1.1.4 Burrowing Bettong (Boodie) (*Bettongia lesueur*)**

The Burrowing Bettong is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth). Previous surveys were undertaken for Boodie warrens across Barrow Island within fifty 1 km<sup>2</sup> blocks by Short *et al.* (1989). The Draft EIS/ERMP documented the method for surveying for Boodie warrens in the vicinity of the Gorgon Gas Development Footprint and the Onshore Feed Gas Pipeline route (Chevron Australia 2005). The survey areas are shown in Figure 1.1. Transects totalling 131 km (spaced 50 m apart in an east–west direction) were surveyed in the vicinity of the Gas Treatment Plant site. The locations of warrens are recorded in Chevron Australia's geographic information system (GIS).

Boodie burrows are usually in well-drained limestone cap rock or caves, and are often associated with fig trees, which provide food. No warrens were 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.

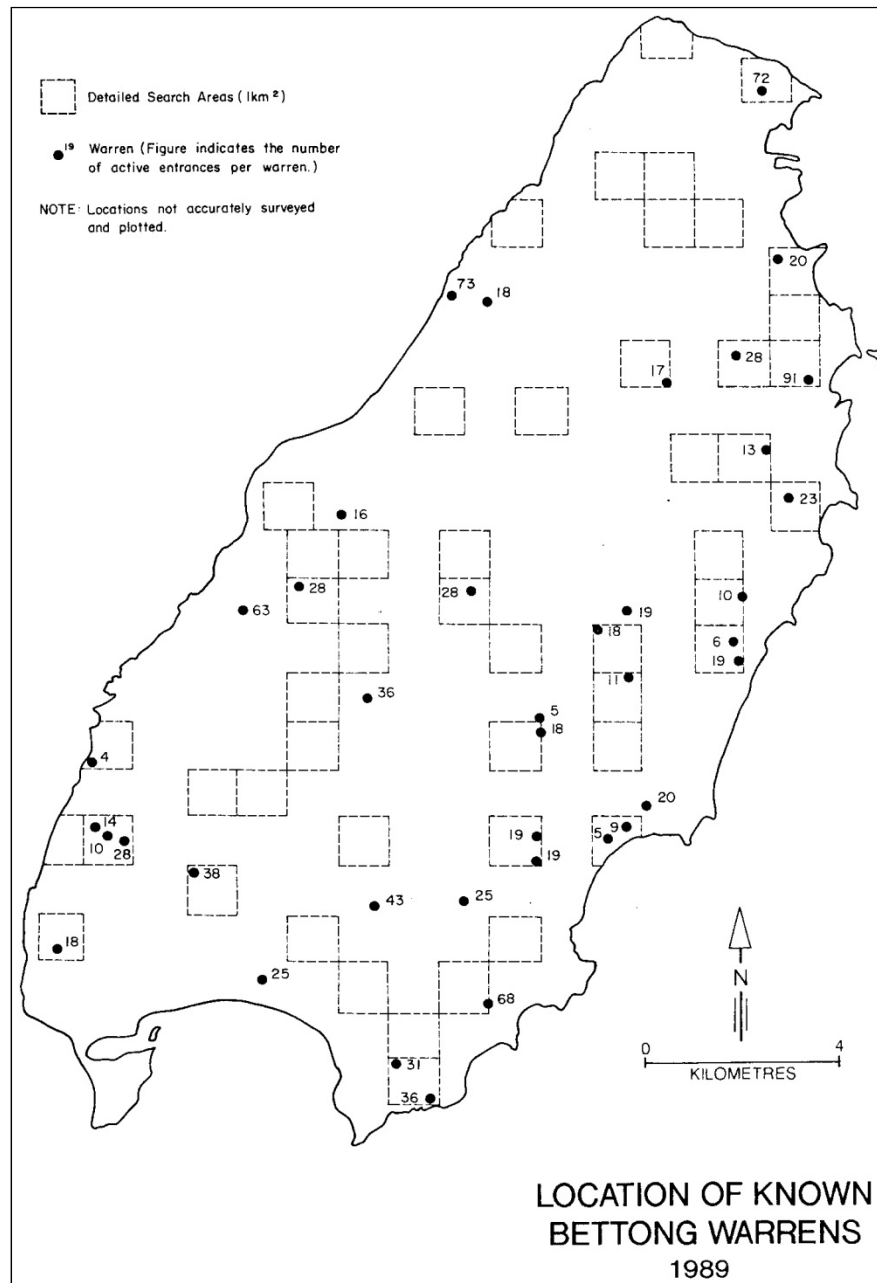
Sixty-two active and seven inactive Boodie warrens have been recorded since 2003. There appear to be more suitable sites for warrens than active warrens (Short *et al.* 1989). One Boodie warren is within the area to be cleared for the Gas Treatment Plant site.

Surveying of over 5000 ha of Barrow Island, as indicated in Figure 1.1, demonstrates active Boodie warrens are dispersed widely and evenly across the Island at low density (approximately 0.43 per km<sup>2</sup>).

Boodies are dependent upon their warrens and are expected to have limited ability to disperse into surrounding areas (Chevron Australia 2005).

Vehicle strike is the terrestrial stressor identified in the Draft EIS/ERMP (Chevron Australia 2005) as potentially impacting upon this species.





Source: Short et al. 1989

**Figure 1.1 Approximate Locations of Boodie Warrens**

#### 1.1.1.5 Spectacled Hare-wallaby (*Lagorchestes conspicillatus conspicillatus*)

The Spectacled Hare-wallaby is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth). This species uses a range of habitats and is widespread across landforms and vegetation communities on Barrow Island, including the existing oilfield operations. This species uses tall spinifex as daytime refuge from both predators and heat.

Vehicle strike is the terrestrial stressor identified in the Draft EIS/ERMP (Chevron Australia 2005) as potentially impacting upon this species.

## 1.1.2 Avifauna

### 1.1.2.1 White-winged Fairy-wren (Barrow Island)

The White-winged Fairy-wren (Barrow Island) is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth). The population of White-winged Fairy-wrens (Barrow Island) on Barrow Island appears to have remained relatively stable between the 1978 and 2004 surveys (Pruett-Jones and O'Donnell 2004).

Intensive surveys of the White-winged Fairy-wren (Barrow Island) were conducted in October 2004 to examine habitat preferences. Further surveys of the nesting habitat preferences of White-winged Fairy-wrens (Barrow Island) were conducted during their breeding season, August to September 2005, in the Gorgon Gas Development and Jansz Feed Gas Pipeline areas between the existing Chevron Australia Camp and the Terminal Tanks site just north of the Gas Treatment Plant site (RPS BBG 2006).

The White-winged Fairy-wren (Barrow Island) is a relatively territorial and sedentary species. Therefore, the significant number of records outside the distribution of the main populations of *Melaleuca cardiophylla* may reflect that there are individuals of this bird species that do not use this shrub on Barrow Island at all.

Noise is the terrestrial stressor identified in the Draft EIS/ERMP (Chevron Australia 2005) as potentially impacting upon this species.

## 1.1.3 Stygofauna

### 1.1.3.1 Blind Gudgeon

One stygal vertebrate has been recorded on Barrow Island – the Blind Gudgeon (*Milyeringa veritas*). This subterranean fish is listed as a Schedule 1 species under the *Wildlife Conservation Act 1950* (WA) and as Vulnerable under the EPBC Act (Cth) (i.e. the Blind Gudgeon is a matter of NES). Two individuals of this fish species were collected from the Borehole L8 (GDA 94 coordinates 332664m E, 7697031m N). This borehole is in the centre of Barrow Island, located approximately 6 km east of the proposed Gorgon Gas Development Construction Village. This species is only known in the underground waters (ranging from fresh to seawater) that lie beneath the narrow coastal plain of the Cape Range Peninsula and Barrow Island. It possibly also occurs in the lower Robe River and Fortescue River aquifers on the mainland opposite Barrow Island (DEWHA 2008).

The Blind Gudgeon appears to be relatively common in the aquifer it occupies on the Cape Range Peninsula (Allen 1989). The number of individuals recorded in individual caves varies from several to around one hundred (DEWHA 2008). This species can be assumed to be widespread on Barrow Island due to the extensive freshwater aquifer that provides habitat.

This fish species is omnivorous, with its diet determined by the availability of food items. In aquifers that do not directly interact with the surface, the diet is likely to consist primarily of aquatic shrimps (DEWHA 2008).

The low capture rate for the Blind Gudgeon is likely to be a result of stygofauna traps excluding larger individuals. Whilst the species grows to 4.5 cm long, the boreholes have an internal diameter of only 6 cm.

## 1.1.4 Other Species

The extreme northern extent of the Southern Giant-Petrel (*Macronectes giganteus*), which is common in the Southern Ocean, may include Barrow Island but there are no records of this species on Barrow Island. This species is therefore not considered in this Appendix.

There are also matters of NES potentially affected by the Gorgon Gas Development on the mainland. Twelve terrestrial bird species, which comprise matters of NES, have been confirmed in the vicinity of the Onshore Domestic Gas Pipeline on the mainland. Table 1.2 provides

information on the species abundance and habitat distribution of these matters of NES occurring on the mainland.

**Table 1.2 EPBC Species Abundance and Habitat/Distribution on Mainland**

	<b>Species</b>	<b>Abundance and/or Distribution in Australia</b>	<b>Species or Habitat Potentially Impacted</b>
<b>Land Birds</b>	Rainbow Bee-eater	All of Australia except Tasmania and arid interior of Western Australia. One of the 40 bird species most commonly recorded breeding in Australia.	No
	Nankeen Kestrel	Abundant and widespread. May have increased due to clearing and introduction of prey species. One of the 40 most commonly recorded bird species in Australia.	No
	Pallid Cuckoo	Widespread throughout, except Nullarbor Plain.	No
	Richard's Pipit	Widespread. One of the 40 most commonly recorded bird species in Australia.	No
<b>Littoral Birds</b>	Osprey	Generally common and secure in Australia, particularly in northern Australia. Distributed along Australian coastlines but rare in Victoria and absent from Tasmania.	No
	Brahminy Kite	Widespread, and common to abundant in northern Australia.	No
	Australian Pelican	Only absent in arid interior.	No
	Eastern Reef Egret	Widespread along coast except Victoria and Tasmania.	No
	Bar-tailed Godwit	Widespread along coast. Australian population estimate: 185 000 individuals.	No
	Whimbrel	Widespread along coast. Australian population estimate: 10 000 individuals.	No
	Eastern Curlew	Widespread along coast, except Nullarbor Plain. Australian population estimate: 28 000 individuals.	No
	Common Greenshank	Widespread along coast and also in southern interior.	No

## 1.2 Habitat of Terrestrial Matters of NES

### 1.2.1 Overview

Habitat is defined by the DEC (2008) as the area or areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography) and the biotic factors.

Habitat or distribution for each matter of NES is set out in Table 1.1 and Table 1.2 in this Appendix, but Chevron Australia has further identified 'significant' habitat as follows, so that potential impacts on matters of NES as a result of significant habitat disturbance can be identified.

Habitat was considered 'significant' in the Draft EIS/ERMP (Chevron Australia 2005) 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, 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.

Shrubland of 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) (*Malurus leucopterus edouardi*) (Chevron Australia 2005). However, on Barrow Island the White-winged Fairy-wren (Barrow Island) nests in tall spinifex and a range of shrubs, and this species occurs and breeds in vegetation associations where *Melaleuca cardiophylla* is not present.

Using the same criteria, there is no 'significant' habitat associated with the mainland areas that will be affected by the action.

### **Termite Mounds**

Under the Conservation and Land Management Regulations 2002 (WA), termite mounds are listed as a protected 'naturally occurring feature' on the conservation estate (of which Barrow Island is a part).

The termites *Nasutitermes triodiae* perform an important function in the organic matter cycle, and the termite mounds provide valuable shelter for reptiles, birds and mammals on Barrow Island (Chevron Australia 2005). The potential for nutrient cycling is reflected in elevated levels of organic matter and phosphorus, iron and manganese in material collected from a termite mound on Barrow Island (Lewis and Grierson 1990).

Other fauna recorded on or using termite mounds on Barrow Island include the Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis*), geckos (*Gehyra* species and *Heteronotia binoei*), skinks (*Cryptoblepharus carnabyi*), and dragon lizards (*Ctenophorus caudicinctus caudicinctus*) (Chevron Australia 2005). Other fauna recorded on or in termite mounds on Barrow Island include pythons (*Liasis stimsoni stimsoni*), insects (bristletails, beetles and cockroaches), mice, the Golden Bandicoot (*Isodon auratus barrowensis*), bats and birds (WAPET 1989). The Perentie (*Varanus giganteus*) also lays eggs in termite mounds.

### **Raptor Nests**

There are few substantial trees on Barrow Island and the importance of nests for raptors is recognised through the requirement for exclusion zones around them in Clearing Permit CPS 123/2 issued to Chevron Australia by the DEC.

## **1.2.2 Termite Mounds**

### **1.2.2.1 Methodology**

Termite mounds have been mapped by Chevron Australia within 500 m of the Gorgon Gas Development Footprint based on the interpretation of 2005 aerial photo imagery at scale of 1:1000.

### **1.2.2.2 Results**

Mapping indicates a distribution of approximately 6360 termite mounds (identified in aerial imagery) over an area of 3777 ha. The average density of termite mounds in this area was 1.7 mounds per hectare. There are large variations in mound density within each of the

vegetation formations mapped by Mattiske (1993), ranging from 0.01 to 18.5 mounds per hectare between communities, with no robust correlations evident.

Perry (1972) noted that termite mounds were not distributed uniformly across Barrow Island, and, even in areas where they typically occur (such as red sand dunes and limestone ridges), they are absent over large areas. Termite mounds on Barrow Island are most abundant on the flats south of the geological fault between Junction Beach and Eagles Nest Point, and north of the geological fault between Ant Point on the east coast and North Whites Beach on the west coast (Butler pers. comm. 2008). The Gorgon Gas Development Footprint is therefore located in the portion of Barrow Island where termite mounds are less abundant.

Perry (1972) concluded that factors other than food (spinifex) and mound-building material resulted in the absence of mounds in large areas of suitable habitat. Lewis and Grierson (1990) suggested that termite mound distribution may reflect soil types since large amounts of iron and manganese were present in the mounds and iron is a useful cementing agent. Butler (pers. comm. 2008) suggested that mounds generally occur where there is clay in the soil, except in drainage lines subject to flooding.

### 1.2.3 Raptor Nests

#### 1.2.3.1 Methodology

Raptor nests have been mapped by Chevron Australia on the basis of expert knowledge of the Island and global positioning system (GPS) coordinates supplied by field staff in 2006.

#### 1.2.3.2 Results

Raptors establish nests along the Barrow Island coastline. Of the 54 raptor nests recorded, 35 nests are more than 2 km from the Gorgon Gas Development Footprint, as detailed in Table 1.3. The quadrat-based population estimates in Table 1.3 were considered overestimates due to sighting of individuals at habitats they rarely frequented, and, taking this into account, Pruett-Jones and O'Donnell (2004) revised these population estimates downward.

The distribution of nests is likely to be reflected in the observed distributions of these birds. The observations of Pruett-Jones and O'Donnell (2004) were that:

- Brahminy Kites are scattered along the coast
- Ospreys are regularly spaced along the coast
- White-bellied Sea-eagles are occasional visitors (and nesting pairs were seen on the southern coast).

The only raptor nests within 2 km of the Gorgon Gas Development Footprint are two Osprey nests.

**Table 1.3 Summary of Raptor Nests**

Species	Quadrat-based Island Population (individuals)	Revised Population Estimates	Confirmed Nests	Unconfirmed Nests	Old Records/ Nest Absent	Location Approx	Total Nests
Brahminy Kite	15 <sup>1</sup> –23 <sup>2</sup>	23 <sup>2</sup>	3	1	0	0	4
Osprey	73 <sup>2</sup> –180 <sup>1</sup>	50 <sup>2</sup>	18	10	7	1	36
Sea-eagle	3 <sup>1</sup> –73 <sup>2</sup>	10–12 <sup>2</sup>	6	8	0	0	14
<b>Total</b>			<b>27</b>	<b>19</b>	<b>7</b>	<b>1</b>	<b>54</b>

Notes: 1 Sedgwick (1978)

2 Pruett-Jones and O'Donnell (2004)

## **2.0 Terrestrial Matters of NES – Risk Assessment**

### **2.1 Overview**

Chevron Australia has prepared the HES Risk Management: ASBU – Standardized OE Process (Chevron Australia 2007) to assess and manage health, environment and safety (HES) risks.

A number of environmental risk assessments have been completed for the Gorgon Gas Development. A strategic risk assessment was undertaken during the preparation of the Draft EIS/ERMP to determine the environmental acceptability of the Gorgon Gas Development, and identify key areas of risk requiring mitigation (Chevron Australia 2005).

This Draft EIS/ERMP assessment was reviewed as part of the development of the Gorgon Gas Development Revised and Expanded Proposal (Chevron Australia 2008), in light of the changes to the Gorgon Gas Development. The outcomes of these assessments have been reviewed and considered during the preparation of this Plan. Those aspects that were assessed as having potentially significant impacts (i.e. determined in the Preliminary Environmental Risk Assessment as being of Medium to High level of Inherent Risk) were further assessed by Gorgon Project subject matter experts during preparation of the PER in order to determine the extent of environmental impact(s). To ensure risk assessments align between this Plan and the EIS/ERMP, the same risk assessment methodology used in the EIS/ERMP was applied.

The Gorgon Gas Development Environmental Basis of Design (Chevron Australia 2008a) defines the environmental design requirements for the Gorgon Gas Development facilities. Deviations from the requirements of the Environmental Basis of Design document have been subjected to an As Low As Reasonably Practicable (ALARP) assessment and environmental risks should be managed to ALARP levels and lower (i.e. the risk acceptability test is applied to design decisions).

### **2.2 Methodology**

The methodology for the environmental risk assessments undertaken during the EIS/ERMP assessment process and in this Plan is documented in Chapter 9 of the Draft EIS/ERMP (Chevron Australia 2005).

The risk assessments were undertaken in accordance with the following standards:

- Australian Standard/New Zealand Standard (AS/NZS) 4360:2004 Risk management (Standards Australia/Standards New Zealand 2004)
- AS/NZS Handbook 203:2006 Environmental Risk Management – Principles and Process (Standards Australia/Standards New Zealand 2006)
- AS/NZS 3931:1998 Risk Analysis of Technological Systems – Application Guide (Standards Australia/Standards New Zealand 1998).

### **2.3 Potential Impacts and Residual Risks**

The potential impacts associated with the Gorgon Gas Development are described in detail in the Draft EIS/ERMP (Chevron Australia 2005).

The major additional environmental issues investigated during the environmental assessment process for the Revised Proposal included cumulative air, light and noise emissions impacts. The cumulative risk for the terrestrial environment on Barrow Island has been ranked as Medium (with mitigation safeguards in place when assessing consequence) (Chevron Australia 2005). This risk level is 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) (Chevron Australia 2005). This risk level is related to the remote likelihood of a critical threat to a subterranean fauna population such as through a catastrophic release of CO<sub>2</sub> into the superficial aquifer, leading to the loss of local populations of listed fauna.

Additional potential impacts related to associated stressors were identified through consultation with DEC in August 2009; these are included in Table 2.1 (identified with \*). However, it should be noted that due to incorporating these potential impacts subsequent to the risk assessment and identification of residual risks identified during the EIS/ERMP process, the residual risk rating for each stressor (i.e. low, medium or high) has not been reclassified.

The conclusions of the above risk assessments have been summarised along with the residual risks in Table 2.1. These risks have been categorised into risks related to the different phases, namely Construction, Commissioning, Non-routine or Routine Operations. Risks to terrestrial matters of NES were not dealt with individually, but rather assessed as part of overall risks, on the basis that the management measures proposed for the minimisation of impacts to both listed and non-listed Barrow Island terrestrial species shall be the same. It should be noted that protected bird species identified on Barrow Island are captured by the Terrestrial Fauna environmental factor within the risk assessment summary below.

As documented in the Terrestrial and Subterranean Baseline State and Environmental Impact Report (Chevron Australia 2009), preliminary investigations of the environmental impacts of the Onshore Domestic Gas Pipeline indicate 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. Additional information is unlikely to indicate that relocating the pipeline would further reduce impacts.

**Table 2.1 Residual Risks Associated with Environmental Factors**

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
Terrestrial Fauna	Clearing and earthworks	<b>Construction</b> Clearing and earthworks associated with construction of the Terrestrial Facilities and the Onshore Domestic Gas Pipeline (including access tracks, laydown areas, etc.).	<ul style="list-style-type: none"> <li>• direct displacement or loss of individuals</li> <li>• increased resource competition in adjacent areas</li> <li>• habitat fragmentation</li> <li>• *habitat loss</li> </ul>	M
		<b>Operations</b> Minor clearing and earthworks restricted to previously disturbed ground. Re-clearing survey lines for CO <sub>2</sub> seismic monitoring, every 5–10 years.		L
	Physical interaction (including vehicle movements)	<b>Construction and Commissioning</b> Vehicular traffic. Operation of equipment and machinery. Workforce activities.	<ul style="list-style-type: none"> <li>• direct behavioural disturbance</li> <li>• injury or fatality (i.e. road kill)</li> <li>• possible obstruction of fauna movements</li> <li>• *habitat fragmentation</li> <li>• *habitat loss</li> </ul>	M
		<b>Operations</b> As above, but at lower frequency. Presence of infrastructure.		
	Leaks or spills	<b>Non-routine Operations</b> Spill during storage and transport of fuel or hazardous material. Spill or leak during waste storage and disposal. Failure of plant, equipment or pipelines.	<ul style="list-style-type: none"> <li>• smothering or acute toxicity to habitat and/or fauna</li> <li>• chronic toxicity to sensitive habitat and/or fauna</li> <li>• increased risk of fire</li> <li>• *drowning and/or other mortality</li> </ul>	L
	Light or shade		<b>Construction and Commissioning</b> Shading from infrastructure. Artificial lighting at night from construction sites and flare.	<ul style="list-style-type: none"> <li>• congregation of fauna in shaded areas</li> <li>• risk to sheltering fauna from periodically moving machinery</li> <li>• possible increase in range of shade-dependent fauna</li> <li>• attraction of insects to light may increase the availability of food for adaptable birds and bats</li> <li>• possible changes in community structure in area affected by light spill</li> </ul>
<b>Operations</b> As above.				
<b>Non-routine Operations</b> Flaring during process upset or emergency.				
Atmospheric emissions		<b>Construction and Commissioning</b> Low levels of vehicle / equipment exhaust (NO <sub>x</sub> , SO <sub>x</sub> ).	<ul style="list-style-type: none"> <li>• sub-lethal effect from inhalation of pollutants</li> </ul>	L



Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
		<p><b>Operations</b>  Combustion and fugitive emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, VOCs and particulates. Low levels of vehicle / equipment exhaust (NO<sub>x</sub>, SO<sub>x</sub>).</p> <p><b>Non-routine Operations</b>  Pipeline or equipment failure resulting in the emission of H<sub>2</sub>S, BTEX, CO<sub>2</sub> or hydrocarbons. Flaring releasing combustion products or unburnt gas. Smoke and particulates from fire and flaring. Unscheduled start-up and shutdown of Gas Treatment Plant.</p>	<ul style="list-style-type: none"> <li>sub-lethal effect from ingestion of pollutant on vegetation or in water</li> <li>potential direct toxic effect on fauna from non-routine emission of H<sub>2</sub>S or BTEX</li> <li>asphyxiation from CO<sub>2</sub> inhalation in burrows or low-lying habitats</li> </ul>	
	Dust	<p><b>Construction and Commissioning</b>  Clearing of vegetation and removal of topsoil. Earthmoving, such as levelling of the site, excavation, drilling and transport of fill within the site. Movement of heavy machinery and vehicles on unpaved surfaces. Blasting.</p> <p><b>Operations</b>  Movement of vehicles and machinery on unsealed surfaces. Wind erosion of unsealed surfaces.</p>	<ul style="list-style-type: none"> <li>minor physiological effects on fauna in immediate area</li> <li>effects on vegetated habitats and forage plants negligible</li> </ul>	L
	Unpredicted CO <sub>2</sub> migration	<p><b>Non-routine Operations</b>  Failure of CO<sub>2</sub> injection facilities, or subsurface containment. Emergency venting of CO<sub>2</sub> to atmosphere if injection system breaks down.</p>	<ul style="list-style-type: none"> <li>release of large volumes of CO<sub>2</sub> to the atmosphere with potential for accumulation at ground surface during still weather</li> <li>asphyxiation of fauna in low-lying areas (e.g. fauna burrows)</li> <li>exceedance of greenhouse gas emission budget</li> </ul>	L
	Heat and/or cold	<p><b>Construction and Commissioning</b>  Heat from sources such as power generators, turbines, air coolers, pipelines, earthmoving equipment, welding units and vehicles. Cold from pipelines.</p> <p><b>Operations</b>  Heat from power generators, air, coolers, turbines, flare etc. Feed gas pipeline will be at ambient temperature.</p>	<ul style="list-style-type: none"> <li>heat plume from flare and air coolers could injure/kill avifauna flying over Gas Treatment Plant</li> <li>attraction of insects and reptiles to heat in cold weather</li> <li>*attraction of fauna to shelter in or under piping and to moisture</li> </ul>	L
	Noise and vibration	<p><b>Construction and Commissioning</b>  Blasting. Earthworks, vehicle movements and the operation of</p>	<ul style="list-style-type: none"> <li>physiological impacts to fauna in immediate vicinity due to blast</li> </ul>	M

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
		equipment. Seismic survey. <b>Operations</b> Gas Treatment Plant operation. Operation of vehicles and equipment. Flaring. Seismic monitoring every 5–10 years.	overpressure <ul style="list-style-type: none"> <li>• short-term behavioural changes</li> <li>• disturbance of fauna in vicinity of seismic source discharges</li> </ul>	M
	Fire	<b>Non-routine Construction and Commissioning and Operations</b> Vehicles, welding sparks are potential ignition sources. Flare event dislodging hot build-up from inside flare tower. Run-off of water or foam used in fire control near infrastructure.	<ul style="list-style-type: none"> <li>• temporary loss of habitat</li> <li>• injury or mortality in fire</li> <li>• damage to infrastructure potentially causing gas or liquid leaks</li> <li>• effects on soil or water quality from run-off containing nutrients and chemicals</li> </ul>	M
Subterranean Fauna	Clearing and earthworks	<b>Construction and Commissioning</b> Clearing and earthworks for the Gas Treatment Plant and associated infrastructure. Excavation of material to a depth of 8 m during site preparation. Use of drilling muds. Shallow blasting of cap rock over 40–60% of Gas Treatment Plant site. Installation of approximately 750 piles, possibly to a depth of approximately 32 m.	<ul style="list-style-type: none"> <li>• direct loss of troglofauna and habitat within Gas Treatment Plant Footprint</li> <li>• run-off during construction causing sedimentation of aquifer</li> <li>• localised loss of stygofauna</li> </ul>	H
		<b>Operations</b> Minor clearing and earthworks.		L
	Physical presence	<b>Operations</b> Impermeable surfaces with no groundwater recharge over 30% to 40% site (45–60 ha).	<ul style="list-style-type: none"> <li>• reduced groundwater recharge under Gas Treatment Plant affecting humidity and groundwater in subterranean environment where surface water is diverted to drains</li> <li>• local loss of troglofauna and stygofauna</li> </ul>	M
	Wastewater discharge	<b>Construction and Commissioning</b> Use of treated greywater to control dust.	<ul style="list-style-type: none"> <li>• contamination and nutrient loading of subterranean habitats at Gas Treatment Plant site</li> </ul>	M
	^ Seawater application	<b>Construction and Commissioning</b> Use of seawater for earthworks associated with construction of the Gas Treatment Plant.	<ul style="list-style-type: none"> <li>• groundwater contamination (salinity)</li> <li>• local increase groundwater levels and mounding</li> <li>• local loss of troglofauna and stygofauna</li> </ul>	M
	Noise and vibration	<b>Construction and Commissioning</b> Shallow blasting of cap rock over 40–60% of Gas Treatment Plant site. Installation of approximately 750 piles, possibly to a depth of approximately 32 m.	<ul style="list-style-type: none"> <li>• direct loss of habitat or rupture of subsurface karst lenses</li> <li>• vibration effects (sedimentation/partial collapse of karstic formations)</li> </ul>	M

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
			<ul style="list-style-type: none"> <li>*local loss of troglofauna and stygofauna</li> </ul>	
	Leaks or spills	<b>Construction and Commissioning and Non-routine Operations</b> Failure of proposed bulk storage tanks (MEG, TEG, diesel, condensate) and containment bund. Spill during storage and transport of fuel or hazardous material. Spill or leak during waste storage and disposal. Failure of plant, equipment or pipelines.	<ul style="list-style-type: none"> <li>potential contamination of subterranean habitat</li> <li>acute toxicity to troglofauna and/or stygofauna</li> </ul>	M
	Unpredicted CO <sub>2</sub> migration	<b>Non-routine Operations</b> Failure of CO <sub>2</sub> injection facilities, or subsurface containment.	<ul style="list-style-type: none"> <li>acidification of groundwater with potential loss of stygofauna</li> <li>potential for leaking CO<sub>2</sub> to settle above the watertable (due to difference in density to water and air) affecting troglofauna (i.e. asphyxiation)</li> </ul>	L
Flora and Vegetation Communities	Clearing and earthworks	<b>Construction</b> Clearing and earthworks associated with construction of the Terrestrial Facilities and the Onshore Domestic Gas Pipeline (including access tracks, laydown areas, etc.).	<ul style="list-style-type: none"> <li>loss and/or disturbance to restricted flora and vegetation species and communities</li> <li>erosion or removal of topsoil and seed bank</li> <li>spread of Mesquite (<i>Prosopis</i> sp.) or Buffel grass (<i>Cenchrus ciliaris</i>) on mainland (associated with construction of the Onshore Domestic Gas Pipeline)</li> <li>spread of <i>Setaria verticillata</i> (associated with construction of the Shore Crossing for the Feed Gas Pipeline System)</li> <li>change in soil profile and drainage due to earthworks may change dominance patterns in communities.</li> </ul>	H (restricted flora and vegetation communities)
		<b>Operations</b> Re-clearing survey lines for CO <sub>2</sub> seismic monitoring, every 5–10 years.		L (restricted flora and vegetation communities)
		<b>Construction, Commissioning and Operations</b> Minor clearing and earthworks restricted to previously disturbed ground. Re-clearing survey lines for CO <sub>2</sub> seismic monitoring, every 5–10 years.		L (general flora and veget'n communities)
	Fire	<b>Construction and Commissioning</b> Ignition during welding or grinding activities; vehicle exhausts.		<ul style="list-style-type: none"> <li>long-term loss of vegetation community</li> <li>alteration of vegetation community composition</li> <li>maintenance of unnatural fire regime to protect infrastructure with consequent loss of habitat diversity</li> <li>secondary effects if infrastructure damaged (e.g. may cause leakage of greywater pipes).</li> </ul>
<b>Operations</b> Ignition during maintenance activities; vehicle exhausts; fall-out of burning particles from flare.				

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
	Atmospheric emissions	<b>Construction and Commissioning</b> Low levels of vehicle and equipment exhaust (NO <sub>x</sub> , SO <sub>x</sub> ); flaring and venting during commissioning.	<ul style="list-style-type: none"> <li>physiological effects of deposition of pollutants on flora and vegetation</li> <li>localised change in taxon dominance due to nitrogen enrichment and soil acidity</li> <li>alteration of community composition</li> <li>reduced growth due to soil acidity or CO<sub>2</sub></li> <li>increased growth due to uptake of nitrogen or CO<sub>2</sub></li> </ul>	L
		<b>Operations</b> Combustion and fugitive emissions of SO <sub>2</sub> , NO <sub>x</sub> , CO <sub>2</sub> , CO, CH <sub>4</sub> , VOCs and particulates. Low levels of vehicle / equipment exhaust (NO <sub>x</sub> , SO <sub>x</sub> ).		
		<b>Non-routine Operations</b> CO <sub>2</sub> leak; pipeline or equipment failure; flaring; smoke and particulates from fire; gas venting during start-up and shutdown of Gas Treatment Plant.		
	Light/shade/heat/cold	<b>Construction and Commissioning</b> Temporary shading from stockpiles, temporary equipment, etc.	<ul style="list-style-type: none"> <li>decrease in plant growth or localised loss of vegetation within shaded areas</li> </ul>	L
		<b>Operations</b> Heat and reflected light from permanent infrastructure.		
Dust	<b>Construction and Commissioning</b> Clearing and earthworks associated with construction of the Terrestrial Facilities and the Onshore Domestic Gas Pipeline (including access tracks, laydown areas, etc.); vehicle and machinery movements on unsealed roads and exposed surfaces; wind erosion of stockpiles.	<ul style="list-style-type: none"> <li>reduced photosynthetic activity of plants</li> <li>increased absorption of near-infrared radiation and elevated leaf temperatures</li> </ul>	L	
	<b>Operations</b> Vehicle and machinery movement on unsealed roads and exposed surfaces.			
Unpredicted CO <sub>2</sub> migration	<b>Non-routine Operations</b> Failure of CO <sub>2</sub> injection facilities; failure of subsurface containment.	<ul style="list-style-type: none"> <li>increased or decreased plant growth depending on concentration of CO<sub>2</sub></li> <li>mortality of plants in the event of an ongoing severe leak</li> </ul>	L	
Leaks or spills	<b>Construction, Commissioning and Non-routine Operations</b> Spill during storage and transport of fuel or hazardous material; spill or leak during waste storage and disposal; failure of plant, equipment or pipelines; leakage of storage tanks and bunds.	<ul style="list-style-type: none"> <li>localised loss of vegetation</li> <li>reduced plant growth</li> <li>soil contamination affecting regrowth</li> <li>*soil erosion</li> <li>*altered vegetation association</li> </ul>	L	

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
	^ Seawater application	<b>Construction</b> Use of seawater for earthworks associated with construction of the Gas Treatment Plant.	<ul style="list-style-type: none"> <li>overspray or surface water run-off onto vegetation</li> <li>decrease in plant growth or localised loss of vegetation</li> <li>alterations to vegetation rehabilitation</li> </ul>	M
Soil and Land-form	Clearing and earthworks	<b>Construction</b> Clearing and earthworks associated with construction of the Terrestrial Facilities and the Onshore Domestic Gas Pipeline (including trenching, access tracks, laydown areas, etc.).	<ul style="list-style-type: none"> <li>soil compaction</li> <li>soil inversion</li> <li>disturbance to significant geological features (e.g. caves)</li> <li>changes in landform</li> <li>*erosion, caused by wind, water, and sedimentation</li> </ul>	M
		<b>Operations</b> Minor clearing and earthworks restricted to previously disturbed ground. Re-clearing survey lines for CO <sub>2</sub> seismic monitoring, every 5–10 years.		L
	Liquid and solid waste disposal	<b>Construction and Commissioning</b> Generation and disposal of liquid and solid wastes including: hydrotest water; domestic waste and sewage; waste chemicals and oil; drilling waste (e.g. drill cuttings and fluid); produced formation water.	<ul style="list-style-type: none"> <li>soil contamination</li> <li>*erosion, caused by wind, water, and sedimentation</li> </ul>	M
		<b>Operations</b> Generation and disposal of liquid and solid waste, including: domestic waste and sewage; and waste chemicals and oil.		L
	Leaks or spills	<b>Construction, Commissioning and Non-routine Operations</b> Spill during storage and transport of fuel or hazardous material; spill or leak during waste storage and disposal; failure of plant, equipment or pipelines; HDD drilling fluid release.	<ul style="list-style-type: none"> <li>soil contamination</li> <li>*erosion, caused by wind, water, and sedimentation</li> </ul>	M
^ Seawater application	<b>Construction</b> Use of seawater for earthworks associated with construction of the Gas Treatment Plant.	<ul style="list-style-type: none"> <li>increase in salinity levels in soil profile</li> <li>alterations to vegetation rehabilitation</li> </ul>	M	
Surface and Ground-water	Clearing and earthworks	<b>Construction</b> Clearing and earthworks associated with construction of the Terrestrial Facilities and the Onshore Domestic Gas Pipeline (including access tracks, laydown areas, etc.).	<ul style="list-style-type: none"> <li>sedimentation of natural drainage systems</li> <li>disturbance to natural drainage patterns</li> </ul>	M
		<b>Operations</b> Minor clearing / earthworks restricted to previously disturbed ground		L

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
	Physical presence	<b>Construction, Commissioning and Operations</b> Presence of sealed/hardstand areas associated with the Terrestrial Facilities.	<ul style="list-style-type: none"> <li>change in water infiltration and recharge rates</li> <li>increased run-off</li> <li>change in groundwater level</li> <li>*altered drainage patterns</li> </ul>	M
	Liquid and solid waste disposal	<b>Construction and Commissioning</b> Generation and disposal of liquid and solid wastes including: hydrotest water; domestic waste and sewage; waste chemicals and oil; drilling waste (e.g. drill cuttings and fluid); produced formation water. Use of drilling muds.	<ul style="list-style-type: none"> <li>surface water and groundwater contamination</li> <li>local loss of stygofauna</li> </ul>	M
		<b>Operations</b> Generation and disposal of liquid and solid waste, including: domestic waste and sewage; and waste chemicals and oil.		L
	Leaks or spills	<b>Construction and Commissioning and Non-routine Operations</b> Spill during storage and transport of fuel or hazardous material; spill or leak during waste storage and disposal; failure of plant, equipment or pipelines.	<ul style="list-style-type: none"> <li>surface water and groundwater contamination</li> <li>local loss of stygofauna</li> </ul>	M
	^ Seawater application	<b>Construction and Commissioning</b> Use of seawater for earthworks associated with construction of the Gas Treatment Plant.	<ul style="list-style-type: none"> <li>surface water and groundwater contamination (salinity)</li> <li>local increase groundwater levels and mounding</li> <li>local loss of troglofauna and stygofauna</li> </ul>	M
Air Quality	Atmospheric emissions	<b>Construction and Commissioning</b> Low levels of emissions associated with vehicle / equipment exhaust (NO <sub>x</sub> , SO <sub>x</sub> ).	<ul style="list-style-type: none"> <li>decrease in local and regional air quality</li> <li>decrease in global air quality resulting from greenhouse gas emissions</li> </ul>	L
		<b>Operations</b> Combustion and fugitive emissions of SO <sub>2</sub> , NO <sub>x</sub> , CO <sub>2</sub> , CO, CH <sub>4</sub> , VOCs and particulates. Low levels of vehicle / equipment exhaust (NO <sub>x</sub> , SO <sub>x</sub> ).		
		<b>Non-routine Operations</b> CO <sub>2</sub> leak; pipeline or equipment failure; flaring; smoke and particulates from fire; gas venting during start-up and shutdown of Gas Treatment Plant.		

Environmental Factor	Stressor	Causes	Potential Impacts	Residual Risk <sup>1</sup>
	Clearing and earthworks	<b>Construction and Commissioning</b> Dust generation associated with clearing and earthworks and vehicle movements.	<ul style="list-style-type: none"> <li>localised reduction in air quality</li> </ul>	L
		<b>Operations</b> Localised dust generation associated with minor clearing and earthworks.		L

Notes: 1 L=Low, M=Medium, H=High

\* Stressors identified in consultation with DEC, subsequent to full risk assessment process being undertaken as part of the EIS/ERMP

^ Stressors identified in consultation with DEC (2010), subsequent to full risk assessment process being undertaken as part of the EIS/ERMP.

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## Appendix D Compliance Reporting Table

Appendix Table D-1: Compliance Reporting Table

Section No.	Actions	Timing
Table 4-1	Procedures will be implemented to manage fire ignition risk for the transport and handling of fuel and explosives.	All phases
Table 4-1	A fire and gas leak detection system will be maintained for the GTP	Operations
Table 4-1	An isolation and emergency depressurisation system will be maintained for the GTP	Operations
Table 4-1	Vegetation regrowth will be cleared from within the ground flare boundary fence (including within the flare boxes) as required.	All phases
Table 4-1	Procedures will be implemented to minimise the risk of the ground flare system causing fire and explosion.	All phases
Table 4-1	Only diesel engine vehicles will be used on site. Any exception must be authorised internally.	All phases
Table 4-1	Activities with the potential to ignite a fire will be completed in accordance with the requirements of an internal permit or equivalent (e.g. procedure).	All phases
Table 4-1	Smoking permitted only in designated smoking areas that have portable firefighting equipment, fixed point lighters, and butt disposal facilities.	All phases
Table 4-1	Site-based personnel working on the Gorgon Gas Development will be made aware of smoking requirements and the location of firefighting equipment in their work area.	All phases
Table 4-1	Access to 24/7 emergency response capability, equipped with appropriate firefighting equipment.	All phases
Table 4-1	An Emergency Response Plan will be in place and implemented in the event of a fire emergency.	All phases
Table 4-1	Site vehicles and earthmoving plant will carry a minimum of one fire extinguisher	All phases
Table 4-1	Active fire protection systems will be maintained at the GTP, Butler Park, Administration and Operations Complex, and permanent warehouses.	All phases
Table 4-1	A communication system will be in place for emergency response.	All phases
Table 4-1	Activities with the potential to ignite a fire will have response measures in place as required by the internal permit or equivalent (e.g. procedure) to be implemented for that activity.	All phases
Table 4-1	Emergency response to Gorgon Gas Development-attributable fires will be undertaken in accordance with a standardised Incident Command System. See Section 4.2 for details.	All phases
Table 4-1	The Barrow Island Emergency Management Team will determine response priorities and strategies for managing fire events, based upon the risk posed to personnel or assets.	All phases
Table 4-1	Reasonable measures will be taken, including outside the fire disturbance TDF, to suppress and manage Gorgon Gas Development-attributable fires and other fires that threaten personnel or facilities on Barrow Island, which may include but not necessarily be limited to: <ul style="list-style-type: none"> <li>• complying with directions given by officers authorised under the Fire and Emergency Services Act, Bush Fires Act, or the Conservation and Land Management Act or their delegates</li> </ul>	All phases

Section No.	Actions	Timing
	<ul style="list-style-type: none"> <li>• clearing firebreaks or fire access tracks</li> <li>• burning a firebreak when another fire is already burning as directed, permitted or authorised by officers authorised under the Fire and Emergency Services Act, Bush Fires Act, or the Conservation and Land Management Act or their delegates</li> <li>• taking and applying alternative water sources (e.g. sea water, waterflood water) for fire suppression where freshwater sources are exhausted or not practicably available</li> <li>• using fire suppressants</li> <li>• implementing other fire management, suppression, or prevention measures as directed, permitted or authorised by officers authorised under the Fire and Emergency Services Act, Bush Fires Act, or the Conservation and Land Management Act or their delegates.</li> </ul>	
4.3	For areas outside the fire disturbance TDF (Section 2.1.1) affected by a fire attributable to Gorgon Gas Development, Chevron Australia will consult with the Conservation Commission to determine if that area requires active rehabilitation.	All phases
4.3	If active rehabilitation is required, Chevron Australia will consult with Parks and Wildlife, BICC, and the Conservation Commission in developing and implementing appropriate rehabilitation measures.	All phases
Table 6-1	All bushfires detected by Gorgon Gas Development personnel are to be reported to the Parks and Wildlife Barrow Island Senior Reserves Officer as soon as practicable.	All phases
Table 6-1	Fire events (attributable to the Gorgon Gas Development) resulting in Material or Serious Environmental Harm outside the TDF are to be reported to OEPA, DER, and DotE within 48 hours of detection of Material or Serious Environmental Harm outside the TDF.	All phases