



Pluto-North West Shelf Interconnector

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

REVISION B

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1. Introduction

1.1. Background

DDG Operations Pty Limited (DDGO) proposes to construct the Pluto-North West Shelf Interconnector (PNI) (herein referred to as the Project), a 3.3 km-long buried steel natural gas pipeline in the industrialised section of the Burrup Peninsula in the Pilbara Region in Western Australia (WA). The Project will commence at the Pluto Compressor Station (PCS) within the DBNGP corridor and connect the Pluto Liquefied Natural Gas (LNG) Plant with the Karratha Gas Plant (KGP).

The Project will enable the transfer of raw gas Pluto LNG Plant to KGP for processing. The KGP is operated by Woodside Energy Limited (Woodside) on behalf of the North West Shelf Joint Venture (NWSJV). The Pluto LNG Plant was commissioned in 2006 and is also operated by Woodside on behalf of the Pluto LNG Joint Venture.

The Project construction has been designed to align with existing disturbed areas to reduce the nature and scale of associated environmental impacts. The first 2.2 km of the Project extending north from the PCS will traverse inside the Dampier to Bunbury Natural Gas Pipeline (DBNGP) corridor. The existing DBNGP Corridor established under Section 31 of the *Dampier to Bunbury Pipeline Act 1997* has been disturbed historically during the original construction of the DBNGP and at sections along the DBNGP Corridor for subsequent inspection, maintenance and expansion activities.

The latter section of the Project will traverse the NWS buffer zone lease (I123605) granted to the NWS Project participants (Buffer Zone Lease) for approximately 400 metres (m) and then into the KGP lease (I123606) granted to the NWS Project participants (KGP Lease) for approximately 700 m (Appendix A). Both leases were granted pursuant to the *North West Gas Development (Woodside) Agreement Act 1979*.

Construction of the Project is scheduled to be completed in Q4 2020.

1.2. Proponent

The proponent is DDG Operations Pty Limited, a related company to DBNGP Nominees (WA) Pty Ltd, the owner of the DBNGP. In future AGIG may nominate a related entity to build, own and operate the pipeline, which will also be the pipeline licence holder (pending Department of Mines, Industry Regulation and Safety (DMIRS) approval) and the grantee of all relevant land tenure and other licences or permits required for the Project.

DDGO is part of the Australian Gas Infrastructure Group (AGIG) and is a wholly owned subsidiary of a consortium comprising CK Infrastructure Holdings Limited, CK Asset Holdings Limited and Power Asset Holdings Limited, all of which are listed companies on the Hong Kong Stock Exchange having a combined market capitalisation of approximately A\$84 billion (together the CKI Consortium) (refer **Figure 1-1**).

DDGO relies on the services of DBNGP (WA) Nominees Pty Ltd (DBP), the owner of the DBNGP, for the provision of labour and equipment to undertake its business. In this regard, DDGO adopts all AGIG and DBP policies and procedures across the operation of its business. The AGIG Vision and Values are incorporated in Figure 1-2.

AGIG Projects Corporate Structure Chart

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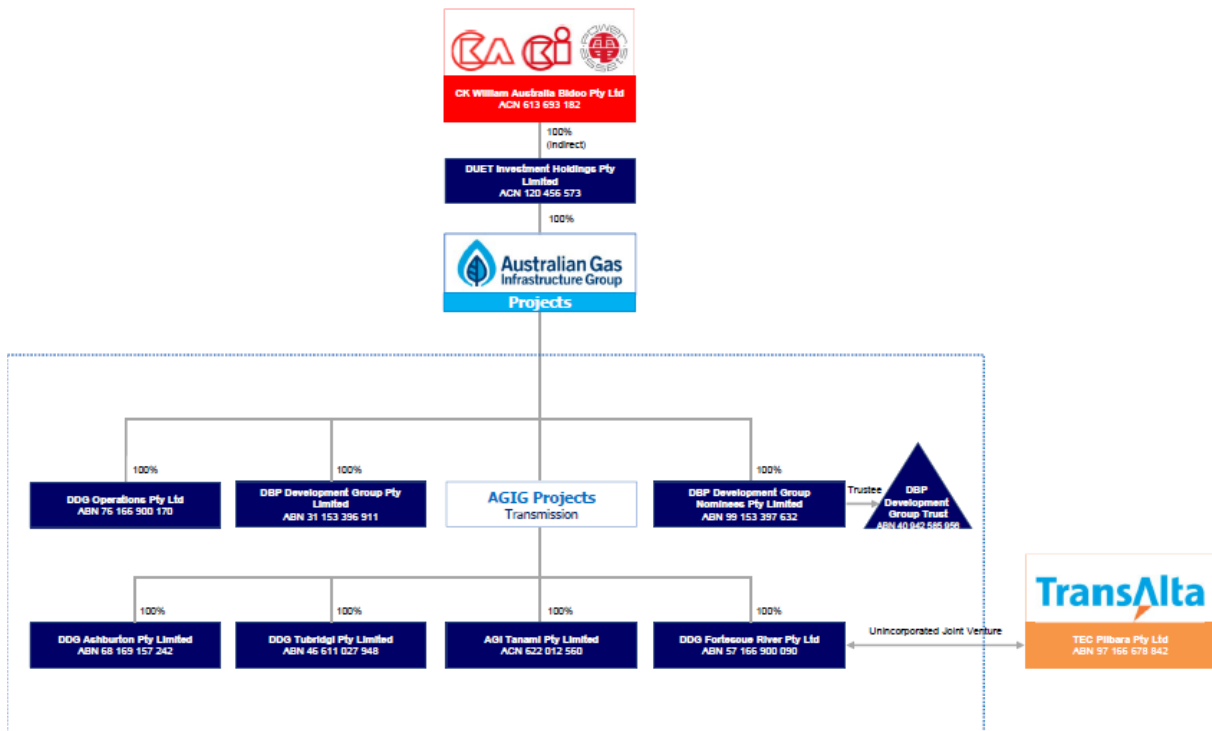


Figure 1-1 AGIG Projects Corporate Structure

Our vision

Our vision is to be the leading gas infrastructure business in Australia...

Delivering for customers

Public Safety

Reliability

Customer Service

A good employer

Health & Safety

Employee Engagement

Skills Development

Sustainably cost efficient

Working Within Industry Benchmarks

Delivering Profitable Growth

Environmentally and Socially Responsible

...achieving top quartile performance on our targets



Figure 1-2 AGIG Vision and Values

1.3. Objectives

The objective of this Construction Environmental Management Plan (CEMP) is to identify and assess environmental aspects associated with construction of the Project and establish suitable controls so as to eliminate or minimise these risks to a level that is low, negligible or reduced to as low as is reasonably practical (ALARP).

The CEMP aims to establish performance objectives and measurement criteria for the ongoing monitoring of environmental performance.

The CEMP is a practical tool for implementation in the management of environmental risk during the construction of the Project.

1.4. Scope

The scope of this CEMP includes all activities associated with construction of the PNI and associated infrastructure, namely:

- 10.69 Ha of disturbance for construction of a 3.3 kilometre (km) 30" of buried onshore pipeline including clearing, grading, earthworks, installation and commissioning of pipeline and associated facilities.

In addition this CEMP should be read in conjunction with the following other key management documents once developed and approved:

- PNI Construction Safety Case; and
- PNI Cultural Heritage Management Plan.

2. Environmental Management Framework

2.1. Policy

DDGO adopts all AGIG and DBP's long standing and industry leading policies and procedures across the operation of its business.

DBP has a corporate culture which strives for Health, Safety and Environment (HSE) excellence driven by a corporate commitment to protect people and the environment. Central to this is the AGIG Health and Safety Policy and the Environmental Policy which is supported by a statement of commitment signed by the Executive Team. AGIG also has a set of core principles, called Zero Harm Principles, which are aimed at establishing principles for undertaking activities that have been assessed as having the highest risk to AGIG and its workforce.

The AGIG Environmental Policy is reviewed annually. Employees are consulted during the review process through a number of mechanisms, including HSE Committees.

2.2. Structure and Responsibility

All staff are responsible for the environmental performance of their activities and for reporting any environmental hazards and incidents. Environmental responsibilities for staff and contractors are contained within position descriptions, relevant procedures and work instructions. Overarching environmental roles are described in Table 2-1 below and specific environmental responsibilities are addressed in Section 6 of this Plan.

Table 2-1 Key Environmental Responsibilities

Position Title	Environmental Responsibilities
Executive Management Team	<ul style="list-style-type: none"> ▪ Hold overall responsibility for environmental management ▪ Approves the CEMP ▪ Ensure adequate resources are provided for the implementation of the CEMP
General Manager Transmission Asset Management	<ul style="list-style-type: none"> ▪ Ensure that environmental obligations are embedded into design, systems and processes for satisfying compliance and due diligence requirements ▪ Ensure that proposed project additions and alterations obtain all necessary environmental approvals ▪ Management of environmental emergencies ▪ Coordinate emergency response in accordance with the DBP Emergency Response Plan ▪ Oversee completion of emergency response exercises annually ▪ Assess emergency response capabilities ▪
Project Manager	<ul style="list-style-type: none"> ▪ Conduct adequate project planning to ensure that construction may meet all design and schedule requirements specified within this plan ▪ Ensure that the relevant environmental requirements of the Master Obligations Register are implemented and complied with in the design and construction of the PNI ▪ Ensure that environmental approval processes are embedded within project construction systems ▪ Ensure all necessary environmental approvals relevant to the project are obtained ▪ Ensure that project specific obligations/commitments are captured within the CEMP and/ or the Contractor's Environmental Management Interface Plan, and effectively implemented ▪ Ensure that any ongoing obligations/commitments upon the completion of construction are identified, documented and handed over via the project handover process into operations and directly to the HSE Manager. ▪ Ensure incident reporting protocols are followed and that the construction personnel report Events/Hazards and near misses ▪ Respond to environmental incidents as required

Position Title	Environmental Responsibilities
Construction Contractor	<ul style="list-style-type: none"> ▪ Ensure all construction personnel are aware of and understand the requirements of this plan ▪ Implement all construction activities in accordance with this plan ▪ Ensure incident reporting protocols are followed and that construction personnel report Events/Hazards and near misses ▪ Respond to environmental incidents as required
HSE Manager	<ul style="list-style-type: none"> ▪ Monitor implementation of and compliance with this operations CEMP and environmental risk assessment recommendations ▪ Facilitate and monitor CEMP Reviews ▪ Review audit reports and monitor completion of required corrective actions ▪ Report significant environmental non-compliances with CEMP and legislation internally to the DBP Executive Management Team and externally to regulatory authorities, as required ▪ Ensure all environmental obligations are kept current
Senior HSE Advisor	<ul style="list-style-type: none"> ▪ Identify changes during construction and update the CEMP to address and manage any new environmental risks ▪ Provide assistance and/or advice regarding implementation of the CEMP and any other environmental management concern ▪ Liaise with government agencies regarding environmental issues ▪ Assess Environmental incidents to determine regulatory reporting requirements ▪ Report on, and address as required, existing and emerging Native Title and Cultural Heritage issues ▪ Undertake planned external reporting
Land Manager	<ul style="list-style-type: none"> ▪ Liaise with landholders, traditional owners, community representatives, contractors, councils, planning and local government authorities as well as utilities and infrastructure owners on land management and environmental matters as required
All Personnel	<ul style="list-style-type: none"> ▪ Read, understand and implement the control measures detailed within Section 6 of this Plan ▪ Report all observed non compliances to a supervisor ▪ Report all observed incidents, hazards and near misses ▪ Continually seek to identify areas for improvement of environmental management and report these to the Senior Advisor – Environment and Heritage

2.3. Legislation

Key environmental legislation and other requirements that may apply to the PNI are presented in Table 2-2 below.

Table 2-2 Associated Environmental Legislation and Other Requirements

Regulatory Aspect	Item
Commonwealth Legislation	<ul style="list-style-type: none"> • Aboriginal and Torres Straits Islander Heritage Protection Act 1984 • Environment Protection and Biodiversity Conservation Act 1999 • National Greenhouse and Energy Reporting Act 2007 • National Environment Protection Measures (Implementation) Act 1998 • Native Title Act 1993
Western Australian Legislation	<ul style="list-style-type: none"> • Aboriginal Heritage Act 1972 • Aboriginal Heritage Regulations 1974 • Agriculture and Related Resources Protection Act 1976 • Biodiversity Conservation Act 2016 • Biodiversity Conservation Regulations 2018 • Biosecurity and Agriculture Management Act 2007 • Bush Fires Act 1954 • Bush Fires Regulations 1954 • Conservation and Land Management Act 1984

Regulatory Aspect	Item
	<ul style="list-style-type: none"> • Contaminated Sites Act 2003 • Contaminated Sites Regulations 2006 • Dampier to Bunbury Pipeline Act 1997 • Dangerous Goods Safety Act 2004 • Environmental Protection Act 1986 • Environmental Protection Regulations 1987 • Environmental Protection (Abrasive Blasting) Regulations 1998 • Environmental Protection (Clearing of Native Vegetation) Regulations 2004 • Environmental Protection (Controlled Waste) Regulations 2004 • Environmental Protection (NEPM-NPI) Regulations 1998 • Environmental Protection (Noise) Regulations 1997 • Environmental Protection (Unauthorised Discharges) Regulations 2004 • Health Act 1911 • Heritage of Western Australia Act 1990 • Land Administration Act 1997 • Litter Act 1979 • Local Government Act 1995 • Local Government (Miscellaneous Provisions) Act 1960 • Main Roads Act 1930 • Native Title (State Provisions) Act 1999 • State Agreement: North West Gas Development (Woodside) Agreement Act 1979 (relevant to the NWS) • Petroleum Pipelines Act 1969 • Petroleum Pipelines (Environment) Regulations 2012 • Planning and Development Act 2005 • Reserves (National Parks Conservation Parks Nature Reserves and Other Reserves) Act 2004 • Rights in Water and Irrigation Act 1914 • Rights in Water and Irrigation Regulations 2000 • Soil and Land Conservation Act 1945 • Waterways Conservation Act 1976
Standards	<ul style="list-style-type: none"> • AS1940 The storage and handling of flammable and combustible liquids • AS1697 Installation and maintenance of steel pipe systems for gas • AS1692 Tanks for flammable and combustible liquids • AS 2436 Guide to Noise and Vibration Control on Construction, Maintenance and Demolition Sites • AS 2507 The storage handling of pesticides • AS 2832 Cathodic protection of metals • AS 2885.0 Pipelines—Gas and liquid petroleum—General requirements • AS 2885.1 Pipelines—Gas and liquid petroleum—Design and construction • AS 2885.2 Pipelines—Gas and liquid petroleum—Welding • AS 3780 The storage and handling of corrosive substances • AS 4970 Protection of trees on development sites • AS 5667.1 Water Quality – Sampling • AS/NZS 4853 Electrical hazards on metallic pipelines • AS/NZS 9001 Quality Management Systems – Requirements • AS/NZS ISO 14001 Environmental Management Systems – Requirements with guidelines for use • AS/NZS ISO 19011 Guidelines for quality and / or environmental management systems auditing • AS /NZS 31000 Risk management – principles and guidelines • XK0101 Purging principles and practice

Regulatory Aspect	Item
Codes / Guidelines	<ul style="list-style-type: none"> • Aboriginal Heritage Due Diligence Guidelines • Acid Sulphate Soils Planning Guidelines • APGA Code of Environmental Practice for Onshore Pipelines, October 2013 • Australian Dangerous Goods Code • ANZECC (2018) Guidelines for Fresh and Marine Water Quality • Guidelines for De-watering, 2006 • Preparation, review and amendment of monitoring protocols SOP No: 1.2 • Stakeholder Consultation Guideline • Best Practice Erosion and Sediment Control (International Erosion Control Association)

2.4. Project Approvals

DDGO will be seeking a pipeline easement under the *Petroleum Pipelines Act 1969* (PP Act) for the section of the pipeline located within the KGP Lease and Buffer Zone Lease and an access right under the *Dampier to Bunbury Natural Gas Pipeline Act 1997* for the section of the pipeline located within the DBNGP Corridor.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that a person must not undertake an action that is likely to have a significant impact upon a listed Matter of National Environmental Significance (MNES) without approval. A self-assessment concluded that the impacts of the Proposal upon MNES are not considered significant. However, DDGO decided it would be prudent to refer the Proposal to the Department of the Environment and Energy (DotEE). The outcome of the referral is not available at time of preparation of this CEMP. This CEMP will be further updated upon the outcome of the referral.

Part IV of the WA *Environmental Protection Act 1986* (EP Act) requires a proponent to refer any proposal that is likely, if implemented, to have a significant effect on the environment. A self-assessment of the Proposal identified potential for impact to three factors: flora and vegetation, terrestrial fauna and social surroundings. The self-assessment concluded that there is minimal potential for the Proposal to have significant environmental impact. However, DDGO decided it would be prudent to refer the Proposal to the Environmental Protection Authority (EPA). The outcome of the referral is not available at time of preparation of this CEMP. This CEMP will be updated upon the outcome of the referral.

The approvals and permits that are relevant to the scope include the following:

- Assessment and approval under Part IV of the EP Act;
- Assessment and approval under EPBC Act;
- Native Vegetation Clearing Permit (if not assessed under Part IV of the EP Act);
- Environmental Plan under the *Petroleum Pipelines Act 1969*;
- Pipeline easement granted under *Petroleum Pipelines Act 1969*, Access Right granted under *Dampier to Bunbury Pipeline Act 1997*.

The pipeline will be constructed within a 30 m wide construction right of way (known as the Indicative Disturbance Footprint) which will be located within the KGP Lease, Buffer Zone Lease and the DBNGP Corridor, together with an area of approximately 0.6 hectare (ha) located adjacent to the existing DBNGP Dampier Facilities. The size of the Indicative Disturbance Footprint (and proposed area to be cleared) is approximately 10.69ha.

3. Existing Environment

3.1. Climate

The Project is situated within the Roebourne subregion of the Pilbara Bioregion of Western Australia. This region is classified as arid tropical with two distinct seasons: a hot and wet summer from October to April, and a mild dry winter from May to September (BoM 2018).

Key characteristics of the physical environment in the Pilbara coastal area are:

- Cyclonic activity between November and April with attendant storm surge and flooding of coastal plain and rivers
- Ephemeral creeks and rivers resultant from unreliable and sporadic rainfall

The mean maximum temperature ranges from 36.2 °C in the summer to 26.3°C in the winter and mean minimum temperatures range from 26.8°C in the summer to 13.8°C in the winter. Rainfall is highest between the months of December and April with highest mean monthly rainfall in February (77.1 mm) and lowest mean monthly rainfall in October (0.4 mm).

3.2. Landforms, Geology and Soils

Geology

The geological substrate of the Burrup Peninsula is described as jointed Archean and gneissic granite with intrusive outcrops of granophyric rhyodacite, which is predominantly blue-grey rock with a reddish-brown weathering skin. The original granite capping has likely been eroded away, leaving the rhyodacite exposed as the main surface rock present (Jacobs 2018).

The surface geology of the pipeline corridor is comprised of the Gidley Granophyre unit, which is granophyre, commonly porphyritic and remelted granite (Astron 2018a; Stewart et al. 2008). This unit is at least 2 km thick, and it outcrops over an area of approximately 100 km².

Landforms

The Burrup Peninsula comprises of four land systems: Cheerawarra, Granitic, Littoral and Rocklea. The Project area lies solely within the Granitic land system, characterised by rugged granitic hills supporting shrubby hard and soft spinifex grasslands (Astron 2018a). The distribution of the granitic land system comprises of 4,020 ha within the Pilbara bioregion, where approximately 26% lies within the Project area (10.69 ha).

The pipeline alignment traverses a significant portion of made ground representing areas which have been altered through anthropogenic influences, such as through earthworks and development for infrastructure. The landforms in the Project area are not considered significant.

Soils including Acid Sulphate Soils (ASS)

The Burrup Peninsula comprises of Archaean igneous rocks and relatively shallow, heavily weathered red soils reaching a maximum depth of 2.0 m in the lower alluvial slopes. The adjacent Pluto LNG soils are thin and develop between outcrops of rhyodacite. The soils consist of clayey sandy gravels, as a result of erosion from underlying rhyodacite with a transition between soils to very strong rock, with irregular soil-rock interface (Woodside, 2006).

Surface soils have historically been disturbed and modified through the original trenching, blasting and filling during construction of the DBNGP.

A search of the National Map (Australian Government) found no ASS are known to occur within the Indicative Disturbance Footprint. In the southern extent near KGP, on the other side of Burrup Road (outside the Indicative Disturbance Footprint) there is a moderate to low risk of ASS occurring within

3m of natural soil surface but a high to moderate risk of ASS beyond 3 m of natural soil surface (Australian Government, 2018).

Contaminated Sites

A desktop review of the Department of Water and Environmental Regulation (DWER) Contaminated Sites Database was undertaken to identify the presence or absence of contaminated sites within the Indicative Disturbance Footprint.

No contaminated sites were identified within the Indicative Disturbance Footprint.

3.3. Vegetation Associations and Flora

The Interim Biogeographic Regionalisation for Australia (IBRA) currently recognises 89 bioregions and 419 subregions (DoE 2013). The Proposal is situated within the Roebourne subregion of the Pilbara Bioregion.

Vegetation Associations and Pre-European Vegetation

Astron Environmental Services (Astron) conducted a biological survey of the Project area. This survey involved an initial desktop survey, including database searches and a literature review. A field flora, vegetation and fauna Reconnaissance (formerly Level 1) surveys was then conducted in June 2018 along a survey corridor approximately 5 km in length and 50 m in width with a total area of 21.1 ha.

Based on the vegetation mapping conducted by Beard (1975), the only pre-European vegetation association mapped within the survey area is vegetation association 117: Abydos Plain – Roebourne (Hummock grassland, grass steppe, soft spinifex *Triodia* species). Within the Roebourne subregion, approximately 92% of the pre-European extent of this vegetation association remains with 32.5% of this protected in conservation estate (Astron, 2018).

The survey report identified 11 vegetation associations consisting of four associations representing undisturbed vegetation (mainly *Triodia* grasslands with or without an upper storey of shrubland and/or woodland), six associations representing drainage line vegetation (mangroves, Eucalypt woodlands and *Terminalia canescens* shrublands/woodlands) and 8 associations representing disturbed vegetation (similar associations to the undisturbed and drainage line vegetation but with *Cenchrus ciliaris* dominant). The vegetation condition of the survey area includes 33% mapped as 'completely degraded' where this area consists of roads and infrastructure with land clear of vegetation.

A comparison of vegetation associations of the survey area was conducted with Trudgen's 2002 mapped vegetation association of the Burrup Peninsula. The 2b and 7b vegetation associations of the 2018 survey was identified to be of the TcBaTe vegetation. The TcBaTe vegetation association is considered significant with two to four known occurrences in the area (Trudgen, 2002). Vegetation 2b consists of 5% of the survey area and 7b vegetation consists of 3% of the survey area, found at the base of the KGP batter in the artificial drainage line. All other vegetation associations that were identified within the survey area were found to have greater than 10 occurrences in the Burrup Peninsula as identified by Trudgen (2002) (Astron, 2018).

Threatened Ecological Communities and Environmentally Sensitive Areas

No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) or habitat were recorded.

However, the survey area is found to be within or adjacent to the buffer of two Priority 1 PECs, namely the Burrup Peninsula rock pile communities; and the Burrup Peninsula Rock pool communities (Astron, 2018).

Flora

A total of 63 plant taxa which are representative of 51 plant genera and 28 plant families were recorded within the survey area. The majority of the taxa recorded were representative of the Fabaceae (16 taxa), Poaceae (8 taxa) and Malvaceae (8 taxa) families.

No State or Commonwealth Listed Threatened flora were recorded within the survey area. Two State Listed Priority (P) flora species were identified; *Terminalia supranitifolia* (P3) and *Rhynchosia bungarensis* (P4). The species are considered widespread on the Burrup Peninsula (Astron, 2018). A desktop assessment identified one further priority flora species *Vigna triodiophila* (P3) to potentially occur in the area however the species was not recorded in the survey (Astron, 2018).

Two introduced flora species were recorded in the survey area:

- *Aerva javanica* (Kapok bush)
- *Cenchrus ciliaris* (Buffel grass)

C.ciliaris was identified as a key species in the disturbed vegetation of the survey area (Astron, 2018). No weed species listed as a Weed of National Significance (Australian Weeds Committee 2012) or declared pest plant in Western Australia under the Biosecurity and Agriculture Management Act 2007 (BAM) (Department of Primary Industries and Regional Development 2017) were recorded in the survey area.

Figure 3-1: Environmental Sensitivities



Figure 4: Priority Flora Locations

- Legend
- *Rhynchosia bunganensis* (P4)
 - *Terminalia supranitifolia* (P3)
 - NVCP Application Area
 - PNI Construction Footprint

Map, HERE, Garmin, © OpenStreetMap contributors, and the GD user community

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Scale: 1:12,000
Spatial Reference:
Datum: GDA 1994
Projection: Transverse Mercator
Layout Name: Figure 4 Priority Flora Locations

3.4. Fauna

A fauna survey was conducted in conjunction with the flora survey in June 2018. The survey area was approximately 50 m in width, which included the Indicative Disturbance Footprint. At the time of survey, it was requested that two additional sites (herein referred to as 'additional survey sites') located outside of the survey corridor also be assessed. These included:

- an area 50 m in width extending approximately 500 m from the north east corner of the survey corridor to the end of the fenced DGBP Corridor; and
- the area of vegetation encapsulated by the southern end of the survey corridor as it bends into the adjacent Pluto LNG plant.

Approximately 33% of the survey corridor area is infrastructure and roads and considered 'highly degraded'. The condition of remaining vegetation within the corridor ranged from 'disturbed' (19%) to 'high quality' with the majority (43%) recorded as 'high quality'. The Indicative Disturbance Footprint traverses three broad habitats based on vegetation types and landforms present in the survey area: grassland; open woodland/shrubland; eucalypt.

The areas of Eucalypt Woodland are of higher value for fauna, particularly for conservation significant species, than the other recorded habitats due to the diversity of microhabitats present and the diversity and complexity of the vegetation. In particular, to the south of the KGP there is a drainage zone and associated narrow drainage line located within the survey corridor that supports a *Terminalia canescens*, *Eucalyptus victrix* and *Corymbia hamersleyana* open low woodland.

A desktop assessment identified total of 59 terrestrial fauna species have the potential to occur within a 20 km buffer of the survey area including; 8 mammal, 3 reptile and 48 birds.

Of the 50 species, two conservation significant species the northern quoll (*Dasyurus hallucatus*) and Pilbara olive python (*Liasis olivaceus barroni*) were considered to have a 'high' likelihood of occurrence within the survey area. Three conservation significant species were considered to have a 'moderate' likelihood: Lined soil-crevice skink (*Notoscincus butleri*); Fork-tailed swift (*Apus pacificus*) and Peregrine falcon (*Falco peregrinus*).

During the field survey a total of three vertebrate species were opportunistically recorded in the survey area, comprising the euro (*Osphranter robustus erubescens*), short-beaked echidna (*Tachyglossus aculeatus acanthion*) and corella (*Cacatua sanguinea*).

No conservation significant species were recorded during the survey. Given the number and proximity of previous records for both these species on the Burrup Peninsula, it was considered likely that the northern quoll and Pilbara olive python will utilise the survey area for foraging or dispersal purposes. However, the field survey confirmed that the habitats within the survey area were not suitable as shelter habitat. The Pilbara Olive Python is commonly found under rockpiles and spinifex within rocky escarpments, deep gorges and water holes and the Northern Quoll is commonly found within rocky escarpments and open lowland savannah forests.

The Indicative Disturbance Footprint alignment (being a narrower 30m corridor (in most locations) within the wider survey area) has been designed to minimise interaction the Pilbara Olive Python and the Northern Quoll habitat by avoiding the drainage line at the base of the Karratha LNG plant.

Feral and pest animals that are likely to occur within the survey area are the Rock Pigeon, House Sparrow, Eurasian Tree Sparrow, Domestic Dog, Horse, Domestic Cat, House Mouse, Rabbit, Black Rat and the Red Fox (Astron, 2018).

3.5. Conservation Areas

No conservation reserves occur within the survey area. One national park (Murujuga National Park), one unnamed nature reserve and six unnamed Section 5(1)(h) reserves are located within a 20km radius from the survey area (Astron, 2018).

3.6. Hydrology and Hydrogeology

The project does not require abstraction of groundwater or excavation below the water level and no standing surface water exists within the Indicative Disturbance Footprint.

The Burrup Peninsula and the wider Pilbara region predominantly relies on the wet season for surface freshwater supplies. Freshwater flows tend to be highly variable and high flow, short period (duration) events often occur. During the dry period surface water supplies are limited with stream flow and recharge of deep water holes and gorges becoming restricted (Woodside, 2006).

The natural topography has been modified and historically disturbed from the existing DBNGP Corridor and KGP and Pluto LNG Plant adjacent to the Project. No permanent natural bodies of fresh surface water exist on site however an ephemeral creek line crosses the site to the east of the Pluto LNG Plant. An ephemeral creek line runs to the east of the Burrup Road emptying into King Bay. Several minor tributaries of this creek line cross the Indicative Disturbance Footprint.

Groundwater aquifers are present across the Burrup Peninsula, occurring as localised systems with regional flow of isolated pockets in rock fractures, joints and cavities of rock mass. The Burrup Peninsula contains soils and underlying weathered bedrock that are highly permeable enabling groundwater recharge from rainfall events. The presence of granophyre governs the rate and nature of groundwater movement. At shallow depths, there is limited potential for long-term subsurface water storage and at lower depths it is expected to be generally tight, solid rock mass, with limited open fractures/joints. Perched water tables are expected to have little groundwater flow, where presence of water is temporary and is subjected to gradual drainage and evaporation. Groundwater aquifers are not used for commercial or domestic abstraction purposes (Woodside, 2006).

3.7. Community

The Indicative Disturbance Footprint falls within the City of Karratha Local Government Area.

The area of the Project is industrial-zoned area, as defined by the Burrup Land Use Plan and Management Strategy (BPMAB 1996) (Woodside, 2006). Adjacent land is used for the operation of the KGP and Pluto LNG Plant.

The Project will traverse the DBNGP Corridor and extend north for approximately 2.2 km to the DBNGP Dampier Facilities before traversing the NWS buffer zone lease (I123605) granted to the NWS Project participants (Buffer Zone Lease) for approximately 400 metres (m) and then into the KGP lease (I123606) granted to the NWS Project participants (KGP Lease) for approximately 700 m.

3.8. Cultural heritage

Aboriginal

A Site Avoidance Aboriginal Heritage Survey was conducted on 16 and 17 of July 2018 by Horizon Heritage, Yaburara & Mardudunera and Wong-goo-tt-oo representatives. Seven sites were observed within the pipeline corridor, all of which have been previously identified and will be avoided as they are generally not within the preferred pipeline alignment area:

- 9843 Surveyors Valley;
- 9854 LNG Scatter;
- 23333 Woodside Pluto Area B 46;
- 23340 Woodside Pluto Area B 68;
- SRS002;
- SRS004; and
- WPIC 001.

After the survey, the Indicative Development Footprint was revised down to a nominal 30 m wide corridor and subsequently now also avoids site 23340 Woodside Pluto Area B 68, leaving only six heritage sites within the Indicative Disturbance Footprint.

These six heritage sites will not be disturbed during construction of the Project. A full detailed description of the sites is provided in the SAAHSR report (Horizon Heritage, 2018). No new aboriginal heritage sites were identified (Horizon 2018).

The Indicative Disturbance Footprint is within the Burrup and Maitland Industrial Estates Agreement Implementation Deed (the Burrup Agreement), an agreement between the WA Government and three Aboriginal groups being the Ngarluma Yindjibarndi, Yaburara Mardudhunera and Wong-Goo-tt-oo people (Woodside, 2006). Prior to the agreement entered in 2003, three Native Title Claims existed within the area that the Pluto LNG Plant is located. Under the Burrup Agreement, the native title rights were extinguished, allowing for industrial development to occur within the Burrup Peninsula, and also setting aside land for residential and commercial purposes and ensuring the protection of Aboriginal heritage (Woodside, 2006).

The Western Pilbara Region includes the Dampier Archipelago where it is estimated to have over one million pieces of rock art (petroglyphs) (Woodside, 2006) and have a density of 17 and 76 heritage sites per square kilometre (National Trust, 2006). The Ngarluma Yindjibarndi, Yaburara Mardudhunera and Wong-Goo-tt-oo groups are the traditional custodians of the land. The Indicative Disturbance Footprint does not impact on any rock art areas.

European and State Heritage

There were no registered European heritage values in the project area at the time of the Pluto LNG development. A search of the WA Heritage Council database (23/05/2018) indicates two closest registered sites are located east of the project area: Watering Cove (place number 25282) and Burrup Peninsula Hearson's Cove (place number 08663), both on the eastern coastline of the Burrup Peninsula, at least 5 km from the project area.

4. Activity Description

Construction of the Project will adopt a clear and lay approach where by minimising the extent of clearing of the construction right of way

- clearing of land required to install the pipe on a length by length basis;
- control blasting and trenching of the pipe ditch;
- Laying of 3.3 km x DN750 (30 inch) pipe on a length by length basis to minimise handing of earth off the easement;
- Lowering in and backfill of pipe ditch;
- Rehabilitation of all disturbed areas;
- Pre-commissioning and hydro testing of the pipeline prior to operation; and
- Commissioning of pipeline and facilities.

The construction methodology adopted will be based on controlled archaeological dig, laying and tie in of pipe, backfilling before the next length is prepared for installation. It is a slow but controlled process to avoid the need to disturb and move mass material from the corridor.

The ultimate size of the Indicative Disturbance Footprint is approximately 10.69 ha. A significant portion of the Indicative Disturbance Footprint is within area of the existing DBNGP (approx. 2.2 km of the length of the PNI), which was constructed in 1982 using blasting and conventional excavation techniques. The DBNGP Corridor has already been disturbed during the construction of the DBNGP as shown in these photographs.



The Original DBNGP being constructed (where the proposed PNI will be installed) in 1982

The construction of the PNI will adopt a single pipe by pipe tie in approach due to limited access available on the corridor. A pipeline production approach is not appropriate for this short interconnect

Within the DBNGP Corridor, the pipeline will be constructed at a minimum safe distance of 6.5 m from the existing DBNGP pipeline, which is also located within the DBNGP Corridor. Within the KGP Lease and the Buffer Zone Lease, the pipeline could be constructed closer than 6.5 m to the existing DBNGP pipeline subject to appropriate risk assessments, safety cases and approvals between the relevant parties.

4.1. Trench

Trenching works will be slow and controlled operation utilising controlled blasting to soften the ground and excavation to clear the trench sufficiently for pipe by pipe laying. Alignment will be approved to minimise encroachment into sensitive areas. Chemical blasting may be adopted in areas where more control is required. Blasting shall be minimised where rock breakers and other machinery can be used for trenching. Due to the close location of the DBNPG, blasting impacts shall be reduced to less than 6m from trench line.

The micro tunnel crossing (thrust bore) of the Pluto main access road and NWS main access road will require deep pits to both sides of the road. Construction of these pits will be controlled to ensure protection of the DBNGP and the roads.

4.2. Road Crossings

Two road crossings will be encountered on this pipeline and both will adopt a thrust bore technique in lieu of HDD.

Thrust boring utilises an auger boring machine, which will remove material from the proposed location of the pipeline to be installed horizontally beneath an existing surface. An entry pit (approximately 20 m x 4 m) and an exit pit (approximately 4 m x 4 m) shall be required to varying depth (determined as required by the depth of cover in that location and typically no greater than 3 m). The entry pit is usually longer to accommodate the pipe being installed into the bored hole by use of a pipe jacking machine. Entry and exit pits will be managed in accordance with all other excavation and trenches associated with pipeline construction (i.e. equipped with fauna shelters, egress and subject to clearance inspections daily).

Thrust boring does not require the addition of drilling fluids or other chemicals. As such at thrust bore sites there shall be no associated contaminated drilling mud and all cuttings shall be respread over the source and adjacent area.

4.3. Watercourse crossings

There are no significant water course crossing on this pipeline although minor creekline will be crossed (see section 3.6).

4.4. Pressure testing

Pipeline integrity is verified using hydrostatic testing, conducted in accordance with AS 2885.5. Prior to hydrotest the line will be cleaned using a bi-directional pig propelled by oil free compressed air. During hydrostatic testing the pipeline is capped with test manifolds, filled with water and pressurised up to a minimum of 125% of design maximum operating pressure for a minimum of two hours. A minimum 24-hour duration leak test then follows.

Providing it meets Department of Water and Environmental Regulation (DWER) water quality guidelines and surface disposal has landholder approval, hydro-test water is discharged to the surrounding environment, applying the minimum performance standards of the APIA CoEP (APIA 2013).

It is estimated that approximately 873kL of water shall be required for hydrotesting. The water will be sourced from the Water Corporation under a commercial agreement. Being potable water there will be no need to treat the water with chemicals. Discharge of water shall be managed to prevent erosion or ponding.

4.5. Construction camps

The construction workforce will be accommodated at existing facilities in Karratha.

4.6. Water Supply

Water supply for construction and dust suppressant will be sourced from scheme water by agreement with the Water Corporation and will be trucked in as required.

4.7. Access tracks

No construction access tracks will be required as access will be via the construction corridor and existing access tracks to the DBNGP corridor and as approved by NWS.

5. Environmental Risk Identification and Assessment

DDG ensures the effective management of risk across its business through implementation of the DBP Risk Management Policy. The DBP Risk Management Policy makes a commitment to ensure that:

- Systems are in place to identify (as far as reasonably practicable) risks faced by the business
- The impact of identified risks is understood
- Risk treatment owners are nominated to manage the identified risks
- Assurance is provided on the effectiveness of the risk management system and risk controls

In order to identify, understand and manage all environmental sources of risk and consequent impacts associated with the construction of the PNI, a comprehensive Environmental Risk Assessment (ERA) will be completed to complement the pipeline licence application process. The ERA will include a multidisciplinary team of in house personnel following a structured process to:

- outline key construction activities;
- identify, analyse and evaluate associated hazards and corresponding environmental impacts;
- where necessary, establish suitable controls; and
- systematically assess the residual associated environmental risk.

This approach is in line with the AS/NZS ISO 31000:2009 process summarised by Figure 5-1.

The ERA methodology employs a structured workshop which completes the below key steps:

- 1) Definition of the study objectives and area to be studied.
- 2) Identification of activities involved in operation and maintenance of the assets.
- 3) Brainstorming of the hazards and their causes.
- 4) Assessment of the risk associated with the identified hazards including:
 - i. determination of worst case credible consequences;
 - ii. identification of the existing safeguards (management control and mitigation systems and procedures);
 - iii. determination of the likelihood of the consequence occurring;
 - iv. categorization of the risk utilizing the DBP Operational Qualitative Risk Analysis Matrix (Appendix B).
- 5) Development of control measures (where deemed appropriate) to address the risks deemed unacceptable or not ALARP. Consideration of not just the proposed risk control action but also the accountability, resource requirements, timing, performance measures, monitoring and reporting requirements.
- 6) Evaluation of the residual risk as per the methodology outlined in Step 4.
- 7) Documentation of all findings within the Project Environmental Aspects and Impacts Risk Register.

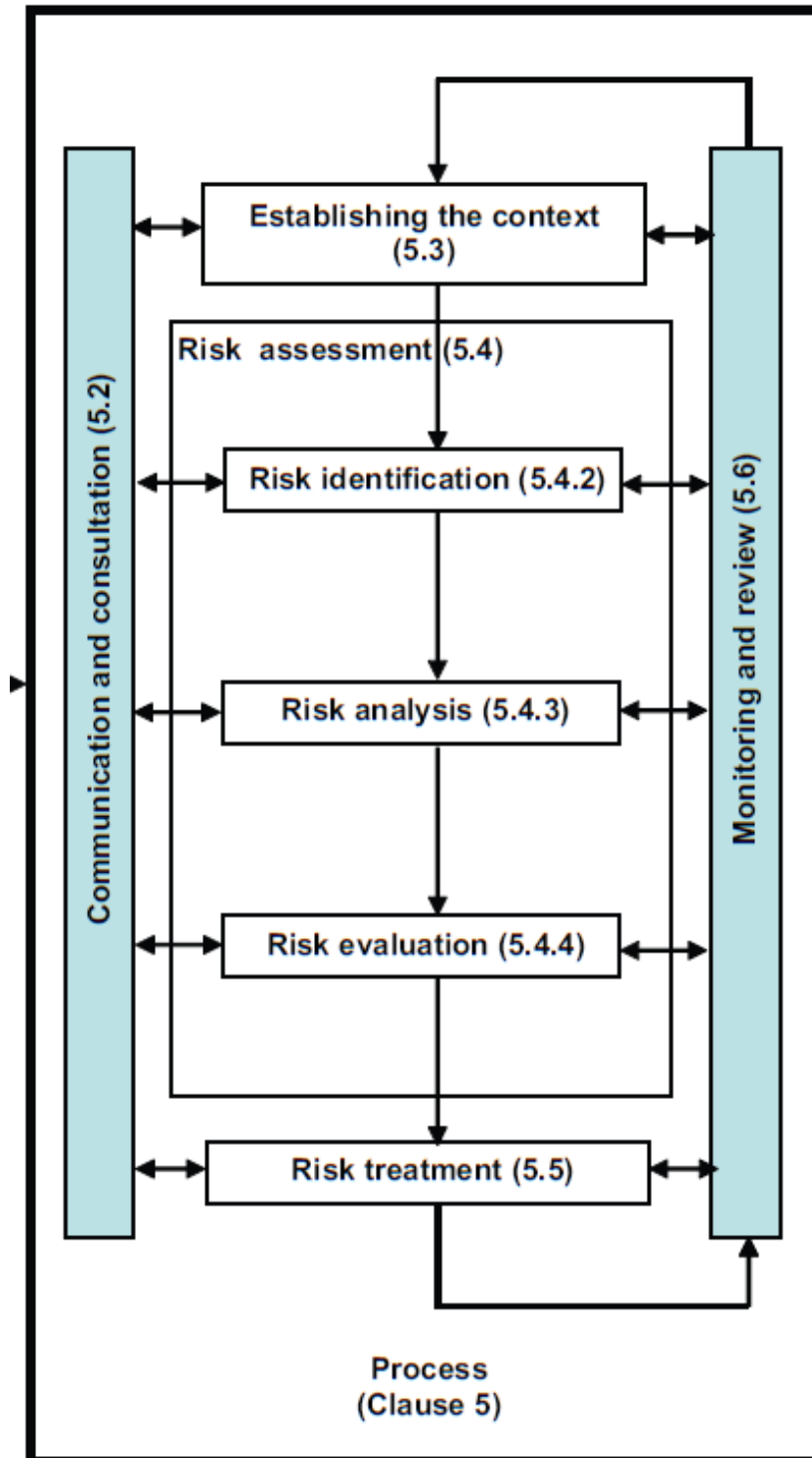


Figure 5-1 AS/NZS ISO 31000:2009 Risk Management Process

6. Implementation Strategy

6.1. Soils and Sediment

Topsoil is an important resource in rehabilitation as it provides nutrients, biomass and productivity for vegetation and contains a significant seed bank. Inappropriate soil management increases the risk of erosion, sedimentation, and mixing of the soil profiles, potentially resulting in environmental impacts on surrounding vegetation, waterbodies and residents.

Topsoil performs a vital role in rehabilitation processes, and the loss or contamination of topsoil (with subsoil) may reduce the success of rehabilitation efforts.

Topsoil on the PNI is embedded with rock ground cover throughout the easement. Where rock out crop thins – topsoil protection will be implemented

DDGO will work cooperatively with the traditional owners where rehabilitation would benefit from the introduction of approved native species to supplement the natural topsoil.

6.1.1. Performance Indicators

Table 6-1: Objectives, Standards and Measurement Criteria: Soil and Sediment

Issue	Objective	Standard	Measurement Criteria
Topsoil	Minimise change to soil profile from excavation activities	<ul style="list-style-type: none"> ▪ <i>Agriculture and Related Resources Protection Act 1976</i> ▪ <i>Soil and Land Conservation Act 1945</i> ▪ DBP Native Vegetation Clearing Procedure 	<ul style="list-style-type: none"> ▪ No evidence of subsoil on surface (as detected by colour and texture) within excavated areas following backfill ▪ No visual evidence of soil compaction following backfill and rehabilitation (e.g. hard soil, local water pooling)
Erosion and Sediment control	Prevent occurrence of soil erosion during and following construction	<ul style="list-style-type: none"> ▪ <i>Soil and Land Conservation Act 1945</i> 	<ul style="list-style-type: none"> ▪ No soil erosion inconsistent with that of the surrounding land

6.1.2. Control Measures

Table 6-2: Control measures: Soil and Sediment

Control Measure	Responsibility
The top 100-150 mm of topsoil shall be removed from any areas within the disturbance footprint and stockpiled where available (mainly rock)	Construction Contractor
If erosion is identified associated with construction activities, erosion and sediment control structures shall be constructed, such as sediment traps or drainage controls.	Construction Contractor
Topsoil, subsoil and trench spoil disturbed during earthworks shall be stockpiled separately such that the soil profile may be maintained during backfilling.	Construction Contractor
Stockpiles shall be stored within the approved construction footprint as close as practicable to the source location.	Construction Contractor

Control Measure	Responsibility
Soil shall not be stockpiled where it has the potential to result in flooding or sedimentation of land or surface water (e.g. on slopes that drain immediately to a watercourse). Topsoil containment measures e.g. berms and sediment fencing shall be used as necessary. Gaps shall be placed in topsoil windrows in low areas to minimise flooding and erosion potential.	Construction Contractor
Following the completion of earthworks, trench spoil, subsoil and topsoil shall be returned in that order such that the soil profile is reinstated.	Construction Contractor
Sumps and containment ponds excavated for crossings or water storage shall be reinstated to restore the soil profile and natural contours.	Construction Contractor

6.1.3. Monitoring and Recording

Table 6-3: Monitoring of Environmental Performance: Soil and Sediment

Monitoring	Details	Timing	Responsibility	Records
Site inspection	Opportunistic observation for evidence of erosion or sedimentation issues	Opportunistic, minimum once annually	Construction Contractor	Event Report

6.2. Flora

Activities that require flora management may include clear and grade; and trenching and excavation. Note that for the PNI – minimal clear and grade will be conducted due to the presence of heavy rock outcrop that covers the terrain

6.2.1. Performance Indicators

Table 6-4: Objectives, Standards and Measurement Criteria: Flora

Issue	Objective	Standard	Measurement criteria
Disturbance to Native vegetation	Minimise and manage disturbance to remnant vegetation	<ul style="list-style-type: none"> ▪ <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> ▪ DBP Native Vegetation Clearing Procedure 	<ul style="list-style-type: none"> ▪ All vegetation disturbance undertaken within the spatial limits of the native vegetation clearing permit. ▪ Conformance with the conditions of the native vegetation clearing permit or other approval where relevant.

6.2.2. Control Measures

Table 6-5: Control measures: Flora

Control Measure	Responsibility
Maintain a GIS Environmental Database to present available information regarding the location of conservation significant and environmentally sensitive areas in addition to NVCP (as applicable) and Pipeline Licence boundaries.	Senior HSE Advisor and GIS Manager
Appropriate approvals shall be obtained prior to the clearing of any native vegetation.	Senior HSE Advisor and Construction Contractor
An internal approval process shall be used for ground disturbance / clearing activities	Construction Contractor
No clearing is to be undertaken outside the delineated approved construction footprint	Construction Contractor
Conservation significant flora identified proximal to but outside the construction footprint shall be demarcated in the field and identified on the Environmental Line List (ELL) to mitigate against accidental disturbance.	Construction Contractor
Previously cleared areas shall be utilised where possible for laydown and turn around points.	Construction Contractor
Records shall be kept to document the details of clearing conducted in order to facilitate reporting in accordance with relevant approvals.	Construction Contractor
Vegetation shall not be burned.	All personnel

6.2.3. Monitoring and Recording

Table 6-6: Monitoring of Environmental Performance: Flora

Monitoring	Details	Timing	Responsibility	Records
Vegetation Clearing Record	Record the location; date of clearing and total hectares; of all vegetation clearing	Ongoing	Construction Contractor	<ul style="list-style-type: none"> ▪ Vegetation Clearing Register
Vegetation Demarcation Review	Inspection of adequacy of demarcation of all approved boundaries and conservation significant flora required to be avoided	Weekly	Construction Contractor	<ul style="list-style-type: none"> ▪ Internal Clearing Process ▪ Event Report

6.3. Weeds

Construction activities have the potential to introduce or disperse weeds. The highest risk of spreading weeds will be during clear and grade. Note that for the PNI – minimal clear and grade will be conducted due to the presence of heavy rock outcrop that covers the terrain

6.3.1. Performance Indicators

Table 6-7: Environmental objectives and key performance criteria: Weeds and Pathogens

Issue	Objective	Standard	Measurement criteria
Introduction of new weeds, pests or pathogens	Minimise the potential for new weeds to be introduced into the corridor from external sources.	<ul style="list-style-type: none"> ▪ <i>Agriculture and Related Resources Protection Act 1976</i> ▪ DBP Clean on Entry Procedure 	<ul style="list-style-type: none"> ▪ No new species of weeds recorded in the pipeline corridor.

Issue	Objective	Standard	Measurement criteria
Threat of spreading weeds, pests or pathogens	Minimise the risk of spreading existing weeds along the corridor and to adjacent areas.	<ul style="list-style-type: none"> ▪ <i>Agriculture and Related Resources Protection Act 1976</i> ▪ DBP Clean on Entry Procedure 	<ul style="list-style-type: none"> ▪ No significant change to the extent and distribution of weeds within one year of completion of construction activities compared to the extent and distribution of weeds prior to construction.

6.3.2. Control Measures

Table 6-8: Control Measures: Weeds, Pests and Pathogens

Control Measure	Responsibility
Maintain a GIS Environmental Database to identify the location of hygiene risk areas within the construction footprint.	Senior HSE Advisor and GIS
Identify hygiene risk areas on the ELL.	Senior HSE Advisor GIS
As far as practicable, construction activities will be scheduled for drier periods and avoided during wet conditions.	Construction Contractor
All vehicles and machinery shall be checked to ensure they are free from soil/organic matter prior to arrival on site (recorded as part of the mobilisation procedure) and marked accordingly.	Construction Contractor
All vehicles shall remain on designated roads and access tracks and shall not go outside approved access areas.	All personnel
Hygiene stations will be sufficient to enable the clean down and capture of soil material from machinery and vehicles.	Construction Contractor
A hygiene station will be established at the entry and exit point of the hygiene risk area.	Construction Contractor
The requirement for hygiene stations shall apply at all times whilst topsoil is present (i.e. prior to clear and grade and post rehabilitation).	Construction Contractor
All construction machinery, including handheld tools, and vehicles shall be cleaned down at the hygiene management stations.	Senior Advisor – Environment and Heritage
The transport of soil shall be avoided where practicable.	Construction Contractor
All topsoil within identified hygiene risk areas shall be stockpiled within the high risk area and not with topsoil from lower risk areas.	Construction Contractor
Any imported soil/fill shall be certified as weed and pathogen free.	Construction Contractor

6.3.3. Monitoring and Recording

Table 6-9: Monitoring of Environmental Performance: Weeds and pathogens

Monitoring	Details	Timing	Responsibility	Records
Hygiene station integrity checks	Integrity check of hygiene stations and hygiene risk area demarcation.	Weekly	Construction Contractor	Weekly Field Report
Random vehicle inspection	Opportunistic observation for evidence of appropriate weed clean down practices	Random, Ongoing	Construction Contractor	Weekly Field Report

6.4. Bushfire

Fire within bushland and areas of conservation value can detrimentally affect the conservation significance of these areas. Construction activities associated with the project (i.e. welding) may increase the risk of fire, particularly within high fire danger areas.

6.4.1. Performance Objectives

Table 6-10: Objectives, Standards and Measurement Criteria: Bushfire

Issue	Objective	Performance standard	Measurement criteria
Bushfire	To prevent fires occurring as a result of construction activities	<ul style="list-style-type: none"> ▪ <i>Bush Fires Act 1954</i> ▪ <i>Bush Fires Regulations 1954</i> 	<ul style="list-style-type: none"> ▪ No construction related fires

6.4.2. Control measures

Table 6-11: Control measures: Bushfire

Control Measure	Responsibility
All construction activities shall be conducted in accordance with the requirements of regulatory and local fire authorities. In particular, operations shall comply with relevant fire restrictions, notification requirements and permitting procedures.	Construction Contractor
Fire weather warnings will be monitored daily through local government sources and other relevant authorities and communicated to construction crews daily during toolbox meetings.	Construction Contractor
Regular liaison shall be initiated and maintained with local emergency service organisations and stakeholders, including advising them of the nature and schedule of construction activities.	Construction Contractor
All welding and grinding shall be undertaken with facilities in place to prevent any sparks contacting any flammable material.	Construction Contractor
During hot works, dedicated assistants (spotters) shall be alert for evidence of spot fires.	Construction Contractor
Machinery and vehicles not in use shall be parked in areas of low fire risk (e.g. not parked over shrubs, tall grass or cleared vegetation residue).	All personnel
All vehicles shall be fitted with dry chemical extinguishers (light vehicles with 1 kg units, trucks etc 9 kg units). All extinguishers shall be tagged by an approved inspector prior to mobilisation.	Construction Contractor
Service trucks shall be fitted with both a 9 kg foam extinguisher and a 9 kg chemical extinguisher.	Construction Contractor
All fires must be immediately reported to a supervisor.	All personnel
Fire prevention and response equipment shall be organised and checked prior to construction in any area, such that access to pump, hose and associated fire fighting equipment shall be available at all times.	Construction Contractor
Relevant personnel shall be trained in the use of fire fighting equipment.	Construction Contractor
The following is prohibited in hazardous areas: <ul style="list-style-type: none"> ▪ smoking ▪ the presence of matches, lighters and naked flame ▪ the access of any sources of ignition to the area (e.g. spark-ignition engines, motor vehicles etc.). 	All Personnel
Vegetation shall not be burned.	All Personnel

6.4.3. Monitoring and Recording

Table 6-12: Monitoring of Environmental Performance: Bushfire

Monitoring	Details	Timing	Responsibility	Records
Site Inspections	Opportunistic observation for evidence of fire hazards.	Daily	Construction Contractor	Weekly Field Reports

6.5. Fauna

For the purposes of this section:

- “trench” refers to open excavation intended for the installation of the pipeline.
- “bell holes” refer to excavations left open where pipe strings are joined

Construction will have potential to impact upon fauna through activities including: clear and grade; trenching and excavation; and lowering in and backfilling.

6.5.1. Performance Objectives

Table 6-13: Objectives, Standards and Measurement Criteria: Fauna

Issue	Objective	Performance standard	Measurement criteria
Direct fauna impacts	To minimise the direct impacts on fauna through impacts with vehicles, entrapment in excavation works, or extraordinary exposure to predators.	<ul style="list-style-type: none"> ▪ WC Act and associated regulations ▪ DBP Trapped and Injured Fauna Management Procedure 	<ul style="list-style-type: none"> ▪ No conservation significant fauna deaths as a consequence of construction activities
Fauna habitat decline	To minimise the temporary and permanent reduction or fragmentation of existing fauna habitat.	<ul style="list-style-type: none"> ▪ <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> ▪ DBP Native Vegetation Clearing Procedure ▪ Flora control measures (Section 6.2). 	<ul style="list-style-type: none"> ▪ Conformance with the conditions of the native vegetation clearing permit or other approval where relevant.

6.5.2. Control measures

Table 6-14: Control measures: Fauna

Control Measure	Responsibility
Trained fauna handlers holding a relevant licence issued specifically for the purposes of fauna capture and release on the project shall be available at all times during construction to respond to fauna interactions.	Construction Contractor
Habitat trees shall be pruned preferentially and not be felled except where they materially interfere with construction of the pipeline, or are a safety concern. Pruning of trees is to employ the three-cut method.	Construction Contractor
Welded pipeline sections shall be capped at end of shifts to prevent fauna entry.	Construction Contractor
Fauna shall not be fed and direct contact with fauna shall be avoided.	All personnel
Domestic waste shall be maintained within sealed bins and collected for appropriate disposal.	Construction Contractor
Pets shall be prohibited on site.	Construction Contractor
No part of the trench, other than “bell holes”, shall remain open for more than 14 days unless such an exceedance can be demonstrated as being unavoidable under the prevailing circumstances.	Construction Contractor

Control Measure	Responsibility
Bell holes will be fenced to exclude fauna	Construction Contractor
In areas where rock breaking measures are required to excavate the trench, trenches may remain open for a maximum of 21 days.	Construction Contractor
Fauna shelters/refuges (eg: cardboard boxes, hessian bags, commercial egg cartons) shall be placed in open trenches at intervals not exceeding 50 m.	Construction Contractor
Trench plugs and fauna exit ramps shall be installed at both ends of trenches and ramp slopes are not to exceed a 1:2 ratio of rise.	Construction Contractor
Open trenches shall be inspected and cleared by fauna handling teams within 3 hours of sunrise (2.5 hours where temperatures exceed 35° c) again between 2.00 and 3.00pm, again prior to sunset (no earlier than 4 pm). Inspections by personnel shall also occur immediately prior to lowering in and backfill operations.	Construction Contractor
The occurrence of water in trenches shall be managed by taking action to avoid the development of any individual water bodies longer than 100 m in length. Use of soil 'islands' or floating refuges is an acceptable method of managing effective water body lengths.	Construction Contractor
Sumps or containment ponds shall be risked assessed to consider depth, gradient and content viscosity to establish if fauna egress is required.	Construction Contractor
Records shall be kept of all trapped, deceased or injured fauna interactions to document the date, location (KP), species, habitat, and any notes such as the form of encounter and details regarding release.	Construction Contractor
Report and respond to all conservation significant fauna fatalities as an incident.	All personnel
Translocation of fauna shall be immediate, to suitable habitat at a suitable distance from disturbance and done in a manner to minimise stress to the animal and completed by a trained fauna handler.	Construction Contractor
Injured and orphaned animals shall be transferred to a wildlife carer where possible or euthanized where care is not available. Injured animals shall not be left to suffer.	Construction Contractor
Construction activities will be scheduled for daylight hours where practicable.	Construction Contractor

6.5.3. Monitoring and Recording

Table 6-15: Monitoring of Environmental Performance: Fauna

Monitoring	Details	Timing	Responsibility	Records
Open trench length and location	Observe and record the open trench KP start and end points to demonstrate compliance with time limits on trench open times.	Daily	Construction Contractor	<ul style="list-style-type: none"> ▪ Fauna Interaction Register
Trench inspections	To rescue trapped fauna	Daily, within 3 hours of sunrise (2.5 hours where temperatures exceed 35° c) again between 2.00 and 3.00pm, again prior to sunset (no earlier than 4 pm). Inspections by personnel shall also occur immediately prior to lowering in and backfill operations.	Construction Contractor	<ul style="list-style-type: none"> ▪ Fauna Interaction Register

6.6. Cultural Heritage

Construction activities that physically disturb the land surface or subsurface profile (e.g. clear and grade, trenching), may unearth and/or destroy Aboriginal artefacts or skeletal remains and may also have the potential to disturb known Aboriginal sites adjacent to construction areas identified for protection.

A separate Cultural Heritage Management Plan (CHMP) has been prepared which includes cultural monitors being present during works being undertaken in the vicinity of cultural sensitive areas.

The below information does not replace or override the CHMP.

6.6.1. Performance Objectives

Table 6-16: Objectives, Standards and Measurement Criteria: Cultural Heritage

Issue	Objective	Performance standard	Measurement criteria
Known (recorded) Aboriginal heritage sites	To avoid disturbance to Aboriginal heritage sites identified for protection near the pipeline corridor.	<ul style="list-style-type: none"> ▪ <i>Aboriginal Heritage Act 1972</i> ▪ s 18 approval conditions (if any) ▪ Project Cultural Heritage Management Plan (CHMP) 	<ul style="list-style-type: none"> ▪ No disturbance to Aboriginal heritage sites identified for protection ▪ Avoidance of culturally and socially valuable granophyre outcrops found within and around the Proposal; ▪ Conformance with s 18 permit conditions (where relevant)
New (unrecorded) Aboriginal heritage sites	To manage new Aboriginal heritage sites/artifacts uncovered or identified in accordance with the requirements of the <i>Aboriginal Heritage Act 1972</i> .	<ul style="list-style-type: none"> ▪ <i>Aboriginal Heritage Act 1972</i> ▪ Aboriginal Heritage Regulations 1974 ▪ Project Cultural Heritage Management Plan (CHMP) 	<ul style="list-style-type: none"> ▪ All new Aboriginal heritage sites managed in accordance with the <i>Aboriginal Heritage Act 1972</i>

6.6.2. Control measures

Table 6-17: Control measures: Cultural Heritage

Control Measure	Responsibility
All personnel working on or near an Aboriginal site shall be made aware of their responsibilities under the Aboriginal Heritage Act 1972.	HSE Manager
No ground disturbing activity shall be conducted outside the spatial limits of the approved disturbance corridor.	Project Manager
Heritage surveys shall be undertaken of the disturbance footprint prior to works commencing.	Land Manager
Maintain a GIS Environmental Database to present the location of all identified sites in the vicinity of the construction footprint.	GIS Manager
Aboriginal heritage sites to be protected shall be recorded on the Environmental Line List (ELL).	Senior HSE Advisor
Identified sites shall be avoided where possible.	Project Manager and Construction Contractor
Identified sites near construction activities identified for protection shall be clearly demarcated for avoidance.	Construction Contractor
The installation of physical barriers when constructing within 10 m of a heritage site;	Construction Contractor
Identified sites that cannot be avoided shall be disturbed only in accordance with a valid S18 consent.	Construction Contractor and Land Manager

Control Measure	Responsibility
Qualified site heritage monitors shall be invited to be onsite to monitor clear and grade activities for areas considered to have a high potential to contain additional surface or sub-surface archaeological material.	Land Manager
Any flagging and fencing used to identify and protect heritage sites shall be removed post construction.	Construction Contractor
If a previously unidentified cultural site is identified, the following must be undertaken: <ul style="list-style-type: none"> ▪ stop all work within 30 m of potential Heritage site ▪ report the location and nature of the site to the Senior Advisor – Environment and Heritage ▪ establish a 30 m buffer around the site, outside which work may continue. 	All personnel
Notify the relevant regulatory body and Aboriginal group regarding any previously unidentified potential sites encountered during works, as soon as practicable.	Land Manager
All personnel shall be inducted regarding the cultural significance of the construction corridor.	Project Manager and Construction Contractor

6.6.3. Monitoring and Recording

Table 6-18: Monitoring of Environmental Performance: Cultural Heritage

Monitoring	Details	Timing	Responsibility	Records
Event Reporting - Analysis of Trends	Analyse events reported for identification of disturbance to areas or artefacts of cultural significance.	Annually	HSE Manager	<ul style="list-style-type: none"> ▪ Event Reports ▪ AER

6.7. Dust and Blasting Impacts

Potential impacts of dust on air quality may occur from construction activities such as vegetation clearing, earthworks, excavation, blasting, materials handling and soil stockpiling.

The majority of the airborne particles associated with dust emissions from construction activities are likely to be larger than PM10 and are associated with nuisance rather than public health problems. Further, the larger particles tend to settle back to the ground within a short range (<300 m) from the source, reducing the potential impact of the operations.

The impact of dust on fauna is expected to be insignificant as individuals are unlikely to be near the construction site when dust-generating activities are being conducted. Further, due to the short-term nature of the construction activities, the risk of dust smothering vegetation is not expected to be significant.

6.7.1. Performance Indicators

Table 6-19: Objectives, Standards and Measurement Criteria: Dust

Issue	Objective	Performance standard	Measurement criteria
Dust impact on public/residents	To minimise the temporary impact of dust emissions from construction activities, machinery and vehicles.	<ul style="list-style-type: none"> ▪ Guidelines for the Management of Dust and Associated Contaminants from Land Development Sites (DEC 2011) 	<ul style="list-style-type: none"> ▪ Compliance with statutory regulations. ▪ No reasonable substantiated complaints.

Issue	Objective	Performance standard	Measurement criteria
Blast impacts	To minimise any offsite impacts from blasting (either normal or chemical)	<ul style="list-style-type: none"> ▪ Noise Regulation Fact sheet – Regulation 11 Blasting operations 	<ul style="list-style-type: none"> ▪ Compliance with statutory regulations ▪ No reasonable substantiated complaints

6.7.2. Control measures

Table 6-20: Control measures: Dust

Control Measure	Responsibility
BOM forecasts shall be consulted during construction planning to avoid undertaking earthworks during high wind events or when prevailing winds are toward sensitive receptors.	Construction Contractor
The construction schedule shall be planned to minimise the elapsed time between clearing, grading and restoration.	Project Manager
All blast operations shall be undertaken by trained, competent and licensed personnel.	Construction Contractor
All blast operations shall be conducted with landholder notification, during daytime and with appropriate exclusion zones in place.	Construction Contractor
Blast operations shall be minimised at all times. Vibration monitoring shall be in place.	Construction Contractor
Blast operations shall not impact offsite sensitive receptors	Construction Contractor
All blast materials shall be locked and secured at all times. This includes segregation from other chemicals, signage and security fencing where required.	Construction Contractor
Third parties undertaking any activities within 200 m of construction area shall be advised of the likely duration, impacts, potential health risks and mitigation measures to be undertaken whilst construction is occurring in their vicinity. This include potential traffic management on Burrup Road if required.	Land Manager
Vehicle movements shall be restricted to remain within dedicated access tracks and the construction footprint.	Construction Contractor
Stockpiles shall be at a maximum height of 2 m unless otherwise agreed in consultation with DMIRS.	Construction Contractor
Grit blasting shall be undertaken to comply with the <i>Environmental Protection (Abrasive Blasting) Regulations 1998</i> , as per Regulation 6, (i.e. away from public places) and under appropriate conditions (i.e. prevailing wind direction) such that no visible dust shall escape onto any place to which the public has access.	Construction Contractor
All registered complaints regarding dust nuisance shall be reported as an environmental incident.	Construction Contractor and Land Manager
Where excessive airborne dust is generated or a substantiated landholder complaint received, any combination of one or more of the following shall be implemented as required: <ul style="list-style-type: none"> • application of water or stabilisers via water trucks and sprayers to dampen down soil. No run-off should be generated from application. Applications shall be frequent enough to provide persistent dust suppression. • cover vehicles with dust emitting loads (except when loading and unloading). • use of dust stabilisers, tarps or geo-textile materials to suppress dust generated from stockpiles. • Spray on chemical dust stabilisers shall be non-hazardous, non-toxic and biodegradable. 	Construction Contractor/ Project Manager

6.7.3. Monitoring and Recording

Table 6-21: Monitoring of Environmental Performance: Dust

Monitoring	Details	Timing	Responsibility	Records
Dust monitoring –	Visual inspection to monitor dust generation and determine if dust suppression is required.	Continually	Construction Contractor	<ul style="list-style-type: none"> ▪ Weekly Field Report ▪ Event Reports

6.8. Noise

Increased noise emissions may result from construction activities including: clearand grade; and drilling.

6.8.1. Performance Objectives

Table 6-22: Objectives, Standards and Measurement Criteria: Noise

Issue	Objective	Performance standard	Measurement criteria
Noise nuisance	To minimise the impact of noise and vibration emissions from construction activities, machinery and vehicles	<ul style="list-style-type: none"> ▪ <i>Environmental Protection (Noise) Regulations 1997</i> ▪ AS2436-2010 (R2016) Guide to Noise Control on Construction, Maintenance and Demolition Sites ▪ DBP Noise Management Procedure 	<ul style="list-style-type: none"> ▪ No reasonable substantiated landholder complaints

6.8.2. Control measures

Table 6-23: Control measures: Noise

Control Measure	Responsibility
Equipment shall be selected in consideration of its noise emissions. Where practicable, equipment should be selected that is likely to result in the lowest noise impact whilst still completing the required task.	Construction Contractor
Blasting shall only occur within daytime operations and meet Blasting Operations – Noise Resulations requirements.	Construction Contractor
Equipment shall be fitted with appropriate noise abatement devices (e.g. mufflers, silencers and screens).	Construction Contractor
All equipment shall be regularly and efficiently maintained to ensure that noise-attenuating measures are operating efficiently.	Construction Contractor
Semi-fixed noise generating equipment (e.g. generators, compressors and campsite equipment) shall be located as far as practicable from surrounding premises.	Construction Contractor
Report and respond to all noise complaints as an environmental incident.	Project Manager
If location is sensitive to vibration, to minimise vibration impacts, compaction rollers shall be used in preference to plate or other vibratory based compactors.	Manager Engineering and Operational Projects

6.8.3. Monitoring and Recording

Table 6-24: Monitoring of Environmental Performance: Noise

Monitoring	Details	Timing	Responsibility	Records
Analysis of Incident Trends	Analyse incidents reported for identification of noise complaints.	Annually	HSE Manager	<ul style="list-style-type: none"> ▪ Event Reports ▪ AER

Noise Monitoring	Monitor noise at adjacent sensitive receptors in response to complaints or in high risk work programs (i.e. those with nearby sensitive receptors where noisy works are required outside standard hours).	As required	Project Manager	Noise Monitoring Report
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6.9. Surface and Ground Water

The proposal does not require abstraction of groundwater or excavation below the water level and no surface water exists within the Indicative Disturbance Footprint.

Hydro test water will be disposed of in a manner that does not impact surface water quality.

6.9.1. Performance Objectives

Table 6-25: Objectives, Standards and Measurement Criteria: Surface and Ground Water

Issue	Objective	Performance standard	Measurement criteria
Surface and Ground Water quality	To prevent contamination of surface and ground water	<ul style="list-style-type: none"> ▪ <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> ▪ DBP Spill Response Procedure ▪ DBP Hazardous Materials Handling Procedure 	<ul style="list-style-type: none"> ▪ No at fault contamination of surface or ground water quality to below background or guideline levels (whichever is deemed relevant)

6.9.2. Control measures

Table 6-26: Control measures: Surface and Ground Water

Action	Responsibility
Erosion control measures shall be installed as required to protect sites near the pipeline corridor.	Construction Contractor
When surface water is present, diversion berms or drains shall be installed to divert water away from the construction area.	Construction Contractor
Backfilled Construction Corridor shall be graded and shaped as closely as practicable to pre-existing contours.	Construction Contractor
Disposal of hydrostatic test water shall comply with Department of Water (DoW) requirements as set out in Water Quality Protection Note 13 Dewatering of Soils at Construction Sites (DoW 2012).	Construction Contractor
Potable water used for hydrostatic testing shall be assumed to already meet water quality guidelines and hence, shall not require chemical analysis or treatment prior to discharge, provided there has been no chemical added to water during testing.	Construction Contractor
Should addition of chemicals be required in hydrostat testing, details of these chemicals shall be submitted to DMIRS for approval prior to use.	Construction Contractor / Senior HSE Advisor
Disposal of hydrostatic test water to ground shall occur in a manner that ensures that standing water does not remain present for a period of more than 3 days. This will involve consideration of the volume to be discharged, aquifer capacity and the permeability of the receiving medium. Discharge to ground should include use of diffusers to reduce discharge stream energy and prevent erosion, and filters to remove sediment particles, if present	Construction Contractor
Disposal of hydrostatic test water to surface water shall not be undertaken.	Construction Contractor

Action	Responsibility
Records shall be kept of the dates of discharge for hydro-testing water, volumes and location of disposal.	Construction Contractor

6.9.3. Monitoring and Recording

Table 6-27: Monitoring of Environmental Performance: Surface and Ground Water

Monitoring	Details	Timing	Responsibility	Records
Discharged water quality (hydrostatic testing)	Relevant physical and chemical parameters (after treatment), including pH, electrical conductivity, dissolved oxygen and turbidity NOTE: If chemical is added only.	Weekly during discharge	Construction Contractor	Dewatering Report

6.10. Hazardous Materials Storage and Handling

The uncontrolled release of fuels and chemicals has the potential to result in the contamination of soil, groundwater and surface water, which may lead to significant environmental impact and harm. On this basis, the storage and use of fuels and chemicals must be managed to minimise the risk of a release.

Typical fuels and chemicals used include diesel, hydraulic oil, grease engine oils and butyl primer.

Hazardous materials storage and handling may be related to the following activities: refuelling and servicing; and chemical storage and handling.

6.10.1. Performance Objectives

Table 6-28: Objectives, Standards and Measurement Criteria: Hazardous Materials Storage and Handling

Issue	Objective	Performance standard	Measurement criteria
Contamination	Prevent the contamination of groundwater, surface water and soil due to accidental spills of hazardous materials.	<ul style="list-style-type: none"> ▪ <i>Environmental Protection Regulations 1987</i> ▪ <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> ▪ Australian Dangerous Goods Code ▪ <i>AS1940: 2017</i> -The storage and handling of flammable and combustible materials ▪ DBP Spill Response Procedure ▪ DBP Hazardous Materials Handling Procedure 	<ul style="list-style-type: none"> ▪ No significant spills or leaks of hazardous materials (in excess of 80 litres). ▪ No spills or leaks within 100 m of watercourses.

6.10.2. Control measures

Table 6-29: Control measures: Hazardous Material Storage and Handling

Control Measure	Responsibility
All sites shall maintain a Material Safety Data Sheet Manifest and the MSDS for all stored hazardous materials shall be readily accessible.	Manager Engineering and Operational Projects
All chemicals used during operations shall be transported, stored, handled and disposed of in accordance the requirements of the relevant legislation and industry standards.	Manager Engineering and Operational Projects
A licensed contractor shall be sourced for the transport of Dangerous Goods where required.	Project Manager
Chemical use shall be minimised where practicable.	All Personnel
The minimum practicable volume of chemicals shall be stored on-site.	Project Manager
Hazardous materials shall be stored in containment facilities (e.g. bunded areas, leak proof trays) designed to hold 110% of the capacity of the largest tank or 25% of the total combined volume of stored materials (whichever is greater) and be impervious to prevent the release of spilt substances to the environment.	Project Manager
Additional spill containment facilities such as compacted pads or drip trays are to be provided at refuelling stations, oil and chemical storage sites and vehicle maintenance areas.	Construction Contractor
Spill kits are to be provided as follows: <ul style="list-style-type: none"> • all refuelling vehicles carry 250 L spill kits • all vehicles fitted with hydraulic hoses have immediate access to 20 L spill kits • all crews handling hazardous chemicals have immediate access to 20 L spill kits 	Construction Contractor

Control Measure	Responsibility
<ul style="list-style-type: none"> all supervisors will carry 20 L spill kits. 	
The location of on-site fuel/chemical storage areas shall be clearly signed and designated.	Construction Contractor
Hazardous materials are to be provided, stored and maintained in a sealed condition, without leaks.	Construction Contractor
Hazardous materials shall be stored in labelled and lidded containers.	Construction Contractor
Fuel powered dewatering pumps shall be bunded to contain spills, using an impermeable liner. The bund shall be a large enough to contain the contents of the pump's fuel tank.	Construction Contractor
Fuels and chemicals shall not be stored or handled within 100 m of natural or built waterways or water storage areas (e.g. streams, canals, dams, lakes etc.).	Construction Contractor
Servicing of plant and equipment shall be undertaken off-site in appropriately equipped areas.	Construction Contractor
A drip tray or absorbent material to intercept inadvertent spillage will be used at all times when re-fuelling or lubricating.	All personnel
Refuelling vehicles shall be equipped with the following to enable quick response to spillages: <ul style="list-style-type: none"> 250 L spill kits spill tray(s) shovel containers for temporary storage and transport of contaminated soil. 	Construction Contractor
Prior to commencement of works thrust boring equipment shall be inspected to ensure it is in good working order.	Construction Contractor
No drilling fluids shall be used during thrust boring.	Construction Contractor
Only water based drilling fluids shall be used during HDD and shall be contained in mud tanks or pits and de-sanded and recirculated during drilling.	Construction Contractor
The area shall be continuously monitored during drilling for potential fracturing out of drilling mud.	Construction Contractor

6.10.3. Monitoring and Recording

Table 6-30: Monitoring of Environmental Performance: Hazardous Materials and Storage Handling

Monitoring	Details	Timing	Responsibility	Records
Event Reporting - Analysis of Trends	Analyse events reported for identification of spills	Annually	HSE Manager	<ul style="list-style-type: none"> InControl AER
Liquid Emissions Monitoring	Continually monitor for the occurrence of planned and unplanned hazardous liquid emissions	Continually	Manager Engineering and Operational Projects	Quarterly Emissions and Discharge Report

6.11. Spill Response

Appropriate hazardous materials storage and handling procedures are in place to prevent spills. However, in the event that a spill should occur it is important to have contingency plans in place which facilitate prompt containment and recovery of spilled material.

Spill response may be related to the following activities: refuelling and servicing; and chemical storage and handling.

6.11.1. Performance Objectives

Table 6-31: Objectives, Standards and Measurement Criteria: Spill Response

Issue	Objective	Performance standard	Measurement criteria
Contamination	Minimise the residual impacts to groundwater, surface water and soil associated with accidental spills	<ul style="list-style-type: none"> ▪ <i>Environmental Protection Regulations 1987</i> ▪ <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> ▪ <i>Contaminates Sites Act 2003</i> ▪ Australian Dangerous Goods Code ▪ DBP Spill Response Procedure ▪ DBP Hazardous Materials Handling Procedure 	<p>No offsite migration of localised contamination associated with accidental spills</p> <p>Remediation of all contamination associated with accidental spills</p>

6.11.2. Control measures

Table 6-32: Control measures: Spill Response

Control Measure	Responsibility
Appropriate spill response equipment, including containment and recovery equipment, shall be available on site and in vehicles undertaking work where there is the potential for fuel or chemical spillage.	Manager Engineering and Operational Projects
All spills must be addressed immediately in accordance with the Spill Prevention and Response Procedure (DBP 2012).	All personnel
Spills shall be stopped at source as soon as practicable.	All personnel
Spilt material shall be contained to the smallest possible area.	All personnel
Spilt material shall be recovered as soon as possible, using appropriate equipment.	Construction Contractor
All spills shall be recorded as an incident requiring reporting on the: <ul style="list-style-type: none"> ▪ date, time, location ▪ quantity and material spilled ▪ circumstances that caused the spill ▪ size and type of affected area ▪ damage / harm caused ▪ description of clean-up activities 	All personnel
All contaminated material must be removed and disposed of at a licensed facility.	Construction Contractor

6.11.3. Monitoring and Recording

Table 6-33: Monitoring of Environmental Performance: Spill Response

Monitoring	Details	Timing	Responsibility	Records
Hazardous Material Storage Area Inspections	Inspection of adequacy of on site hazardous material storage	Weekly	Construction Contractor	Weekly Field Reports

6.12. Waste Management

All construction activities will have the potential to generate waste.

6.12.1. Performance Objectives

Table 6-34: Objectives, Standards and Measurement Criteria: Waste Management

Issue	Objective	Performance standard	Measurement criteria
Waste management	Prevent contamination or environmental harm due to inappropriate disposal of waste	<ul style="list-style-type: none"> ▪ <i>Environmental Protection (Controlled Waste) Regulations 2004</i> ▪ <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> ▪ DBP Waste Management Procedure 	<ul style="list-style-type: none"> ▪ No complaints associated with litter by DBP staff ▪ No contamination associated with inappropriate disposal of waste

6.12.2. Control measures

Table 6-35: Control measures: Waste Management

Control Measure	Responsibility
All waste shall be disposed of in accordance with signage and site specific procedures. If unsure consult your supervisor.	All Personnel
All waste shall be disposed of in dedicated, labelled and lidded bins.	Construction Contractor
Do not overfill waste bins.	All Personnel
All waste will be transported to a licensed waste disposal facility.	Construction Contractor
All general wastes, including materials such as wood, vegetation, rags, paper and domestic scraps shall be properly disposed of at a Shire or other approved waste facility.	Project Manager
Good housekeeping shall be maintained at all times.	Construction Contractor
Disposal of any chemical shall be in compliance with approved industry codes of practice, relevant safety guidelines and Australian Standards.	Construction Contractor
Chemical wastes, waste oils and solvents and other toxic material shall be stored in a labelled, lidded container within a bunded area for collection and offsite disposal by a licensed contractor.	Construction Contractor
Dry cuttings from thrust boring (where no drill fluids are used) shall be disposed over via backfilling/respreading of over the source location.	Construction Contractor
Provided groundwater is not present, HDD muds will be disposed to the base of the entry or exit pit (or where necessary trench) excavation and covered with residual excavation spoil and subsequently topsoil.	Construction Contractor
Seed, soil and organic matter removed during clean-down activities shall be collected for disposal at a licenced waste facility.	Construction Contractor
Scrap metal shall be stockpiled separately for salvaging or recycling.	Construction Contractor
Temporary portable sanitary or ablution facilities may be provided on-site where existing facilities are not present.	Construction Contractor
Ablution facilities shall be regularly cleaned and maintained.	Construction Contractor
Sewage collected within portable sanitary or ablution facilities shall be removed by a licensed contractor and disposed of to a licensed facility.	Construction Contractor

6.12.3. Monitoring and Recording

Table 6-36: Monitoring of Environmental Performance: Waste

Monitoring	Details	Timing	Responsibility	Records
Waste Management Inspections	Inspection of adequacy of housekeeping and waste management on site	Weekly	Construction Contractor	Waste Transfer Register

6.13. Rehabilitation

Rehabilitation will be required to revegetate areas cleared for construction purposes that are not required for operational use. Effective rehabilitation will minimise the risk of introducing weed species, minimise disturbance of fauna through re-establishing habitat and stabilising disturbed areas; reducing the potential for erosion and sedimentation of surrounding water bodies.

Refer to the DNI Environmental Aspects & Impacts Risk Register item 46 (Appendix C).

6.13.1. Performance Objectives

Table 6-37: Objectives, Standards and Measurement Criteria: Rehabilitation

Issue	Objective	Performance standard	Measurement criteria
Vegetation Rehabilitation	To re-establish vegetation cover and diversity in line with pre disturbance cover	<ul style="list-style-type: none"> ▪ Guidance Note 6 Rehabilitation of Terrestrial Ecosystems (EPA 2006) ▪ Completion criteria (see Table 6-47) 	<ul style="list-style-type: none"> ▪ Site specific established completion criteria
Site Reinstatement	To re-establish site conditions in line with pre disturbance conditions	<ul style="list-style-type: none"> ▪ DBP Landholder Management Plan 	<ul style="list-style-type: none"> ▪ No substantiated landholder complaints regarding site reinstatement

6.13.2. Control measures

Table 6-38: Control measures: Rehabilitation

Control Measure	Responsibility
All waste materials (e.g. bags, pegs, skids, pillows) and equipment shall be removed from the construction areas once backfilling and tie-ins are completed.	Construction Contractor
All flagging and bunting installed for other than environmental or safety reasons shall be removed from the construction areas once backfilling and tie-ins are completed.	Construction Contractor
Rocks will be returned and placed on the right-of-way.	Construction Contractor
Any infrastructure disturbed during construction shall be restored to the landholder's satisfaction.	Construction Contractor
Upon completion of works, material within any turkeys nests, containment ponds and HDD sumps shall be recovered (in accordance with Section 6.13) and the soil profile shall be reinstated (in accordance with Section 6.1).	Construction Contractor
Salvaged topsoil shall be respread across the rehabilitation area, followed by salvaged vegetation.	Construction Contractor

6.13.3. Monitoring and Recording

Table 6-39: Monitoring of Environmental Performance: Rehabilitation

Monitoring	Details	Timing	Responsibility	Records
Site Closure Inspection	Inspect the suitability of reinstatement and rehabilitation efforts.	Once, upon construction completion.	Construction Contractor	Surface Disturbance Permit Register
Rehabilitation Monitoring	Establish rehabilitation monitoring sites within representative rehabilitated areas and adjacent control areas to monitor specified aspects against set criterion (refer Table 6-49).	Annually for a minimum of 2 years and until the rehabilitated areas have regenerated to a stable condition.	Senior HSE Advisor	Rehabilitation Monitoring Report
Photo Monitoring	Photo monitoring sites shall be established every 5 km within the disturbance footprint. For each round of monitoring, two photographs shall be taken at each photo monitoring site – one in each direction along the corridor.	Prior to clear and grade; immediately following reinstatement; and during rehabilitation monitoring.	Senior HSE Advisor	Rehabilitation Report

Table 6-40: Rehabilitation Completion Criteria

Aspect	Criterion
Native Plant Species Density (plants per m ²):	Native plant density equals or exceeds 40% of that of the adjacent control area at 36 months
Native Species Richness (per plot):	Perennial native species richness equals or exceeds 40% of that of the adjacent control area at 36 months
Native Species Foliage Cover (%):	Percentage Foliage Cover of perennial native species indigenous to each plant community is greater than or equal to 40% at 36 months
Weed Foliage Cover (%):	Foliage Cover of Declared and Environmental Weeds is not greater than that of the adjacent control area at 24 months (excluding extensive populations i.e. buffalo grass and cape weed).

7. Environmental Management System

This chapter describes the documented systems and processes of the Environmental Management System (EMS) used for the safe construction of the Project. DDG adopt all DBP policies and procedures across the operation of its business. Implementation of DBP's EMS ensures that hazards are identified and assessed to eliminate or minimise the risk to the environment to a level that is As Low As Reasonably Practical (ALARP) throughout construction of the PNI.

7.1. Induction and Training

All staff and contractors shall be required to undertake an environmental awareness induction prior to commencement of the Project. The environmental awareness induction is targeted to educate staff and contractors regarding DBP's environmental objectives and their individual responsibilities for environmental management. The environmental awareness induction covers off on the following key topics:

- Flora
- Fauna
- Weeds and pathogens
- Acid sulphate soils
- Cultural heritage
- Community and landholders
- Spill response and
- Waste management

The induction additionally ensures that all personnel are capable of implementing the JHA process to identify and manage risks.

All personnel are required to undergo refresher training once every three years. All visitors receive a site-specific induction appropriate in length and content for the type of work being undertaken.

Employees will be trained and provided with appropriate resources to ensure compliance with environmental laws, codes and standards and company policies. These additional specific training needs are addressed on an as needs basis. DBP will maintain a record of training for all personnel.

7.2. Incident Management

It is a mandatory requirement for any personnel working for or on behalf of DBP to respond to all hazards and events that have affected or have the potential to adversely affect the environment.

Examples of such events include: odour emissions, accidental gas releases (e.g. leaks), fuel spillage, excessive noise incidents, chemical spills or a complaint from a neighbour.

The first line of response is to take immediate actions to minimise risks to persons, plant, equipment and the environment. These actions may include:

- stop work,
- assess site and make the area safe,
- notify other parties that may be affected by the Hazard / Event

Following this, hazards and events must then be classified and reported on in accordance with the Hazard / Event Classification Matrix contained within the HSE Hazard / Event Reporting and Investigation (S-PRO-014). The level of analysis required will vary dependent upon the level of associated risk.

7.2.1. External Reporting

The requirements for external reporting of incidents is summarised in Table 7-1. DBP shall ensure that all relevant parties are informed of any significant incident verbally within 2 hrs and then in writing within 3 days.

A Significant Environmental Incident is an event which:

- may but does not necessarily result in any permanent damage to the environment but requires the use of additional personnel or contractors external to the site and additional remediation equipment; or
- the regulatory authority deems as notifiable; or
- is likely to result in wide spread public complaints and anger.

External notifications of significant incidents shall be carried out by the designated responsible person.

DMIRS may be contacted via a reporting phone number (0419 960 621) and the petroleum environment email address petroleum.environment@dmirs.wa.gov.au.

Additionally, should an incident impacts on a reserve set aside for conservation purposes or a national park the appropriate regional office of the Department of Biodiversity, Conservation and Attractions is to be informed.

Contact details for all agencies, including regional offices, that may need to be contacted in the event of an emergency, are specified within the DBP Emergency Response Plan.

Table 7-1 DBP External Incident Reporting/ Notification Requirements

Requirement	Reference	Agency	Timeframe
Where an incident causes or threatens to cause serious ¹ or material ² environmental harm	<i>EP Act</i>	DWER	As soon as practicable
Recordable Incidents: <ul style="list-style-type: none"> ▪ Any incident arising from the activity that breaches a performance objective or standard identified in the EP (and is not a reportable incident) shall be reported monthly, on or prior to the 15th day of each month. 	<i>PP Act</i>	DMIRS	Monthly, on or prior to the 15th day of each month
Reportable Incidents: <i>Consequence based:</i> Where an unplanned event is identified to have caused (or have potential to cause) an adverse environmental impact where that impact has a consequence rating of 'moderate or more serious than moderate' (NOTE: With reference to the DBP ERA this includes risks with a consequence level of severe, major or catastrophic, refer (Appendix C).	<i>PP Act</i>	DMIRS	As soon as practicable but not later than 2 hours after the operator becomes aware of the reportable incident. A written report shall be submitted within 3 days after the first occurrence of the reportable incident
Reportable Incidents: <i>Additional Reporting Requirements:</i> <ul style="list-style-type: none"> – Spills of hydrocarbons or hazardous materials in excess of 80 L to the sea or inland waters; Spills of hydrocarbons or hazardous materials in excess of 50 L in other areas; – Spills of hydrocarbons or hazardous materials that affect a ground surface area greater than 100 m²; – An unplanned gaseous release to atmosphere 500m³ or more; 	<i>PP Act</i>	DMIRS	As soon as practicable but not later than 2 hours after the operator becomes aware of the reportable incident. A written report shall be submitted within 3 days after the first occurrence of the reportable incident
<ul style="list-style-type: none"> – Death or injury to individual(s) from a Listed Species during an activity; 	EPBC Act	DoEE	Within 7 days of becoming aware of the results of your activity.
Unplanned impact caused to a matter of national environmental significance (NES) during an activity (as per the EPBC Act).	EPBC Act	DoEE	As soon as is reasonably practicable.
Known contaminated sites	<i>Contaminated Sites Act 2003</i>	DWER	Within 21 days of first knowing the site is contaminated
Suspected contaminated sites	<i>Contaminated Sites Act 2003</i>	DWER	As soon as is reasonably practicable

¹ **Serious Environmental Harm:** environmental harm that:

- (a) is irreversible, of a high impact or on a wide scale
- (b) is significant or in an area of high conservation value or special significance
- (c) results in actual or potential loss, property damage or damage costs of an amount, or amounts in aggregate, exceeding 5 times the threshold amount (i.e. \$100,000).

[Environmental Protection Act 1986, s 3A(1)]

² **Material Environmental Harm:** environmental harm that:

- (a) is neither trivial nor negligible; or
- (b) results in actual or potential loss, property damage or damage costs of an amount, or amounts in aggregate, exceeding the threshold amount (\$20,000);

[Environmental Protection Act 1986, s 3A(1)]

Recordable incidents shall be reported on monthly and the following details shall be provided:

- Type of incident
- All material facts
- Actions taken to avoid and mitigate impacts of the incident
- Corrective actions applied

Reportable incidents shall be addressed through documentation and submission of the following details:

- Facility name
- Pipeline title
- Location of incident
- Name of operator
- Names and contact details of witnesses
- Name and contact details of report submitter
- Description of the incident
- Work activity undertaken at time of incident
- Quantity and composition of spilled/vented material
- Duration of spill/vent
- Extent of impact
- Immediate actions taken
- Arrangements for internal investigation
- Corrective actions applied

A Reportable Incident may include:

- Disturbance to declared rare or threatened flora
- Disturbance to a heritage site
- Bushfire
- Bulk fuel spill

7.3. Emergency Preparedness and Response

For emergency preparedness and response purposes, DDGO fully adopts the respective DBP policies and procedures.

DBP has three tiers of emergency and crisis response: Incident, Emergency and Crisis (refer Figure 7-1).

The Emergency Response Plan (ERP) provides for an Emergency Management Team (EMT) and an Incident Management Team (IMT) who are responsible for managing emergencies and minor incidents.

The contractor's local area emergency response plan specifies the assignment of particular responsibility and provisions for project related emergency response requirements and interfaces with the DBP ERP.

The Crisis Management Plan (CMP) establishes the Crisis Management Team (CMT) which is responsible for managing Crisis events, being those that are likely to be associated with personnel, public safety, supply, pipeline licence or DBP reputation issues.

In the event that an emergency deteriorates and can no longer be managed effectively by the Emergency Management Team the CMT would be activated.

7.3.1. Emergency Response Plan

The emergency response processes (including storage of emergency response equipment) have been designed to effectively respond to all foreseeable emergency events as identified in various risk assessments (e.g. FSA, HAZOPs, HAZIDs and JHA's) and from DBP experience on other assets including the DBNGP.

The Emergency Response Plan (ERP) is in place to manage events and emergencies so as to limit the consequences of such events so as to:

- Minimise or eliminate any danger or risk to individuals;
- Minimise or eliminate any risk to the business; and
- Ensure that the PNI is returned efficiently to a safe condition with minimum impact to the environment.

DBP ERP consists of:

- All Hazards Plan (framework) which specifies the arrangements for:
 - incident escalation;
 - incident and emergency management structures;
 - roles and responsibilities of IMT and EMT and their interface;
 - IMT and EMT interface with Crisis Management Team;
 - display of emergency information including incident/emergency management logs;
 - changeover of responsibilities; and
 - emergency operations centre locations.
- Emergency Procedures, Contingency Plans and Work Instructions
- Emergency Equipment Management Plan
- Contacts Directory
- Notification and reporting requirements

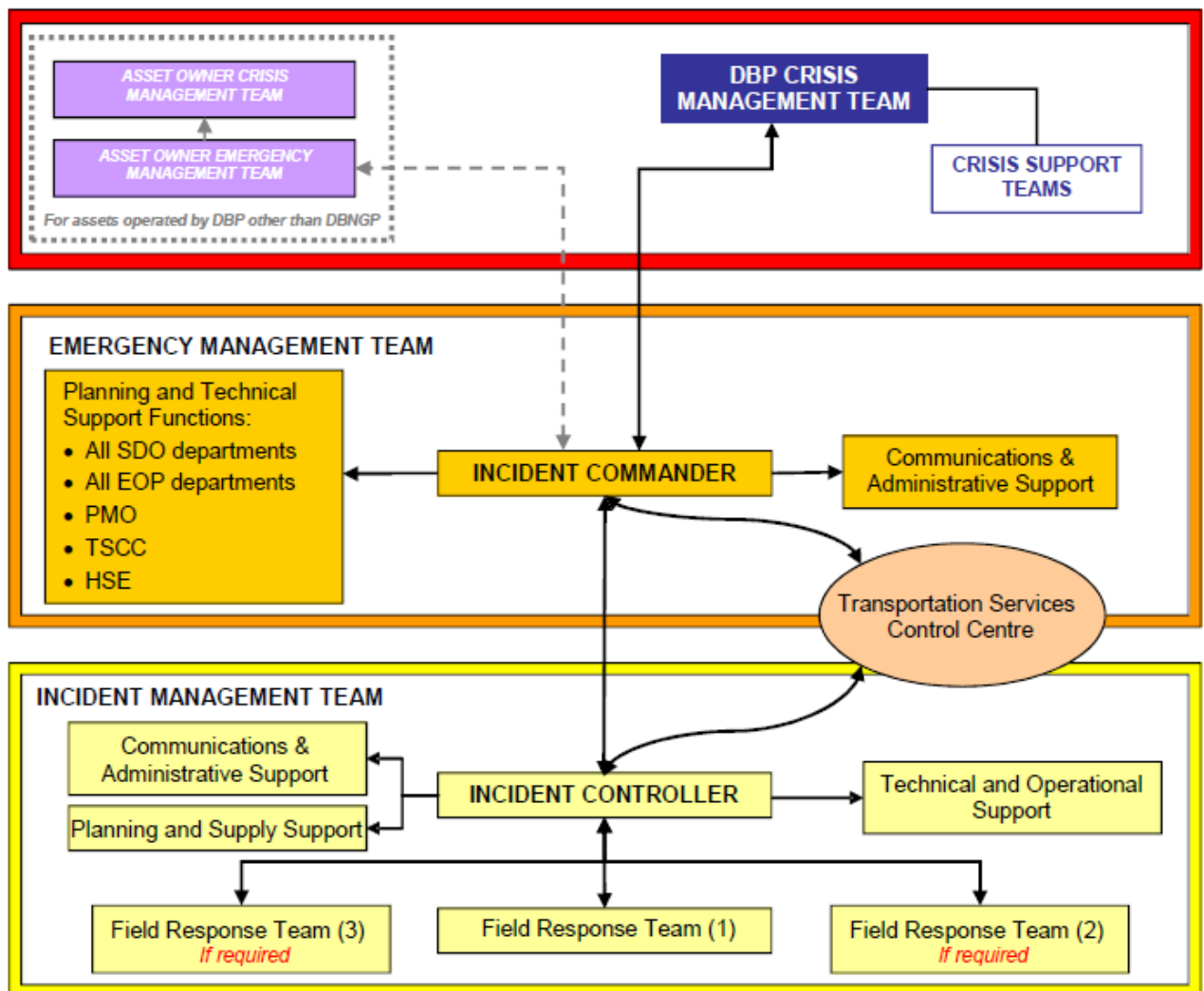


Figure 7-1 Emergency & Crisis Teams – Structures

7.3.2. Emergency Training

All field emergency response personnel are trained and competent in Senior First Aid/Remote Area First Aid, Fire Fighting and Defensive Driving. The performance of the tasks associated with Emergency Procedures for the pipeline and associated facilities are an extension of normal work practices and as such the personnel are trained on a regular basis to perform those tasks. Personnel also conduct competency based training in the completion of emergency response through the annual emergency exercises.

Emergency exercises are conducted annually to assess the emergency response capabilities of the various teams by providing exercises at levels up to and including crisis. The level of escalation may vary from one exercise to another. All exercises include at least activation of the IMT and EMT.

7.3.3. Emergency Preparedness & Management

The preparation for emergency response also includes an assessment of the probability of the type of emergency events identified through the hazard identification process.

Project emergency planning and procedures will reference:

- communications/alarm systems;
- emergency equipment;
- emergency reporting and support contact information;
- frequency of emergency response drills/exercises.
- muster points;
- provisions to account for personnel on site;
- response to specific emergency situations; and
- specific responsibilities.

7.3.4. Crisis Management Plan

DBP's Crisis Management Plan (CMP) details the roles and responsibilities of the Crisis Management Team (CMT). Events that will trigger the activation of the CMT are likely to be associated with personnel, public safety, supply, licence or reputation issues.

The function of the CMT is to manage a crisis at a strategic level. Once activated, the CMT will receive input from all groups involved in the crisis. The operational crisis or the event is monitored and assessed for the impact on DBP's statutory and legal obligations, shipper contracts and its corporate reputation.

7.4. Monitoring

In accordance with Section 33 of the Regulations DBP shall conduct monitoring of the emissions and discharges defined in **Table 7-3**.

The Quarterly Emissions and Discharge Report shall consolidate the results of all monitoring for submission to the DMIRS as specified in **Table 7-5**.

Table 7-2 Overview of monitoring of emissions

Equipment/ Activity	Emission	Monitoring	Reporting
Vehicles, Fixed and Mobile Plant	Diesel combustion	Diesel purchases shall be monitored. Apportioning of diesel usage by vehicles, fixed and mobile plant shall be estimated.	Emissions of CO ₂ equivalents shall be calculated using estimated diesel consumption data in accordance with the NGER Measurement Determination 2008 and reported quarterly.
Generators	Diesel combustion	Diesel purchases shall be monitored. Apportioning of diesel usage by generator shall be estimated.	Emissions of CO ₂ equivalents shall be calculated using estimated diesel consumption data in accordance with the NGER Measurement Determination 2008 and reported quarterly.
Hydrostat Testing	Test waster	Where relevant, as per Section 6.10.	Where relevant, as per Section 6.10.
Commissioning (venting)	Gas	Gas emissions shall be estimated based upon the flow rate during purging and the elapsed time. This will be a conservative estimate as it will assume 100% gas composition throughout that period where infact composition will intially be predominantly nitrogen, decreasing with time.	Estimated volumes of gas vented during commissioning shall be reported quarterly. It is estimated that approximately 0.005TJ of gas may be vented during commissioning.
Waste Disposal	Waste-All types	Monitoring and recording of the type and volume of all waste collected for disposal shall be undertaken.	The total volume for each waste stream collected from site shall be reported quarterly.

7.5. Inspections and Audits

The Construction Contractor shall be responsible for conducting regular inspections against compliance with this plan. Specific monitoring requirements have been detailed where required against the relevant factor within this plan.

DBP shall conduct regular inspections of the Construction Contractor to monitor compliance against this CEMP. All open items from previous inspections will be checked during the next inspection to ensure remedial action has been taken, and to determine if that action has been effective. Records of all works including inspections will be maintained to demonstrate compliance with the requirements of the CEMP.

At a minimum of one environmental compliance audit shall be conducted to ensure that the systems and controls detailed within this CEMP are implemented.

7.6. Review and Improvement

DDG adopt all DBP policies and procedures across the operation of its business. The DBP EMS provides for ongoing review and improvement of existing systems and controls. DBP conducts an annual comprehensive business strategy planning process which guides the overall business operation for the following year. Key performance indicators for the business and individuals are determined from these reviews. The achievement of compliance with environmental management obligations is considered in each business plan, enabling the identification of issues to upper management and the allocation of resources where necessary to implement improvements.

Additional ongoing review commitments are presented in Table 7-4.

Table 7-3 Details of system elements requiring periodic review

Subject	Detail	Timeframe	Responsibility
CEMP	The review shall: <ul style="list-style-type: none">▪ assess the appropriateness of the EP to the construction activities based on audit information; and▪ determine if any changes to the CEMP are required as a result of scope, legislative or organisational changes. All revisions shall be submitted to DMIRS for approval.	In response to a material change to the activities and/or the use of equipment or in response to actions arising from any audit taken.	Senior Advisor – Environment and Heritage
HSE Policy	Review to identify and implement continuous improvement opportunities.	Annual	HSE Manager/ Executive Management Team
Legislation and other requirements	Review to identify amendments to existing and addition of new legislation which is relevant to the environmental management of pipeline activities.	Annual and opportunistic	Audit and Compliance Manager/ Senior Advisor – Environment and Heritage

7.7. Reporting

To demonstrate and maintain compliance against legislative requirements, routine external reporting to key regulatory agencies shall be conducted. Routine external reporting requirements for the Project are summarised in Table 7-5.

It should be noted that construction of the Project does not trigger reporting thresholds for the National Greenhouse and Energy Reporting scheme (NGERs) or the National Pollutant Inventory (NPI).

Table 7-4 Overview of external regulatory reporting requirements

Report	Details	Agency	Period	Due Date	Responsibility
Recordable Incident Report	Details the cause, impacts and corrective actions associated with any incident arising from the activity that breaches a performance objective or standard identified in the CEMP	DMIRS	Each calendar month	Not later than 15 days after the reporting period	Senior Advisor – Environment and Heritage
Emissions and Discharge Report	Details all emissions and discharges to any land, air, marine, seabed, sub-seabed, groundwater, sub-surface or inland waters environment that occur in the course of the activity	DMIRS	Each three calendar months (Jan – Mar; Apr – June; Jul – Sept; Oct – Dec)	Not later than 15 days after the reporting period	Senior Advisor – Environment and Heritage
Annual Environmental Report (AER)	Demonstrates environmental performance objectives and standards within the CEMP are being met	DMIRS	Each calendar year (commencing 1 November and concluding 31 October)	Not later than 3 months after the reporting period	Senior Advisor – Environment and Heritage

7.8. Consultation

DDGO is committed to the identification of - and ongoing consultation with - all stakeholders potentially impacted by its proposed activities. The purpose of consultation is to:

- Keep key stakeholders up to date with proposed activities
- Obtain appropriate input into the ongoing improvement of activities
- Ensure timely response to landholder issues
- Maintain dialogue with regulatory authorities

8. References

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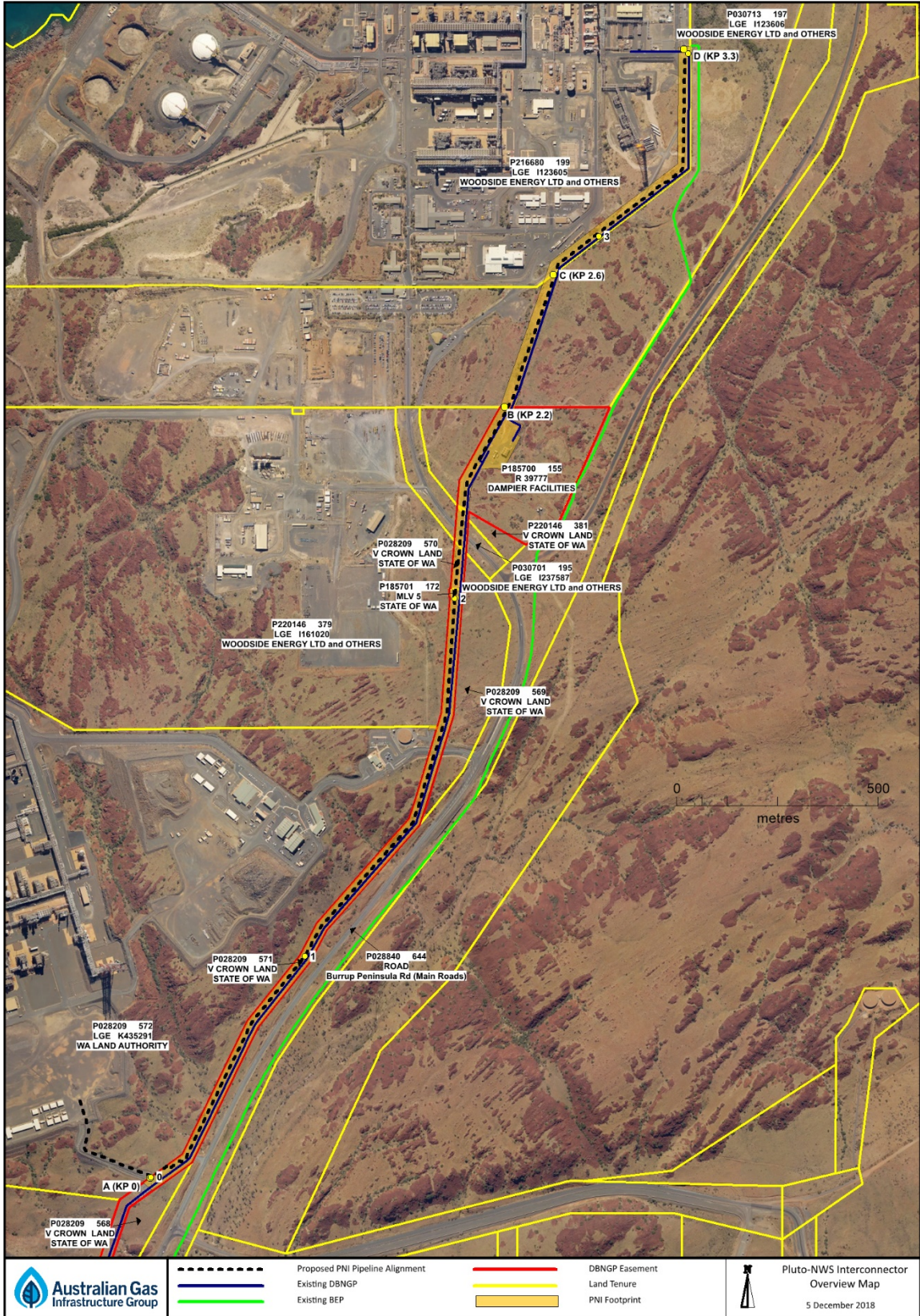
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APPENDIX A

Approximate Location Map



APPENDIX B

DBP Risk Policy and Matrix

AGIG OPERATIONAL RISK MATRIX

RISK MATRIX		Consequence				
		Trivial	Minor	Severe	Major	Catastrophic
Frequency	Frequent	Low	Intermediate	High	Extreme	Extreme
	Occasional	Low	Low	Intermediate	High	Extreme
	Unlikely	Negligible	Low	Intermediate	High	High
	Remote	Negligible	Negligible	Low	Intermediate	High
	Hypothetical	Negligible	Negligible	Negligible	Low	Intermediate

Consequence	Financial impact	People	Environment	Reputation/ Outage	Supply
Catastrophic	Would threaten DDG's survival Greater than \$10M	Two or more fatalities	Permanent, irreparable off site impact	International media	Long term interruption of supply
Major	Would threaten the effective operation of DDG for a substantial period \$5m - \$10m	Less than two fatalities More than four LTIs or MTIs	Long term, off-site impact or medium term impact within ESA	National media	Prolonged interruption; long term restriction of supply
Severe	Exposes DDG to unacceptable cost consequences \$2.5m - \$5m	Less than four LTIs or MTIs	Medium term offsite impact or short term impact within ESA	State media Widespread complaints	Short term interruption, prolonged restriction of supply
Minor	Issues are dealt with internally \$0.5m to \$2.5m	Injuries requiring first aid treatment	Short term offsite effect	Local media and complaints	Short term interruption; restriction of supply with shortfall met by other sources
Trivial	No significant impact on DDG Less than \$0.5m	Injuries not requiring first aid or other treatment	No offsite effect	Internal complaints and minor public nuisance	No impact; no restriction of pipeline supply

Frequency	Definition
Frequent	Event could reasonably be expected to occur eg manual handling injury, vehicle fauna strike and heat overexposure
Occasional	Event may occur from time to time eg vehicle accidents and snake bites
Unlikely	Event is not likely to occur eg diesel tank storage failure, fall from height
Remote	Event is not anticipated to occur eg vehicle collision causing pipeline rupture
Hypothetical	Event is theoretically possible but highly improbable eg. a sudden lightning strike (on an otherwise clear day) striking a communications tower when an officer is working from it causing electrocution.

Risk	Definition
Extreme	Modify the threat, the frequency, or consequence so that the risk is reduced to 'Intermediate' or lower. For an in-service pipeline the risk shall be reduced immediately.
High	Modify the threat, the frequency or consequence so that the risk is reduced to 'Intermediate' or lower. For an in-service pipeline the risk shall be reduced as soon as possible, typically within a timescale of not more than a few weeks.
Intermediate	Modify the threat, the frequency or consequence to reduce the risk rank to 'Low' or 'Negligible', if practicable (ie anything else that can reasonably be done to reduce the risk). Risk is tolerable if we have done all that can be reasonably called upon to further reduce the risk, but the risk remains largely the same. Document reasoning for the ALARP conclusion. For an in-service pipeline, the reduction to 'Low' or 'Negligible' or demonstration of ALARP shall be completed as soon as possible and typically within a timescale of not more than a few months.
Low	Determine the management plan for the threat to prevent occurrence and to monitor changes that could affect the classification.
Negligible	Review at the next review interval. Manage by routine procedures – reassess at next review.

Hazard Identification Tool

Gravity
Gravitational energy is the force caused by the attraction of all other masses to the mass of the Earth.
Examples: a falling object, a collapsing roof, a body tripping or falling

Motion
The change in position of objects or substances.
Examples: vehicle, vessel or equipment movement, flowing water, wind, body positioning, lifting, straining, or bending

Mechanical
The energy of the components of a mechanical system, i.e., rotation, vibration, or motion within an otherwise stationary piece of equipment or machinery.
Examples: rotating equipment, compressed springs, drive belts, conveyors, motors

Electrical
The presence and flow of an electric charge.
Examples: power lines, transformers, static charges, lightning, energized equipment, wiring, batteries

Pressure
Energy applied by a liquid or gas which has been compressed or is under a vacuum.
Examples: pressure piping, compressed cylinders, control lines, vessels, tanks, hoses, pneumatic and hydraulic equipment

Temperature
Temperature is the measurement of differences in the thermal energy of objects or the environment, which the human body senses as either heat or cold.
Examples: open flame and ignition sources, hot or cold surfaces, liquids or gases, friction, general environmental conditions, steam, extreme and changing weather conditions

Chemical
The energy present in chemicals that inherently, or through reaction, has the potential to create a physical or health hazard to people, equipment, or the environment.
Examples: flammable vapors, reactive hazards, carcinogens or other toxic compounds, corrosives, pyrophorics, combustibles, inert gas, welding fumes, dusts

Biological
Living organisms that can present a hazard.
Examples: animals, bacteria, viruses, insects, blood-borne pathogens, improperly handled food, contaminated water

Radiation
The energy emitted from radioactive elements or sources and naturally occurring radioactive materials.
Examples: lightning strikes, welding arc, X-rays, solar rays, microwaves, naturally occurring radioactive material (NORM) scale, or other non-ionizing sources

Sound
Sound is produced when a force causes an object or substance to vibrate—the energy is transferred through the substance in waves.
Examples: impact noise, vibration, high-pressure relief, equipment noise

Hazard:

A condition or action that has the potential for an unplanned release or, or unwanted contact with, an energy source that may result in harm or injury to people, property, or the environment.

Identify hazards at your workplace, analyzing each energy source with the Hazard Identification Tool.

APPENDIX C

PNI Environmental Aspects and Impacts Register

PNI Construction Environmental Aspects and Impacts Register

ID	EP Ref	Activity	Potential environmental impact	Mitigation Measures	Consequence	Likelihood	Risk Level
1	6.5	Daily commuting	Injury to fauna/stock through road strikes	Speed restrictions; licenced fauna handlers on site	Trivial	Occasional	Low
2	6.8		Dust emissions	Water trucks where required; visual observations; complaints response; speed restrictions	Minor	Unlikely	Low
3	6.7, 6.9		Landholder nuisance	Traffic management plan; monitor shire road closures; complaints response	Trivial	Unlikely	Negligible
4	6.4		Bushfire caused by vehicle parked on dry grass	Park vehicles away from long dry grass; restrict vehicle movements to within the cleared right of way or existing access tracks.	Severe	Remote	Low
5	6.3		Spread of weeds	All vehicles stick to established tracks or the cleared construction corridor	Minor	Unlikely	Low
6	6.13; 6.14	Chemical storage and handling	Refuelling spill resulting in contamination of local environment	Drip trays and spill kits; no refuelling within 100 m of watercourses;	Minor	Unlikely	Low
7	6.14		Failure of pressurised hoses resulting in contamination of local environment	Spill response kits; regular maintenance; tool box talks	Trivial	Frequent	Low
8	6.13; 6.14		Loss of containment of bulk fuel/odorant resulting in contamination of local environment	Bunding and spill kits; located away from watercourse; comply with AS1940	Severe	Remote	Low
9	6.15		Discharge of chemical/hydrocarbon waste resulting in contamination of local environment	Labelled, lidded bins; disposal to a licensed facility	Minor	Remote	Negligible
10	6.2, 6.11	Clear and Grade	Impacts on vegetation and flora	Use existing cleared areas where possible; Pre-clearing approvals and demarcation of approved clearing boundary	Minor	Remote	Negligible
11	6.2, 6.11		Loss of vegetation leading to increased erosion risk	Use existing cleared areas; Minimise the elapsed time between clearing, grading and restoration; erosion control structures; chemical suppressants if required	Minor	Remote	Negligible
12	6.2, 6.11		Disturbance to Declared Rare Flora	Pre-clearing approvals and demarcation of approved clearing boundary; no DRF identified	Severe	Hypothetical	Negligible

PNI Construction Environmental Aspects and Impacts Register

ID	EP Ref	Activity	Potential environmental impact	Mitigation Measures	Consequence	Likelihood	Risk Level
27	6.12		Disturbance of Acid Sulphate soils	Field investigations and sampling; treatment protocol	Minor	Unlikely	Low
28	6.8, 6.11		Dust exposure	Minimise the elapsed time between clearing, grading and restoration, refer to BOM forecasts and restrict vehicle speeds; water carts as required	Minor	Remote	Negligible
29	6.1	Drilling/boring	Soil erosion	Minimise the elapsed time between entry/exit pit clearing, grading, excavation and restoration; strategic stockpile location	Trivial	Unlikely	Negligible
30	6.1		Sedimentation	Minimise the elapsed time between entry/exit pit excavation and restoration; strategic stockpile location	Trivial	Unlikely	Negligible
31	6.12		Disturbance of acid sulphate soils	Field investigations and sampling; treatment protocol	Minor	Unlikely	Low
32	6.12		Contamination of surface and groundwater	Preferential use of thrust boring methods (i.e. no drill fluids required); use of water based drilling fluids only (where HDD is required); earthen bund around drill entry and exit points to capture accidental frac-out; sump at entry and exit points for drilling mud capture; stockpiling of dry cuttings in approved disturbance area for disposal at a licenced facility, constant fluid pressure monitoring to prevent surface frac-out.	Trivial	Unlikely	Negligible
33	6.15		Fauna entrapment	Minimise entry/exit open time; inspect and clear trapped fauna from entry/exit pit; install fauna egress and shelters at regular intervals	Minor	Unlikely	Low
34	6.10	Routine trench de-watering	Impact to native vegetation	Have erosion and sedimentation control; discharge to stabilised ground via low dispersion methods; comply with any applicable water quality standards	Trivial	Unlikely	Negligible
35	6.10		Reduced surface water quality	Do not discharge to surface water	Minor	Remote	Negligible
36	6.10	Dewatering	Impacts on watercourses, groundwater and surface waters	Discharge via sediment control structure (e.g. temporary holding basin); do not discharge directly to surface water; comply with any applicable water quality standards	Minor	Remote	Negligible
37	6.12		Disturbance of acid sulphate soils	Field investigations and sampling; treatment protocol	Trivial	Remote	Negligible
38	6.4	Stringing and Welding	Fire	Maintain equipment to standards, use spotters, comply with fire restrictions and ensure fire response equipment available	Severe	Remote	Low

PNI Construction Environmental Aspects and Impacts Register

ID	EP Ref	Activity	Potential environmental impact	Mitigation Measures	Consequence	Likelihood	Risk Level
39	6.5		Fauna entrapment	Welded pipeline sections shall be capped	Minor	Remote	Negligible
40	6.5		Restricted fauna movements	Leave appropriate spaces between strings to allow access particularly at stock crossings	Trivial	Unlikely	Negligible
41	6.5	Lowering-in and backfilling	Fauna entrapment	Trench inspection prior to backfill; welded pipeline sections shall be capped; fauna handlers	Minor	Remote	Negligible
42	6.3		Introduction of weeds	Any padding material brought in from off-site is to come from a clean area	Minor	Remote	Negligible
43	6.8		Dust exposure	refer to BOM forecasts; availability of water carts	Trivial	Occasional	Low
44	6.10	Hydro testing	Disposal of hydro test water causing erosion or sedimentation	Discharge rate shall be <32 L/s; diffusers to prevent erosion; filters to remove sediment particles	Minor	Remote	Negligible
45	6.10		Disposal of hydro test water causing contamination	No addition of chemicals to hydro test water unless approved by DMIRS; ensure no direct discharge to surface waters	Minor	Remote	Negligible
46	6.16	Clean-up and rehabilitation	Lack of vegetation can lead to erosion, sedimentation, visual amenity and alterations in hydrological regimes Disturbance to existing vegetation and faunal habitats	Rehabilitation completion criteria; topsoil respreading; monitoring success	Minor	Unlikely	Low
47	6.3		Spreading of weeds	Use topsoil from the local area for respreading; rehab criteria; monitoring	Minor	Unlikely	Low
48	6.8		Dust exposure	Minimise the elapsed time between clearing, grading and restoration, refer to BOM forecasts and control vehicle speeds	Minor	Remote	Negligible
49	6.13	Energy consumption	Generation of greenhouse gases	Minimise and monitor the consumption of fuel, educate workforce to promote fuel efficiency and minimise lighting	Trivial	Frequent	Low
50	6.5	Accommodation/ site offices	Attraction of non-native species	Utilise existing licenced accommodation facility; No pets permitted at site; no feeding fauna; all bins have lids; general housekeeping	Minor	Occasional	Low
51	6.5		Fauna disturbance by lighting	Minimise lighting at site offices	Trivial	Remote	Negligible
52	6.10		Discharge of sewage causing contamination of local environment	Utilise existing licenced accommodation facility; waste from temporary site ablutions managed by a licenced disposal facility	Minor	Remote	Negligible

PNI Construction Environmental Aspects and Impacts Register

ID	EP Ref	Activity	Potential environmental impact	Mitigation Measures	Consequence	Likelihood	Risk Level
53	6.15		Domestic waste litter	Segregation of recyclables; dedicated bins labelled and lidded; housekeeping inspections; collection and disposal by a licenced waste contractor	Trivial	Occasional	Low

