INPEX

Ichthys PROJECT

UMBILICALS, RISERS AND FLOWLINES (URF) INSTALLATION

Summary Environment Plan

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ACRONYMS AND ABBREVIATIONS

Acronym/abbreviation	Description
ALARP	as low as reasonably practicable
AMSA	Australian Maritime Safety Authority
BMP	biosecurity management plan
CASA	Civil Aviation Safety Authority
CMA	Commonwealth marine area
Contractor	McDermott Australia Pty Ltd
CPF	central processing facility
DEWHA	Department of Environment, Water, Heritage and the Arts
DoE	Department of the Environment (formerly DSEWPaC) (Cwlth)
DRET	Department of Resources, Energy and Tourism
DSEWPaC	Department of Sustainability, Environment, Water, Populations and Communities (Cwlth) – now Department of Environment (DoE) (Cwlth)
EP	environment plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPCI	engineering, procurement, construction and installation
FIS	filtered inhibited seawater
FLNG	floating liquefied natural gas
FPSO	floating production, storage and offtake
GEP	gas export pipeline
ha	hectare
HFO	heavy fuel oil
HSE-MS	health, safety and environment management system
HSES	health, safety, environment and security
IMO	International Maritime Organization
INPEX	INPEX Operations Australia Pty Ltd.

Acronym/abbreviation	Description
Ichthys Project	Ichthys Gas Field Development Project
km	kilometre
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973/1978
MEG	monoethylene glycol
MoU	memorandum of understanding
MSDS	material safety data sheet
NNTT	National Native Title Tribunal
NOHSC	National Occupational Health and Safety Commission
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NWMR	North-west Marine Region
NWSTF	North West Slope Trawl Fishery
ODS	ozone-depleting substances
OPGGS (E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OSCP	oil spill contingency plan
PMS	preventive maintenance system
RAAF	Royal Australian Air Force
ROV	remotely operated underwater vehicle
SOPEP	shipboard oil pollution emergency plan
URF	umbilicals, risers and flowlines
URF EP	INPEX *Umbilicals, Risers and Flowlines Installation Environment Plan*
WTBF	Western Tuna and Billfish Fishery

1 INTRODUCTION

1.1 Background

INPEX Operations Australia Pty Ltd (INPEX), on behalf of the Ichthys Upstream Unincorporated Joint Venture Participants intends to develop the Ichthys Field in the Browse Basin off the north-west coast of Western Australia to produce liquefied natural gas (LNG), liquefied petroleum gas (LPG) and condensate for export to markets in Japan and elsewhere.

The Ichthys Field is located within production licence WA-50-L, in the northern Browse Basin, approximately 210 km north-west off the coast of mainland Western Australia and 820 km south-west of Darwin. Gas from the Ichthys Field will undergo preliminary processing on an offshore central processing facility (CPF) to remove water and raw liquids, including the greater part of the condensate. This condensate will be pumped to a nearby floating production, storage and offtake (FPSO) vessel, from which it will be transferred to tankers for export to overseas markets. The gas will be transferred from the CPF via an 889 km gas export pipeline (GEP) to an onshore liquefied natural gas (LNG) processing plant at Blaydin Point in Darwin (Figure 1-1).

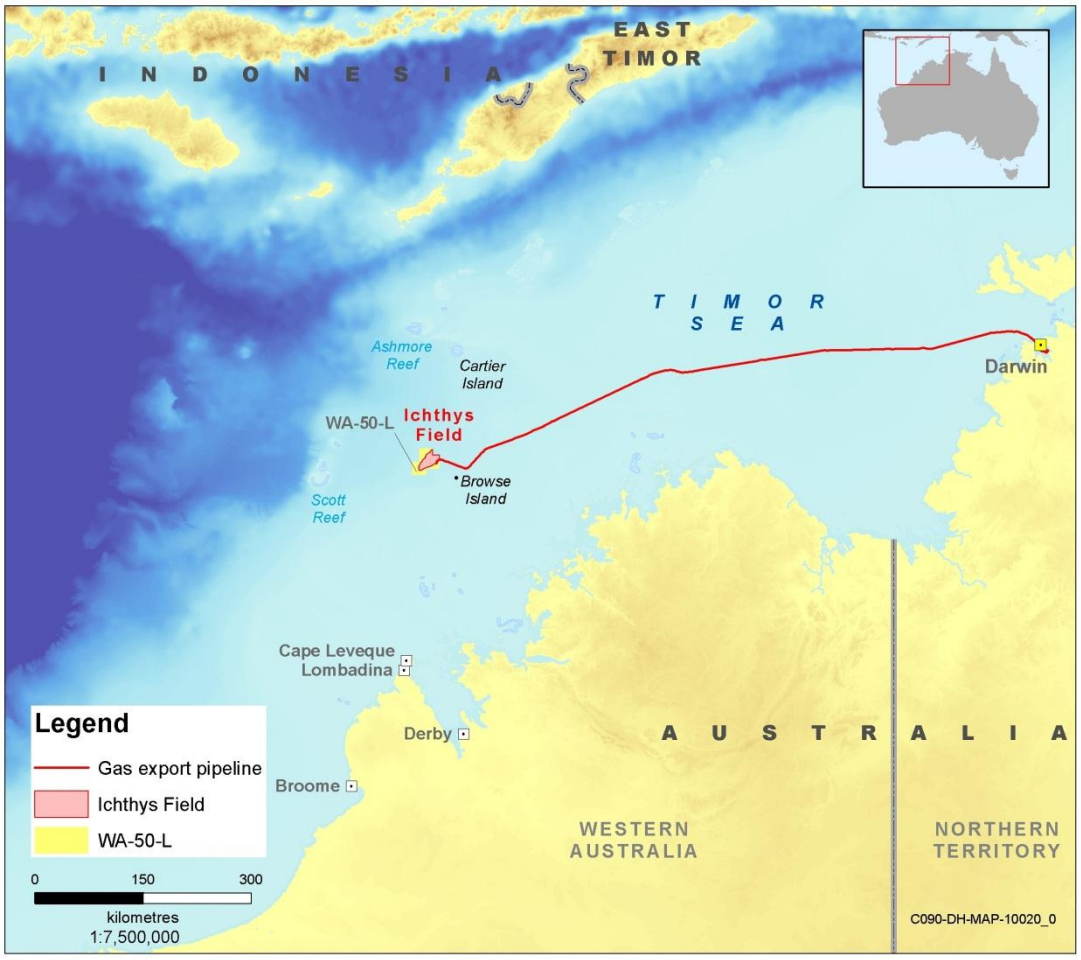


Figure 1-1: Location of the Ichthys Field

Construction and installation activities for the Ichthys Project will occur in several work packages. The umbilicals, risers and flowlines (URF) work package includes the installation of the URF infrastructure and associated works which will occur within a defined area of WA-50-L (URF Activities).

McDermott Australia Pty Ltd. (the Contractor) has been awarded the engineering, procurement, construction and installation (EPCI) contract by INPEX for the URF work package. Heerema Marine Contractors Australia Pty Ltd is the Prime Subcontractor and will undertake a significant proportion of the installation scope of work.

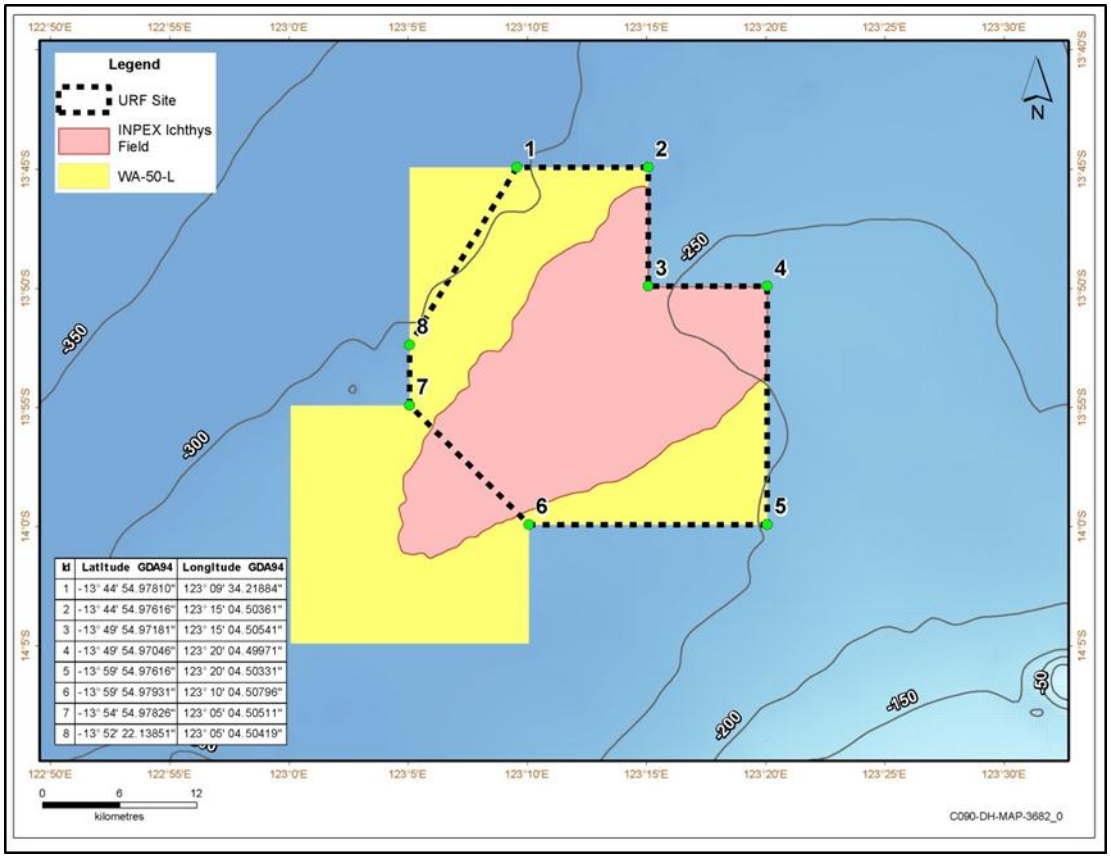
This document provides a summary of the INPEX *Umbilicals, Risers and Flowlines (URF) Installation Environment Plan* (URF EP), applicable to URF Activities, that was accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in accordance with Regulation 11(1) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E) Regulations) and Amendment Regulations 2011. This document has been prepared as per the requirements of Regulation 11(7–8) of the OPGGS (E) Regulations.

2 DESCRIPTION OF THE ACTIVITY

2.1 Location of the activity

The URF Site (Figure 2-1), where the URF Activities will take place, is located wholly within petroleum production licence WA-50-L. The URF Site is defined by the footprint of the URF infrastructure and includes a buffer area within which activities associated with the installation will occur.

The total footprint of the URF infrastructure will be less than 20 hectares (ha), which includes the temporary disturbance footprint from either temporary storage or laydown areas on the seabed for equipment awaiting hook-up.



Id	Latitude GDA94	Longitude GDA94
1	-13° 44' 54.97810"	123° 09' 34.21884"
2	-13° 44' 54.97616"	123° 15' 04.50361"
3	-13° 49' 54.97181"	123° 15' 04.50541"
4	-13° 49' 54.97046"	123° 20' 04.49971"
5	-13° 59' 54.97616"	123° 20' 04.50331"
6	-13° 59' 54.97931"	123° 10' 04.50796"
7	-13° 54' 54.97826"	123° 05' 04.50511"
8	-13° 52' 22.13851"	123° 05' 04.50419"

Figure 2-1: URF Site boundary

2.2 URF installation activities description

The scope of work for the URF package includes the installation and pre-commissioning of subsea flowlines, support structures and control systems, and the connection of these systems to other offshore components. The URF program also includes the installation of the moorings for the CPF and FPSO and the connection of both facilities to their mooring systems.

The URF Activities will involve a number of Contractor and Prime Subcontractor installation and support vessels.

Specific URF Activities include:

- survey activities comprising:
  - installation of temporary subsea positioning systems

  - pre-installation, as-laid and as-constructed surveys
- installation of subsea structures
- installation of the FPSO and CPF moorings (anchors, chains and wires) and their subsequent connection to the FPSO and CPF. Anchors will be driven piles.
- installation of subsea flowlines and risers (flowlines are called risers when they are between the seabed and the CPF or FPSO)
- tie-ins between subsea equipment (installation of spools and jumpers), including tie-in to the wellhead christmas trees at the drilling centres which will be installed by other packages of the Ichthys Project
- installation and subsea connection of umbilicals (electric and hydraulic control cables) and flying leads (umbilicals are called dynamic umbilicals when they are between the seabed and the CPF or FPSO)
- installation of power and communications cables
- mechanical completion and pre-commissioning of subsea umbilicals, risers, flowlines and control systems
- support activities, including equipment transfers, refuelling, crew transfers, and transfer of waste and general supplies (when in the URF Site).

Key subsea infrastructure is shown in Figure 2-2.

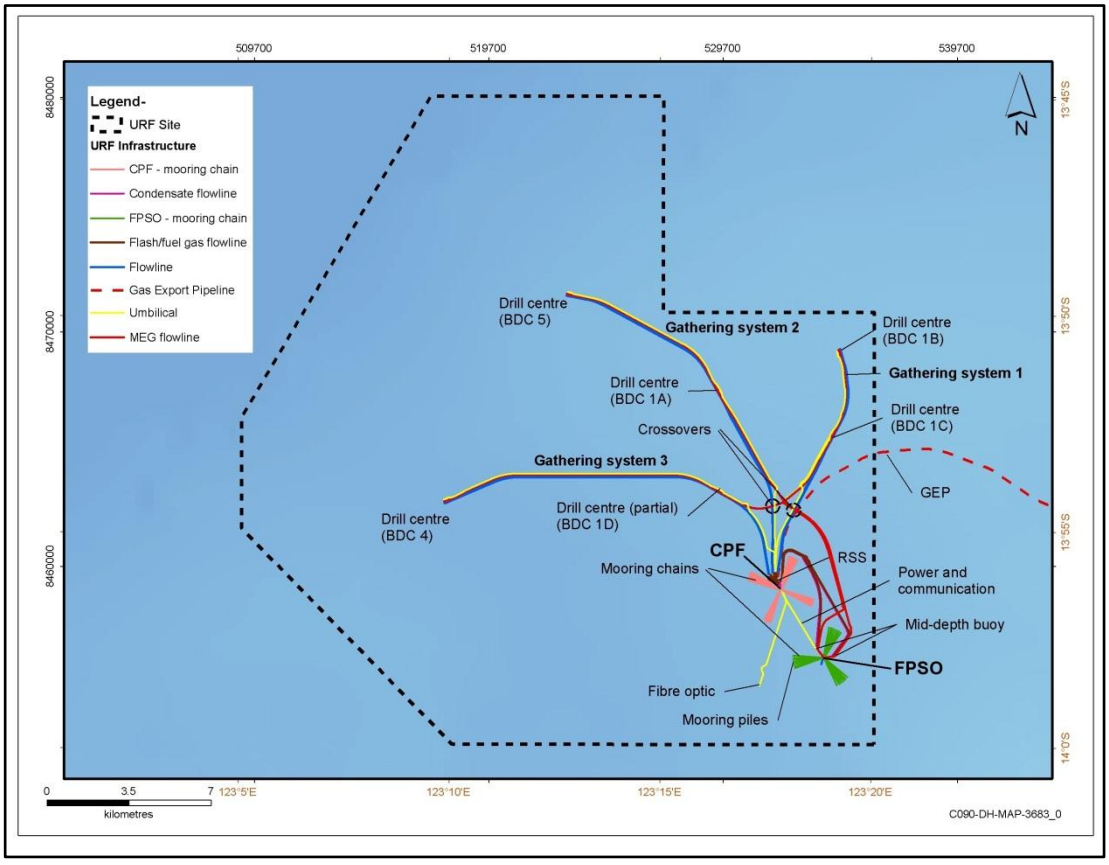


Figure 2-2: URF Infrastructure layout showing key components

2.3 Timing of the activity

URF Activities are scheduled to be performed from May 2014 to the fourth quarter of 2017. The majority of the offshore installation work is expected to take place from June 2014 to May 2016, a period of approximately 24 months. Short campaigns, consisting of drill centre tie-ins, will be performed between June 2016 and the third quarter of 2017. Mooring anchors and mooring chains are scheduled to be installed over a five-month period in the first half of 2015, in advance of the arrival of the FPSO and CPF at the URF Site.

Note that the planned schedule may be affected by delivery dates of equipment and weather conditions (e.g. cyclones and rough seas).

3 DESCRIPTION OF ENVIRONMENT

3.1 Physical environment

The URF Site lies in the North-west Marine Region (NWMR), specifically within the Timor Province bioregion. The climate in the project area is monsoonal with two distinct seasons: summer (October to March); and winter (April to September). Air temperatures at the URF Site remain warm throughout the year, with monthly average means and maximums ranging from between 25–35 °C and 32–35 °C respectively (Waples 2007). Peak rainfall occurs from December to March. The seabed depth at the URF Site drops generally from east to west with depths of 245 m in the east, to around 320 m in the north-west corner.

The primary ocean current is the Indonesian Throughflow, which drives cooler oceanic water in a southerly direction. Regional surface currents show a strong tidal influence with a net westward drift during the monsoon season and a net eastward drift during the dry season.

3.2 Biological environment

Surveys conducted by INPEX, within the Ichthys Field, found infauna and benthic communities were largely determined by substrate type and water depths. Given the great depths and lack of light penetration at the seabed, no primary producing organisms were recorded within the URF Site. Both species richness and abundance of individuals decreased with increasing distance from land and with increasing water depth (INPEX 2010).

The deeper areas are generally supported by very sparse benthic communities. The central portion of the URF Site is located in about 250 m water depth. Very few species of epibenthic organisms are present and the benthic community is comprised primarily of dispersed small gorgonians, sponges and tube worms. The benthic habitat within the URF Site was considered homogeneous within the region, with benthic epifauna generally found to be sparse, scattered and representative of taxa which are characteristic and widespread in the region. The benthic infaunal communities were dominated by the polychaete bristleworms typical of soft sediment habitats (Woodside 2011)

Browse Island is the nearest intertidal habitat, located approximately 26 km south-east of the closest point of the URF Site. The island is an isolated sandy cay surrounded by an intertidal reef platform and shallow fringing reef. It is registered by the WA state government as a Class C nature reserve, supporting a green turtle rookery and foraging area for migratory shorebirds that visit the region from the northern hemisphere (Clarke 2010).

A number of shoals and reefs exist within the Browse Basin. At their closest points, Echuca Shoal and Heywood Shoal are located approximately 63 km east and 100 km north-east of the URF Site boundary respectively. Both shoals are permanently submerged and dominated by a reef platform comprising hard and soft corals, feather stars, sea whips, sponges, sea fans and occasional echinoderms (INPEX 2010).

There are no marine conservation areas within, or immediately surrounding, the URF Site. The closest marine reserves to the URF Site are Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve, approximately 166 km and 138 km north of the closet point of the URF Site, respectively. Both Ashmore Reef and Cartier Island support significant populations of feeding and nesting marine turtles and a high abundance and diversity of seasnakes. Ashmore Reef has a high coverage of seagrass that supports a small dugong population (Department of Environment, Water, Heritage and the Arts (DEWHA) 2008). Hibernia Reef is located approximately 196 km north of the closest point of the URF Site and while it is part of the same group as Ashmore Reef and Cartier Island, it does not form part of the Ashmore Reef and Cartier Island external territory of Australia.

The closest coral reef habitats to the URF Site are Seringapatam Reef and Scott Reef, approximately 118 km and 127 km respectively. These scleractinian coral reefs are classified as regionally important for their high diversity, endemic species and are both important staging areas for migratory shorebirds and foraging areas for seabirds. Sandy Islet represents the only sandy habitat at Scott Reef and is a significant nesting site for green turtles (Woodside 2011).

The Department of the Environment (DoE as of 18 September 2013; formerly the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)) Protected Matters database identifies a total of 10 “Threatened” species and 17 “Migratory” species that potentially use the URF Site and areas within a 5 km buffer of the site (Table 3-1). A search of the database did not identify any “Threatened Ecological Communities”. In addition, the search identified 52 “listed marine species” and 20 “whales and other cetaceans” that may occur at, or immediately adjacent to, the URF Site. Table 3-1 provides a summary of listed species in the *Environmental Protection and Biodiversity and Conservation Act 1999* (EPBC Act) identified in the Protected Matters database search.

No known breeding grounds or sensitive habitat environments critical to the species listed in Table 3-1 are known to exist within, or adjacent to, the URF Site.

Table 3-1: Species listed under EPBC Act that may occur within, adjacent to, or migrate through the URF Site and buffer zone

Common name	Scientific name	Threatened status	Migratory status
Cetaceans			
Blue whale	*Balaenoptera musculus*	Endangered	Migratory
Humpback whale	*Megaptera novaeangliae*	Vulnerable	Migratory
Antarctic minke whale	*Balaenoptera bonaerensis*	–	Migratory
Bryde's whale	*Balaenoptera edeni*	–	Migratory
Killer whale	*Orcinus orca*	–	Migratory
Sperm whale	*Physeter macrocephalus*	–	Migratory
Marine turtles			
Loggerhead turtle	*Caretta caretta*	Endangered	Migratory
Green turtle	*Chelonia mydas*	Vulnerable	Migratory
Leatherback turtle	*Dermochelys coriacea*	Endangered	Migratory
Hawksbill turtle	*Eretmochelys imbricata*	Vulnerable	Migratory
Olive ridley turtle	*Lepidochelys olivacea*	Endangered	Migratory
Flatback turtle	*Natator depressus*	Vulnerable	Migratory
Sharks			
Whale shark	*Rhincodon typus*	Vulnerable	Migratory
Shortfin mako	*Isurus oxyrinchus*	–	Migratory
Longfin mako	*Isurus paucus*	–	Migratory
Marine birds			
Australian lesser noddy	*Anous tenuirostris melanops*	Vulnerable	
Streaked shearwater	*Calonectris leucomelas/Puffinus leucomelas*	–	Migratory

3.3 Socio-economic and cultural environment

Although the URF Site is situated within the Commonwealth marine area (CMA), it is not located within, or adjacent to, any Commonwealth marine reserves, Western Australian marine parks, Ramsar "Wetlands of International Importance", Indigenous heritage sites, Commonwealth Heritage Places, National Heritage places, World Heritage Sites or maritime heritage sites.

At present, there are no oil and gas production facilities in operation within the Browse Basin (Department of Resources, Energy and Tourism (DRET) 2013); however, with a number of companies holding petroleum permits, the region is subject to considerable exploration activity. Current construction activities being undertaken include Shell developing Prelude, a floating liquefied natural gas (FLNG) project; Woodside developing its Browse LNG development, encompassing the Torosa, Brecknock and Calliance fields; and the Nexus development of the Crux gas field.

The Port of Broome is the closest major port to the URF Site, approximately 465 km to the south. The main shipping channel is to the north-west of the URF Site with smaller pockets of activity, likely attributed to the movement of supply vessels supporting offshore oil and gas activity in the region.

A wide range of recreational activities occur within the NWMR. It is possible that recreational vessels will transit through the URF Site, although the likelihood of this is low because of its offshore location and lack of features of interest. The URF Site is unlikely to be used for recreational fishing activities.

The traditional Indonesia fishing area covered by the memorandum of understanding (MoU) signed between the governments of Australia and Indonesia permits traditional Indonesian fishing practices in the region. This includes Scott Reef and associated reefs, including Seringapatam Reef, Browse Island, Ashmore Reef, Cartier Island and various banks. As the URF Site is located within the MoU traditional fishing area, it is possible that some Indonesian traditional fishing vessels will transit through the URF Site when travelling between Scott Reef and Browse Island (although their presence in the area is expected to be low).

The URF Site and surrounds are used by two Commonwealth-managed commercial fisheries, the North West Slope Trawl Fishery (NWSTF) and the Western Tuna and Billfish Fishery (WTBF). Two state-managed commercial fisheries overlap the URF Site, the Mackerel Managed Fishery and the Northern Demersal Scalefish Managed Fishery.

The Royal Australian Air Force (RAAF) Base Curtin air-to-air weapons range training area is located approximately 100 km south-west of the URF Site. Under the Commonwealth *Airspace Act 2007*, the Department of Defence can request the Civil Aviation Safety Authority (CASA) to declare the airspace prohibited or restricted at times. In such cases, CASA specifies the timing and the boundaries of the restricted area. Helicopter transfers of personnel between Broome and the URF Site will comply with any restrictions of movement in airspace and flights may be rescheduled or rerouted when necessary.

4 ENVIRONMENTAL HAZARDS AND CONTROLS

INPEX has a risk management process to guide activities and ensure they are undertaken such that risks and impacts are managed to 'as low as reasonably practicable' (ALARP) levels. A risk assessment has been undertaken for all URF Activities in accordance with INPEX procedures as well as the procedures outlined in the Australian and New Zealand Standards *AS/NZS ISO 31000:2009, Risk management – Principles and guidelines*.

The key environmental hazards and control measures which will be applied during the URF Activities are provided in Table 4-1. These are consistent with the INPEX corporate and project-specific environmental performance objectives, standards and measurement criteria. The control measures associated with the hazards will be implemented to reduce environmental risks to ALARP and to an acceptable level.

Table 4-1: Key environmental hazards and control measures

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
Seabed disturbance		
Planned and unplanned placement of equipment on the seabed	• temporary and permanent loss of benthic habitat and associated infauna and epifauna • temporary increase in suspended sediment and sedimentation	• Planned seabed disturbances will be less than 20 ha. • Long baseline arrays will be used to accurately position URF infrastructure within the design tolerance corridor. • Unplanned laydowns of equipment will be avoided by adherence to: – specific quality assurance and control checks – testing and factory-acceptance testing to confirm all components fit together as designed before being deployed to site – a pre-installation survey to avoid seabed features, such as debris, rocks or large sand waves. • Equipment transfers will only be performed in calm waters or postponed until sea conditions are acceptable. • Lifts will be undertaken in accordance with specific procedures, including pre-lift checks of equipment and safety briefings before critical lifts. • Weather-tracking procedures will be implemented to reduce the potential for equipment laydown due to cyclones or otherwise unsuitable weather.
Atmospheric emissions		
Atmospheric emissions from combustion of fuel or incineration of waste interacting with air quality.	• contribution to global greenhouse gases • reduction in local air quality	• All vessels will comply with specific controls, as required by *Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution* (as appropriate to vessel class). • In accordance with *Marine Orders – Part 95: Marine Pollution Prevention – Garbage*, the type and volume of garbage incinerated will be recorded in vessels' garbage record books. • All vessels will comply with the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* and the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 in regard to ozone-depleting substances (ODS).

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
Physical presence		
Physical presence within the URF Site of: • construction and installation vessels, support vessels, tugs and barges • URF infrastructure and installation equipment.	• interference with other marine users • interference with the behavioural patterns of marine fauna • potential for marine fauna collisions causing death or injury • entanglement and subsequent injury or death of marine fauna • colonisation of infrastructure by mobile and sessile fauna through the creation of artificial habitat	• INPEX will continue to implement a stakeholder engagement program to verify that all contactable stakeholders are aware of the URF Activities. • Vessels will comply with the *Navigation Act 2012* (as appropriate to vessel class); specifically, the Australian Maritime Safety Authority (AMSA) maritime safety/navigation procedures which include the issuing of a Notice to Mariners, advising of the planned activities and safety zones which will be in place. • Use of lights and signals in accordance with *Marine Orders – Part 30: Prevention of Collisions*, Issue 8. • Vessels will comply with EPBC Regulations 2000 – Part 8, Division 1 *Interacting with cetaceans*. • All bridge crew will undergo marine fauna recognition and record training during inductions. Vessel masters and helicopter pilots will also attend marine fauna interaction training. • The Contractor will implement procedures for the use of remotely operated underwater vehicles (ROVs) which will minimise the risk of fauna entanglement.
Biosecurity incursion		
Introduction and establishment of invasive marine and terrestrial species	• reduction in species biodiversity of surrounding environment • displacement of native marine species • socio-economic impacts on commercial resources, e.g. fisheries	• All vessels being mobilised from outside Australia to the URF Site will comply with the following specific requirements of the *Australian Ballast Water Management Requirements – Version 5*: – foreign ballast water will only be exchanged more than 12 nautical miles from Australian land and in waters greater than 200 m in depth. – ballast water exchange records will be maintained, including ballast water record books (as appropriate to vessel class) in accordance with International Maritime Organization's (IMO's) International Convention for the Control and Management of Ships' Ballast Water and Sediments. • All vessels being mobilised from outside Australia will comply with the following specific requirements of the *National Biofouling Management*

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
		Guidance for the Petroleum Production and Exploration Industry: – a biofouling risk assessment will be conducted for each vessel – the implementation of management measures based on the outcomes of the biofouling risk assessment which are commensurate with the risk. • Implementation and adherence to additional controls, including ballast water exchange restrictions and avoidance of direct hull-to-hull contact between vessels. • All vessels being mobilised from outside Australia will comply with the IMO's International Convention on the Control of Harmful Anti-fouling Systems on Ships. • A biosecurity management plan (BMP) will be developed by the Contractor for ratification by the Department of Agriculture.
Waste generation and handling		
Improper management of hazardous and non-hazardous waste	• injury or death of marine biota (by ingestion or entanglement with litter) • temporary and localised reduction in water quality leading to toxic effects on marine biota (by ingestion or contact with hazardous wastes)	• All vessels with onboard incinerators will comply with *Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution* (MARPOL 73/78, Annex VI, Regulation 16). • All vessels will comply with the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* – Parts IIIA and IIIC. • All vessels will comply with *Marine Orders – Part 94: Marine Pollution Prevention – Packaged Harmful Substances*. • All vessels will comply with the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and *Marine Orders – Part 95: Marine Pollution Prevention – Garbage*. • All vessels will comply with MARPOL 73/78, Annex III, Regulation 4 and *Marine Orders – Part 41: Carriage of Dangerous Goods*. • Packaging waste minimisation will be included in the tendering process for vessel catering contractors. • INPEX has submitted a URF offshore waste management plan to the DoE which incorporates the above listed controls. INPEX will implement any additional controls that arise through the approval process with the DoE which are relevant to the scope of the INPEX *Umbilicals, Risers and*

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
		Flowlines (*URF) Installation Environment Plan* (E075-AH-PLN-10000) (URF EP).
Light emissions		
Light emitted from vessels	• disorientation or mis-orientation of turtle hatchlings on Browse Island • localised attraction of marine fauna, in particular, plankton, squid, seabirds and fish	• Installation vessels will be fitted with high-pressure sodium-vapour lamps in working lights where safety requirements permit.
Routine vessel discharges to the marine environment		
Routine discharges of vessel liquid wastes to the marine environment	• increase in nutrient availability, leading to phytoplankton blooms • increase in biochemical oxygen demand • microbial pollution • toxicity effects on marine flora and fauna • decline in water quality associated with lowered dissolved oxygen concentrations as a result of elevated water temperature. • reduction in water quality leading to toxic effects on coral, phytoplankton, zooplankton, larval and adult fish.	• All vessels will comply with *Marine Orders – Part 96: Marine Pollution Prevention – Sewage* (as appropriate to vessel class) which prescribes regulatory requirements for sewage discharge within 12 nautical miles of land (note that the URF Site is more than 12 nautical miles from land). • Where activities permit, vessels will comply with *Marine Orders – Part 95: Marine Pollution Prevention – Garbage* which prescribes regulatory requirements for the discharge of food waste within 12 nautical miles of land (note that the URF Site is more than 12 nautical miles from land). • Vessels will minimise the temperature of cooling water discharges by maintaining all engines and machinery cooled by seawater intake in accordance with the vessels' preventive maintenance systems (PMSs). • All vessels will comply with *Marine Orders – Part 91: Marine Pollution Prevention – Oil* which addresses the disposal of bilge water and deck drainage. • All vessels will comply with *Marine Orders – Part 95: Marine Pollution Prevention – Garbage* which addresses the discharge of deck and external surfaces washdown water. • All chemicals will be packaged, marked, labelled and stowed in accordance with MARPOL 73/78, annexes I, II and III. • Material safety data sheets (MSDSs) will be held on board for any hazardous substances on vessels, as required by the National Occupational Health and Safety Commission (NOHSC): *Approved Criteria for Classifying Hazardous Substances* (NOHSC: 1008; 2004).

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
		• INPEX has submitted a URF liquid discharge management plan to the DoE which incorporates the above listed controls. INPEX will implement any additional controls that arise through the approval process with DoE which are relevant to the scope of the URF EP.
Preservation media discharge		
Discharges of filtered inhibited seawater (FIS) and monoethylene glycol (MEG)	• physiological and behavioural effects on fauna from localised changes to the temperature or salinity • suffocation (anoxia) of fauna leading to injury or death • toxic effects on flora and fauna from the chemical biocide, oxygen scavenger, dye and MEG	• The FIS treatment chemicals shall be selected to be gold or silver under the Chemical Hazard and Risk Management (CHARM) assessment tool. • Hydrotesting and dewatering activities will be in compliance with the defined procedures detailing the concentration levels for the treatment of seawater, rates of discharges and the use of diffusers • Flowline installation activities will be undertaken to minimise the risk of damaging the pipeline which could result in unplanned emissions of FIS • INPEX has submitted a URF liquid discharge management plan to the DoE which incorporates the above listed controls. INPEX will implement any additional controls which arise through the approval process with DoE which are relevant to the scope of the URF EP.
Incidental release of grease, wax or grout		
Incidental release of grease, wax or grout during URF Activities	• localised decline in water and sediment quality • localised toxic or physical effects on fauna • persistence of substances in the marine environment (localised pollution)	• All lubrication of blocks and cables on vessels will be undertaken as specified in the Contractor's PMS. • Grouting operations will not result in more than 50 m^3 surplus of grout reaching the marine environment for specific operations. • Hydraulic media, grease and wax products which will be released to the marine environment will be selected to be gold or silver under the CHARM assessment tool. • INPEX has submitted a URF liquid discharge management plan to the DoE which incorporates the above listed controls. INPEX will implement any additional controls which arise through the approval process with DoE which are relevant to the scope of the URF EP.

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
Generation of underwater noise		
Generation of underwater noise from URF Activities	• barotrauma • hearing loss which may be caused by a temporary threshold shift or a permanent threshold shift • behavioural disturbance to sensitive marine fauna	• Vessels will comply with EPBC Regulations 2000 – Part 8, Division 1 *Interacting with cetaceans*. • All bridge crew will undergo marine fauna recognition and record training during inductions. Vessel masters and helicopter pilots will also attend marine fauna interaction training. • Noise levels will be monitored at the boundary of the Kimberley humpback whale calving area at the start of the piling campaign (for the installation of CPF and FPSO mooring anchors) • Piling activity will be planned to occur outside of the period 1 July to 31 October. • All piling activities will comply with the Government of South Australia's *Underwater Piling Noise Guidelines* (DPTI, 2012). • INPEX will implement any additional management controls which relate to the generation of underwater noise from the URF Activities and arise through approval processes with the DoE.
Oil spill scenario 1 – vessel-to-vessel collision (200 m^3 marine diesel)		
Surface release of 200 m^3 of marine diesel as a result of a vessel-to-vessel collision	• temporary and localised reduction in water quality leading to toxic effects on marine biota • potential oiling of marine wildlife	• URF Activities will comply with OPGGS (E) Regulations with respect to stakeholder engagement, specifically: – advising stakeholders of the nature and timing of URF Activities – entering into a memorandum of understanding (MoU) with the Australian Maritime Safety Authority (AMSA) regarding proposed roles during a spill event – providing AMSA with a copy of the accepted URF oil spill contingency plan (URF OSCP). • The installation vessel which will install a large diameter rigid flowline will have an accepted safety case in place in line with the OPGGS (Safety) Regulations 2009, which define processes for establishing and maintaining a safety zone around the vessel when it is laying pipe. • Interactions between Ichthys Project vessels in the URF Site will be coordinated using a series of controls focussed on communication, speeds,

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
		approaches and distances. • All vessels will comply with the training requirements of the *Navigation Act 2012*, *Marine Orders – Part 6: Marine Radio Qualifications*. • All vessels will comply with the communication and navigation equipment requirements of the *Navigation Act 2012*, *Marine Orders – Part 6: Marine Radio Qualifications* and *Marine Orders – Part 27; Radio Equipment* (as appropriate to vessel class). • All vessels will comply with the *Navigation Act 2012, Marine Orders – Part 21: Safety of Navigation and Emergency Procedures* (as appropriate to vessel class). • All vessels will comply with the *Navigation Act 2012*, *Marine Orders – Part 30: Prevention of Collisions*, which gives effect to the Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGs) (as appropriate to vessel class). • All vessels will comply with *Marine Orders – Part 91: Marine Pollution Prevention – Oil* and MARPOL 73/78, Annex I (as appropriate to vessel class). • All vessels 300 GT and above will have an AIS transponder, as required by the International Convention for the Safety of Life at Sea (SOLAS Convention), 1974 Regulation 19 (Chapter V) *Carriage requirements for shipborne navigational systems and equipment*, that sends out digital radio messages identifying the vessel and provides its position, course and speed. • All vessels will implement the URF OSCP in the event of a spill to the marine environment.
Oil spill scenario 2 – vessel-to-vessel collision (100 m^3 heavy fuel oil)		
Surface release of 100 m^3 of heavy fuel oil (HFO) as a result of a vessel collision	• temporary and localised reduction in water quality leading to toxic effects on marine biota • potential oiling of marine wildlife	• URF Activities will comply with OPGGS (E) Regulations, specifically: – implementing a stakeholder engagement procedure – entering into an MoU with AMSA regarding proposed roles during a spill – providing AMSA with a copy of the accepted URF OSCP. • Interactions between Ichthys Project vessels in the URF Site will be

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
		coordinated using a series of controls focussed on communication, speeds, approaches and distances. • All vessels will comply with the training requirements of the *Navigation Act 2012*, *Marine Orders – Part 6: Marine Radio Qualifications*. • All vessels will comply with the communication and navigation equipment requirements of the *Navigation Act 2012*, *Marine Orders – Part 6: Marine Radio Qualifications* and *Marine Orders – Part 27: Radio Equipment* (as appropriate to vessel class). • All vessels will comply with the *Navigation Act 2012*, *Marine Orders – Part 21: Safety of Navigation and Emergency Procedures* (as appropriate to vessel class). • All vessels will comply with the *Navigation Act 2012*, *Marine Orders – Part 30: Prevention of Collisions*, which gives effect to the COLREGS (as appropriate to vessel class). • All vessels will comply with *Marine Orders – Part 91: Marine Pollution Prevention – Oil* and MARPOL 73/78, Annex I (as appropriate to vessel class). • All vessels 300 GT and above will have an AIS transponder, as required by SOLAS Regulation 19 (Chapter V) *Carriage requirements for shipborne navigational systems and equipm*ent, that sends out digital radio messages identifying the vessel and provides its position, course and speed. • All vessels will implement the URF OSCP in the event of a spill to the marine environment.
Oil spill scenario 3 – equipment failure (2 m^3 hydraulic fluid at the seabed)		
Subsurface release of 2 m^3 of hydraulic fluid as a result of hydraulic hose failure on pile driving hammer	• temporary and localised reduction in water quality leading to toxic effects on marine biota • potential oiling of marine wildlife	• All hammer hydraulic hoses will be visually inspected before each deployment and repair/replacement will be undertaken as necessary. • Vessels will implement the URF OSCP in the event of a spill to the marine environment.

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
Oil spill scenario 4 – at-sea fuel bunkering (2.5 m^3 marine diesel)		
Surface release of 2.5 m^3 of marine diesel as a result of a bunkering spill	• temporary and localised reduction in water quality leading to toxic effects on marine biota • potential oiling of marine wildlife	• Compliance with *Marine Orders – Part 91: Marine Pollution Prevention – Oil* and MARPOL 73/78, Annex I • Bunkering at the URF Site will only occur during daylight hours. • Vessels will implement the URF OSCP in the event of a spill to the marine environment.
Implementation strategy administration		
Poor environmental awareness	• various environmental impacts dependent on the nature of the non-conformance action or incident	• INPEX and the Contractor will comply with the requirements of OPGGS (E) Regulations 2009 – Regulation 14(5): – INPEX training matrix and Contractor training plan shall be developed before the start of URF Activities and will define minimum qualifications. The training matrix and training plan will be reviewed annually. – Inductions will be provided to all employees before work at the URF Site. Induction will include measures to verify that employees/contractors are aware of their responsibilities in relation to the URF EP. – Before the start of any task (with the exception of the most routine, e.g. cleaning decks, painting bulkheads, cleaning tools) a pre-start meeting will be held and any potential environmental issues and planned controls shall be discussed. – Emergency response training and drills will be performed.
Failure to monitor and audit environmental performance	• various environmental impacts dependent on the nature of the non-conformance action or incident	• Contractor-led and INPEX-led environmental audits will be conducted. • Contractor and INPEX offshore HSES advisers will conduct weekly inspections of the installation vessels. • The Contractor will monitor and record a range of parameters applicable to the URF Activities. • The Contractor and INPEX will record and manage the timely closeout of corrective and preventive actions which have arisen from audit and inspection.

Source of risk (hazard)	Potential environmental impact	Management and mitigation measures
Failure to manage non-conformance	• repeat environmental events leading to a variety of potential environmental impacts	• INPEX and the Contractor will implement procedures for reporting and investigation of environmental events (incidents and potential incidents).
Failure to assess environmental risks and impacts associated with amendments to URF Activities.	• various environmental impacts dependent on the nature of the amendments	• INPEX and the Contractor will perform a risk assessment process for amendments to URF Activities (amended from those presented in the URF EP). • The risk assessment process will evaluate the likely environmental impacts and risks associated with the amendment to verify that risks and impacts remain ALARP and at an acceptable level, and whether a revised version of the URF EP is required.

5 MANAGEMENT APPROACH

The Project will be managed in accordance with the INPEX *Umbilicals, Risers and Flowlines* (*URF) Installation Environment Plan* (URF EP) accepted by NOPSEMA under the OPGGS (E) Regulations, other relevant environmental legislation and the INPEX *Environment Policy* dated January 2012.

The URF EP contains an implementation strategy in accordance with Regulation 14 of the OPGGS (E) Regulations 2009.

The key components of the implementation strategy are:

1. Plan: details legal and other standards and guidelines applicable to the URF Activities; describes how URF Activities will be managed such that risks are ALARP; and outlines processes of risk identification and management.
2. Do: details organisation and resources; roles and responsibilities; communication processes; and training and competency measures. The 'do' component also details the INPEX emergency response framework and event management process; including the NOPSEMA-approved URF OSCP and the Contractor's SOPEP; cyclone response and emergency response training; and provides details of INPEX document control procedures.
3. Check: details how compliance with the requirements of the URF EP will be monitored by the implementation of pre-mobilisation checks, ongoing audits, and weekly HSES inspections. In addition, the 'check' component details the monitoring of emissions and discharges and the management of non-conformance.
4. Act: provides for a management review of the Project's environmental performance and details the process of updating the URF EP.

The implementation of the URF EP will be in accordance with, and supported by, the INPEX and Contractor's health, safety and environment management systems (HSE-MSs).

6 CONSULTATION

INPEX has applied the stakeholder engagement processes, procedures and guidelines referenced in the INPEX *Stakeholder Engagement (Offshore Environment Plans) Guideline* as outlined in Figure 6-1.

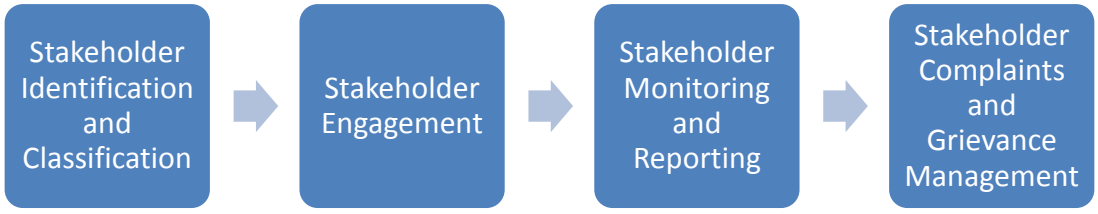


Figure 6-1: Stakeholder management process

The stakeholder engagement process has involved the following stages:

- Stakeholder identification and classification – This stage involved a workshop to identify relevant stakeholders and assess the levels of interest and influence that each stakeholder would specifically or potentially have in relation to the URF Activities.
- Stakeholder engagement – To facilitate the engagement process, all relevant stakeholders were provided with fact sheets that gave a general overview of offshore construction activities, as well as an activity-specific fact sheet providing key information about the URF Activities including a description of activities, location and schedule (timing and duration). It also provided information on vessels and equipment to be used, logistics information, environmental sensitivities and management approaches, as well as contact information for stakeholder queries and feedback.
- Stakeholder monitoring and reporting – Stakeholder engagement has been, and will continue to be, monitored during the course of the URF Activities.
- Stakeholder complaints and grievance management – Any concerns or complaints received in response to the proposed URF Activities have been treated as issues and dealt with in the course of developing the URF EP and the URF OSCP. INPEX has documented any change to the proposed management of an activity, where management or resolution of an issue has required such change.

INPEX has used this process to engage with relevant stakeholders that have an interest in, or the potential to be impacted by, the Project. Stakeholder groups engaged include:

- Commonwealth, state, territory and local government departments and agencies
- ministers of relevant portfolios
- National Native Title Tribunal (NNTT), relevant Aboriginal and Torres Strait Islander land councils and prescribed bodies corporate, traditional owners and relevant land councils in areas potentially impacted by the URF Activities
- the commercial fishing industry and its associations, and individual operators (permit or licence holders/lessees) in fisheries potentially impacted by the URF Activities

- recreational fishing associations
- environmental, heritage and marine research groups
- oil and gas industry peers
- business groups.

Consulted stakeholders' queries have been addressed through further consultation. To date, no major concerns have been raised regarding the URF Activities.

7 CONTACT DETAILS

The main point of contact for further information regarding this INPEX *URF Installation Summary Environment Plan* (E075-AH-PLN-10004) is:

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