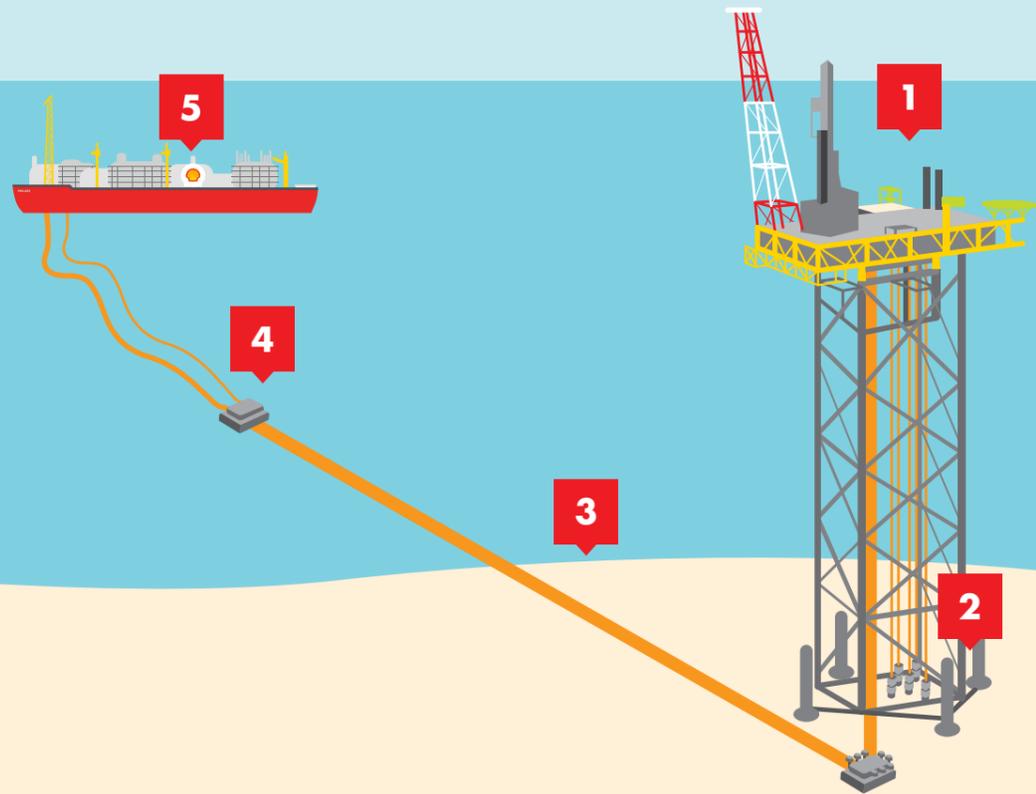


# CRUX PROJECT CONCEPT OVERVIEW



- 1** **A NOT NORMALLY MANNED PLATFORM**  
which includes dry trees, minimal processing facilities and associated utility systems.
- 2** **5 PRODUCTION WELLS**  
connected to the Not Normally Manned platform for completions, perforations, unloading and future operations.
- 3** **AN EXPORT PIPELINE**  
approximately 165km long, which ties the Crux platform back to the Prelude FLNG facility.
- 4** **SUBSEA TIE-IN SYSTEM**  
connecting the export pipeline between the Crux Not Normally Manned Platform and the Prelude FLNG facility.
- 5** **REMOTE OPERATIONS**  
the Crux Platform is connected to and remotely operated from the Prelude FLNG facility.

## CONTACT US

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# THE CRUX PROJECT

## THE PROJECT

Located approximately 620km north-east of Broome and 160km north east of the Prelude FLNG Facility, the current concept for the Crux project is a Not Normally Manned (NNM) platform containing minimal processing facilities, utility systems and limited accommodation facilities. It will be operated remotely from the Prelude FLNG facility and only require periodic maintenance visits, significantly reducing the operational safety exposure to staff. It will be tied back to Prelude via an export pipeline. An initial five production wells are proposed to be drilled.

**Location:**  
Commonwealth marine waters in the northern Browse Basin, 160km offshore north-west Australia and 620km north-east of Broome.

**Facility Type:**  
Not Normally Manned (NNM) Platform

**Number of wells:**  
five

**Production capacity:**  
approximately 2.9 million tonnes per annum capacity

**Water depths:**  
Crux in-field development area: 110 - 170m.  
The export pipeline corridor: 170 - 280m

**Status:**  
First draft of the Crux Offshore Project Proposal has been submitted to National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) (Stage 1). Upon NOPSEMA's initial assessment, the OPP will be released for public comment.



Figure 1: Location of the Crux Project

OCTOBER 2018

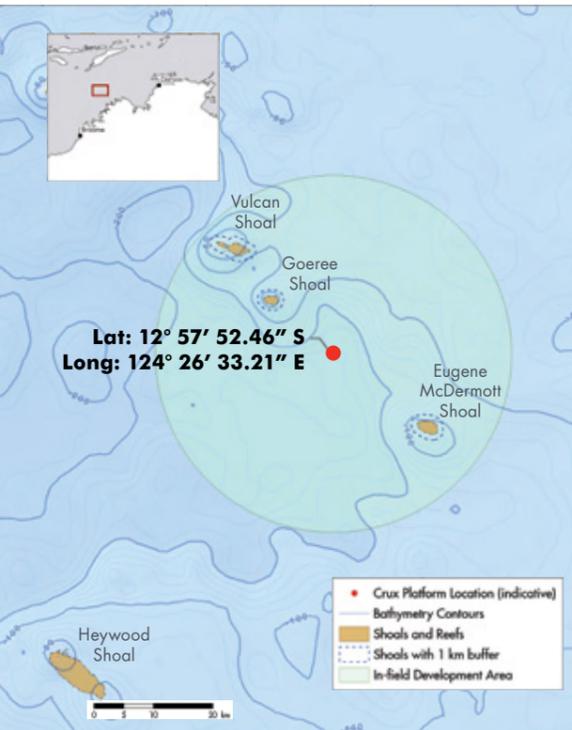


Figure 2: Crux In-field Development Area

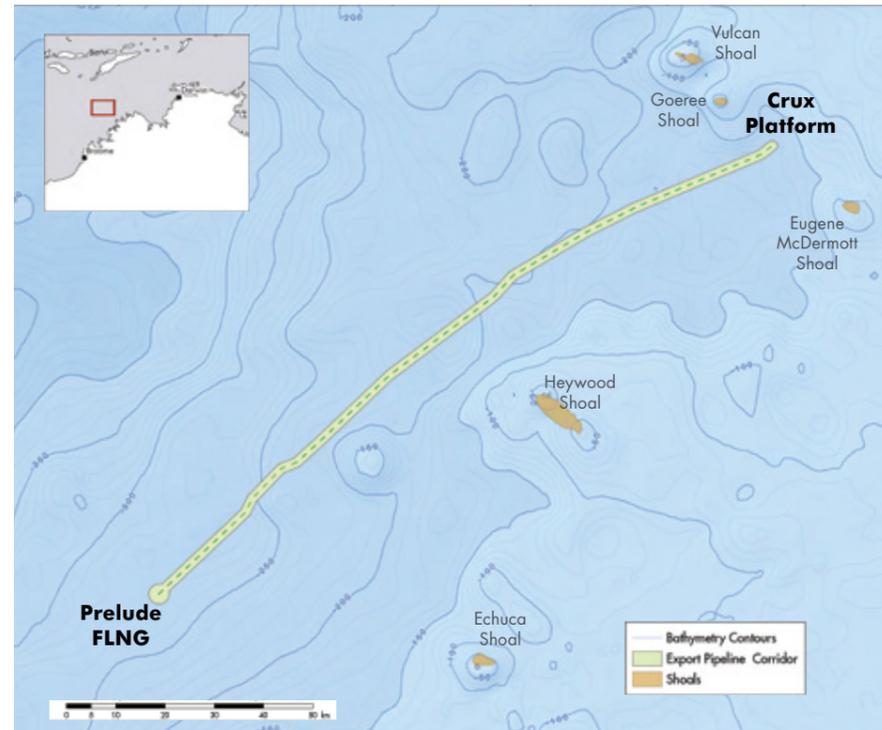


Figure 3: Export Pipeline Corridor

## THE PROPOSED DEVELOPMENT

### The key execution stages of the Crux Project are:

- development drilling, including tie-back and dry tree completion
- installation of the platform jacket and topsides
- installation and hook up of export pipeline and subsea integration system to the platform facilities
- commissioning and start-up
- operations and maintenance, and
- decommissioning.

The current design for the foundation development is initially five production dry tree wells drilled from a single drill centre, in a single campaign.

The preferred Crux platform location, within an approximate 1km radius, is shown in Figure 2. A 1km buffer around shoals will be adhered to in order to avoid impacts to these features.

### EXPORT PIPELINE

A 26-inch export pipeline, approximately 165km long, which ties the platform back to the Prelude FLNG facility.

The Crux export pipeline route (Figure 3) is relatively straight and there are no seabed obstructions.

The proposed pipeline route includes a 1km buffer either side to allow for minor deviations in the final pipeline route.

A slightly larger buffer (approximately 2km) has been allowed at the Prelude end of the pipeline to allow for tie-in to Prelude's turret.

### BACKFILL OPTIONS

There is a potential for future subsea developments. Any future wells will be contained within the Crux in-field development area shown in Figure 2, 30km from the proposed platform location. They will be conventional subsea wells with subsea trees, tied-back to the platform through subsea infrastructure.

## ENVIRONMENTAL APPROVAL

### Before Shell begins substantial work on major projects or existing facilities, regulatory, environmental and social impacts are assessed, alongside commercial and technical considerations.

This process includes environmental, social and health impact assessments to help understand and manage risks and opportunities.

For the Crux project, Shell Australia will be submitting an Offshore Project Proposal (OPP) to NOPSEMA as the first stage in its environmental approval. The OPP details the potential environmental impacts and risks of the proposed activity along with the controls put in place to manage these impacts and risks to an acceptable level.

## ENVIRONMENTAL MANAGEMENT

The table below provides a summary of key environmental aspects and associated management controls which will be outlined in greater detail in the OPP.

<b>Physical presence and vessel movements</b>	<ul style="list-style-type: none"> <li>All project vessels operating within the project area will adhere to the navigation safety requirements at an international and national level.</li> <li>Maintenance of a minimum 1km buffer from shoals within the in-field development area.</li> <li>Vessels will adhere to the requirements of the EPBC Regulations Part 8.1 – Interacting with cetaceans.</li> <li>Pre-lay export pipeline route survey to identify environmentally sensitive benthic habitats (e.g. shoals, banks) to be avoided where practicable.</li> </ul>
<b>Light emissions</b>	<ul style="list-style-type: none"> <li>External lighting on offshore facilities/infrastructure will be minimised to that required for navigation, safety and safety of deck operations, except in the case of an emergency.</li> <li>Flaring during operations is optimised to enable the safe and economically efficient operation of the facility.</li> </ul>
<b>Underwater noise</b>	<ul style="list-style-type: none"> <li>Maintenance of a minimum 1km buffer from shoals within the in-field development area.</li> <li>Pile driving activities will follow standard industry controls for offshore piling which include: <ul style="list-style-type: none"> <li>safety zones – observation and shutdown zones</li> <li>standard management and mitigation procedures, e.g. pre-start, soft start, normal operation, stand-by and shut-down procedures</li> <li>trained crew members as observers.</li> </ul> </li> </ul>
<b>Atmospheric emissions</b>	<ul style="list-style-type: none"> <li>All drilling rigs, vessels and Crux platform (as appropriate to vessel class) will comply with International Convention for the Prevention of Pollution from Ships (MARPOL) requirements.</li> <li>Complete and submit annual National Greenhouse and Energy Reporting reports during the operations stage of the project.</li> <li>Flaring during operations is optimised to enable the safe and economically efficient operation of the facility.</li> <li>Shell will assess greenhouse gas abatement opportunities during the life of the Crux project.</li> </ul>
<b>Invasive marine species</b>	<ul style="list-style-type: none"> <li>Ballast water exchange operations will comply with the International Maritime Organisation (IMO) International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (as appropriate to vessel class), Australian Ballast Water Management Requirements and related requirements.</li> <li>Biofouling management for vessels in accordance to the IMO Guidelines.</li> </ul>
<b>Liquid discharges</b>	<ul style="list-style-type: none"> <li>All planned discharges from vessels will comply with relevant MARPOL, Commonwealth requirements and subsequent Marine Order requirements.</li> <li>An environmental monitoring program and adaptive management framework will be developed for produced formation water.</li> </ul>
<b>Waste management</b>	<ul style="list-style-type: none"> <li>All discharge of waste from vessels will comply with relevant MARPOL, Commonwealth requirements and subsequent Marine Order requirements</li> <li>Waste management procedures will be implemented for the Crux project that provide for waste segregation and storage, safe handling and transport of waste, and appropriate waste classification and disposal.</li> </ul>
<b>Emergency events</b>	<ul style="list-style-type: none"> <li>Vessel specific controls will align with MARPOL, Commonwealth requirements and subsequent Marine Orders (as appropriate for vessel classification), which includes managing spills aboard, emergency drills and waste management requirements.</li> <li>All vessels involved in the project will have a valid Shipboard Oil Pollution Emergency Plan or Shipboard Marine Pollution Emergency Plan (as appropriate for vessel classification)</li> <li>Accepted Well Operations Management Plan in place for all wells, in accordance with the Offshore Petroleum and Greenhouse Gas Storage Act requirements, including: <ul style="list-style-type: none"> <li>installation of a Blowout Preventer (BOP) during drilling operations, and</li> <li>regular testing of BOP.</li> </ul> </li> <li>Accepted Environment Plans and Oil Pollution Emergency Plans in place for all petroleum activities appropriate to the nature and scale of the credible hydrocarbon spill risks.</li> </ul>