Persephone Drilling and Subsea Installation Activities Environment Plan Summary

April 2014

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1. INTRODUCTION

Woodside Energy Ltd (Woodside) as operator, on behalf of the NWS Project proposes to undertake a combination of drilling (two wells, with one contingent well) and subsea installation and pre-commissioning activities (the 'Petroleum Activities Program'), in offshore Commonwealth waters for the Persephone development.

The proposed Persephone development is the next source of gas supply for the NWS Project, following Greater Western Flank Phase 1. The development concept is a two well subsea tieback to the nearby North Rankin Complex (NRC).

This Environment Plan summary has been prepared as per the requirements of Regulation 11 of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Commonwealth) (Environment Regulations). This document summarises the Persephone Drilling and Subsea Installation Activities Environment Plan (EP), accepted under Regulation 10(1)(a) of the Environment Regulations by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

2. DESCRIPTION OF THE ACTIVITY

2.1 Location of the Activities

The proposed Petroleum Activities Program is located within Permit Area WA-1-L (Program Area) in offshore Commonwealth waters approximately 135 km north north-west of Karratha (Figure 2-1). The nearest landfall is Montebello Islands 100 km to the south-east. Water depths are approximately 126 m.

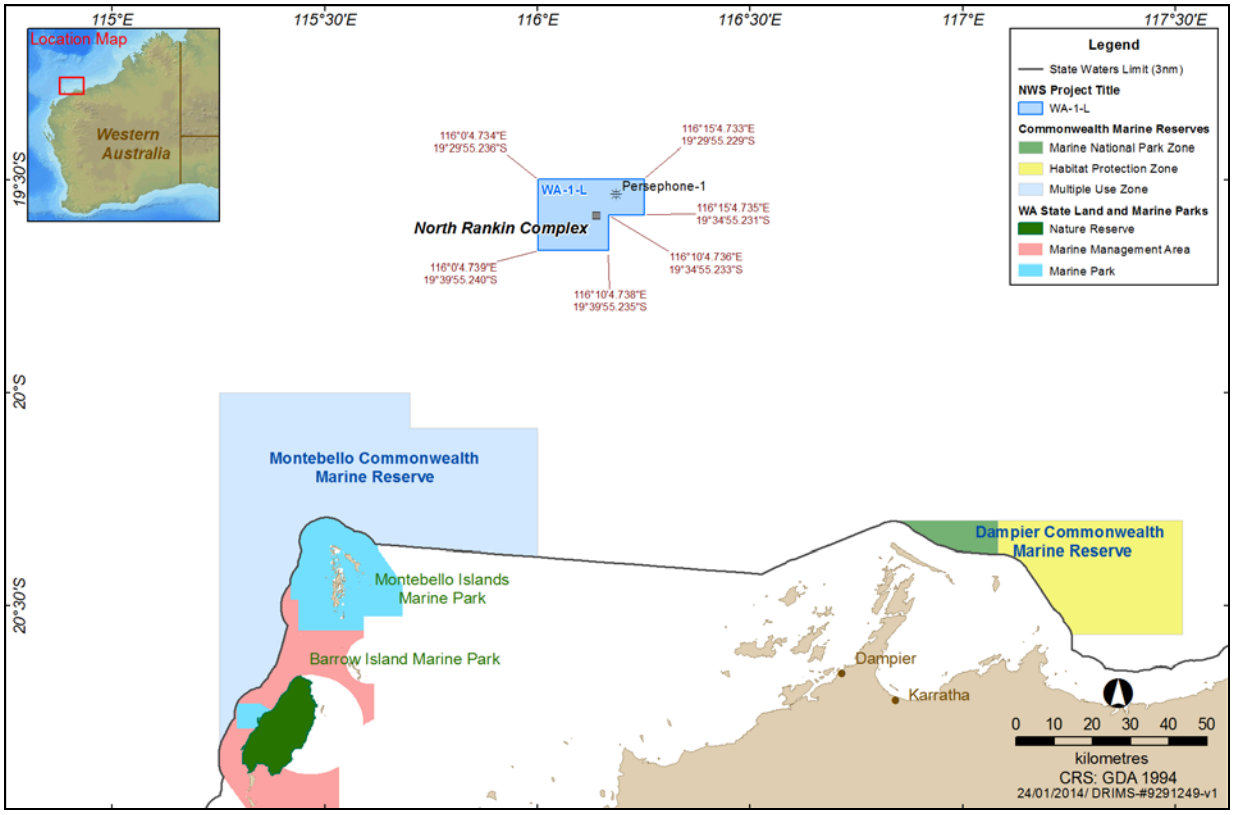

Figure 2-1 Location of the Activities

Table 2-1 provides location details for the Petroleum Activities Program.

Table 2-1: Location Details for the Petroleum Activities Program

Activity	Water Depth (Approx. m LAT)	Easting[1]	Northing	Production Licence
PSA-B (PSA01) well	126 m	116o 10' 50.880" E	19o 32' 25.042" S	WA-1-L
PSA-G (PSA02)well	126 m	116o 10' 50.012" E	19o 32' 24.256" S	WA-1-L
Contingent well (PSA-C)	126 m	116o 10' 51.096" E	19o 32' 22.260" S	WA-1-L
Persephone subsea infrastructure installation and pre-commissioning	126 m	N/A[2]	N/A[3]	WA-1-L

An Operational Area will be implemented around each well location (2,500m radius) and the subsea installation and commissioning location (1,500m radius) when drilling or installing and pre-commissioning subsea infrastructure. The Operational Area defines the spatial boundary of the petroleum activities that will be managed under the EP. Transit to and from an Operational Area by support vessels, installation vessels and drill rigs/ships, and port activities associated with the support vessels, is not within the scope of the EP.

2.2 Timing of the Activities

The current schedule of the Petroleum Activity Program is outlined in Table 2-2. Timing and duration may be subject to change due to mobile offshore drilling unit (MODU)/vessel availability, unforeseen circumstances and weather.

Table 2-2: Summary of Initial Activities for the Petroleum Activities Program

Activity	Start	Duration (days)	Completion	Comment
Drilling and completions of PSA-B (PSA01) and PSA-G (PSA02) wells	Q4 2015	140 – 145	Q2 2016	Pre-lay of the moorings will occurs several weeks prior to spud
Persephone subsea hardware installation and pre-commissioning	Q3 2016	90 – 120	Q4 2016	
Drilling and completions of a contingent well	Q1 2016 – Q4 2017	70	Q4 2017	The drilling of the contingent well will only be required should either PSA-B (PSA01) or PSA-G (PSA02) not perform as required.

[1] GDA94 MGA Zone 50

2 The Persephone subsea tie-back is between the Persephone wells and the North Ranking Complex (NRC) (flowline to NRA platform and EHU to NRB platform)."

3 The Persephone subsea tie-back is between the Persephone wells and the North Ranking Complex (NRC) (flowline to NRA platform and EHU to NRB platform)."

The EP has risk assessed gas well drilling and subsea installation and pre-commissioning activities throughout the year (all seasons) to provide operational flexibility on project schedule changes and vessel/rig availability.

2.3 Project Vessels

Project vessels will include:

- The *Atwood Eagle* semi-submersible moored MODU is currently scheduled to undertake the drilling of the Persephone PSA-B (PSA01) and PSA-G (PSA02) wells. A specific rig for Contingent well (PSA-C) has not been assigned but options include a semi-submersible moored drill rig, Dynamic Positioned (DP) drill ship or DP drill rig, depending on availability and suitability for the well location (e.g. water depth). All MODU options are assessed and managed under the EP.
- A primary installation vessel (PIV) (to be confirmed) for the installation of the subsea infrastructure for the tieback of the Persephone development wells. Installation will employ the use of remotely operated underwater vehicles (ROV).
- Support vessels.

2.4 Drilling

The reference case is for the Persephone wells to be drilled using a water based mud (WBM) system however a non-water based mud (NWBM) system may be used to meet technical requirements if identified during detailed well design. Once the wells have has been drilled, well completion activities will be undertaken including installation of the production tubing and subsea tree followed by well unloading, cleanup and suspension. During well unloading, reservoir hydrocarbons and base oil will be flared off into the atmosphere.

2.5 Persephone Subsea Installation

The subsea installation scope of work to tie the Persephone wellheads back to the NRC will be undertaken in a single campaign by the PIV. The scope involves installation of a valve manifold, 6.9km flexible flowline, rigid spools between the wells and the manifold and a 7.2km Electro-Hydraulic Umbilical (EHU).

Following completion of Persephone subsea installation and pre-commissioning activities the pre-commissioning fluids will be flushed to the North Rankin Complex. Commissioning and Operation of the Persephone field will be managed as per the North Rankin Facility Operations EP.

3. DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Environment

The Program Area (WA-1-L) is located on the North West Shelf (NWS), within the North-West Marine Region. The North West Shelf experiences a tropical monsoon climate, with distinct wet and dry seasons and the presence of tropical cyclones between November and April. Large scale circulation is primarily influenced by the Indonesian Throughflow which feeds into the Leeuwin Current, which flows to the South-West through the area. In summer, tidal disturbance to the highly stratified water column can generate internal waves along the thermocline which induce strong currents on the sea bed.

3.2 Biological Environment

No Critical Habitats or Threatened Ecological Communities, as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), occur within the Persephone Drilling and Subsea Installation

Activities Operational Areas. It is acknowledged that critical life stage activities for a number of EPBC Act (for example turtle nesting) occur in the wider region, outside of the Operational Areas.

Broad-scale surveys confirm that the seabed within Operational areas is flat and relatively featureless and no areas of hard outcropping have been identified. The seabed is typical of deeper offshore areas (>150 m water depth), being characterised by deep (>5 m) soft, silty sediments derived primarily from calcium carbonate, which become deeper, softer and finer with increasing depth.

Twenty-two cetacean species may occur within the Program Area, including two threatened and five migratory species. The endangered blue whale and the vulnerable humpback whale are two whale species that seasonally migrate through the NWS province as they travel between northern breeding grounds and southern feeding grounds. Other cetacean species are likely to occur at low densities and may transverse the vicinity of the Operational Areas infrequently throughout the year.

With consideration of the distance from known key marine turtle habitats (Montebello Islands are approximately 100 km south-west at its closest point), the absence of potential nesting or foraging habitat (i.e. no emergent islands, reef habitat or shallow shoals) and the water depth (126 m) of the Program Area, it is considered that the Program Area is unlikely to represent important habitat for marine turtles.

Sea snakes of the families Hydrophidae and Laticaudidae are widespread in the region, and are protected under the EPBC Act.

Whale sharks may traverse the Program Area during their migrations to and from Ningaloo Reef. However, it is expected that whale shark presence within the Program Area would be of a relatively short duration and not of significant numbers given the main aggregations are recorded in coastal waters, particularly, the Ningaloo Reef edge (MPRA, 2005).

3.3 Socio-Economic Environment

There are no known sites of Indigenous or European cultural or heritage significance within the vicinity of the Operational Areas.

No tourism activities take place specifically within the vicinity of the Operational Areas.

The Operational Areas are located within an area of established oil and gas operations. The closest oil and gas operation, the NRC operated by Woodside, is 6.9km to the south west.

The Operational Areas are located within three Commonwealth and three State fisheries.

The region supports significant commercial shipping activity, mostly associated with the mining and oil and gas industries. Major shipping routes in the area are utilised for entry to the Port of Dampier and Barrow Island.

The Program Area is not located within any designated Defence practice areas.

There are no sensitive marine environments within the Operational Areas. The closest sensitivity is the boundary of the multiple use zone of the Montebello Commonwealth Marine Reserve (**Figure 3-1**).

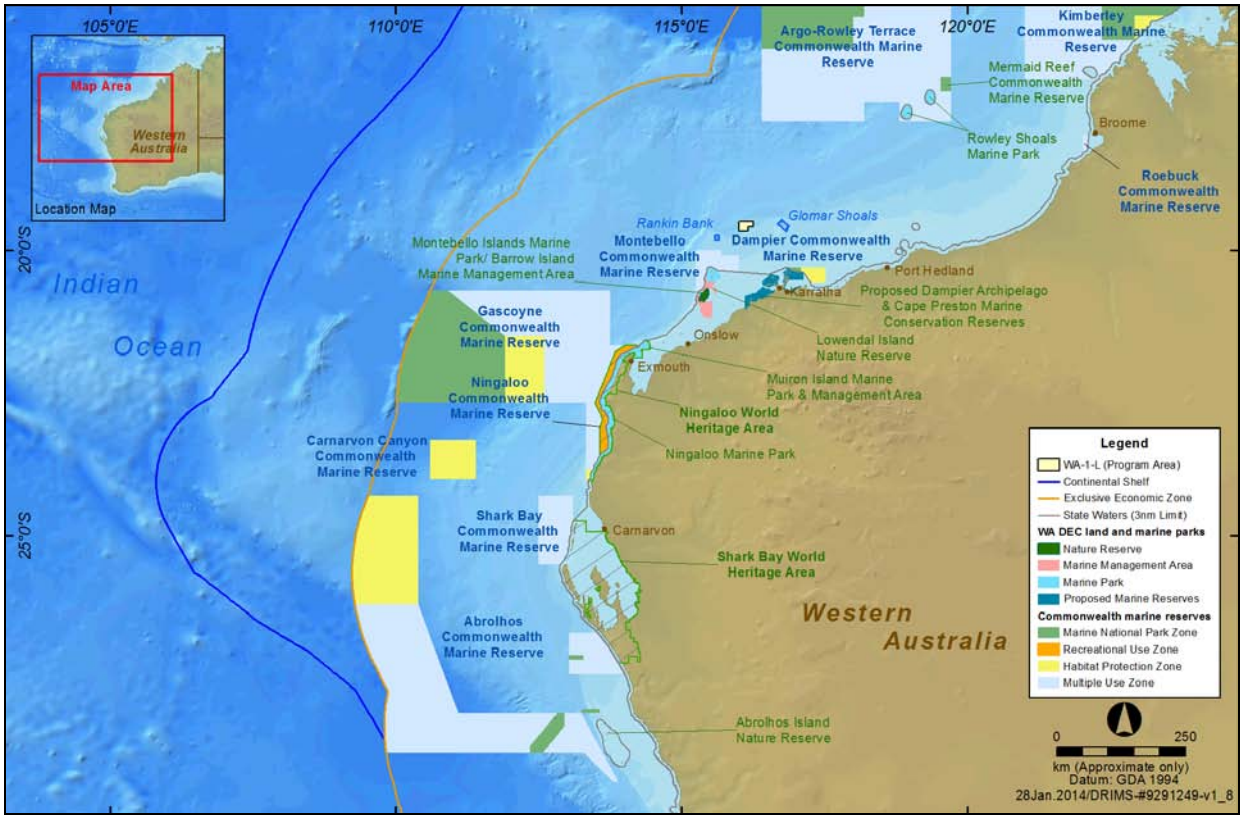

Figure 3-1: Established and Proposed Commonwealth and State Marine Protected Areas in relation to the Operational Areas.

4. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Woodside undertook an environmental risk assessment to understand the potential environmental risks associated with the Persephone Drilling and Subsea Installation Activities to ensure they are reduced to As Low As Reasonably Practicable (ALARP) and will be of an acceptable level using a method consistent with Woodside standards.

A summary of key environmental hazards and control measures to be applied to the activities are shown in **Appendix A**. These are consistent with Woodside corporate and project-specific objectives, standards and criteria. All control measures associated with the hazards will be used to reduce environmental risk to ALARP and will be of an acceptable level.

5. MANAGEMENT APPROACH

The Persephone Drilling and Subsea Installation Activities will be managed in compliance with the *Persephone Drilling and Subsea Installation Activities Environment Plan* accepted by NOPSEMA under the Environment Regulations, other relevant environmental legislation and Woodside's Management System (e.g. Woodside Environment Policy).

The objective of the EP is to ensure that potential adverse impacts on the environment associated with the Persephone Drilling and Subsea Installation Activities, during both routine and non-routine operations, are identified, and will be reduced to ALARP and will be of an acceptable level.

The Persephone Drilling and Subsea Installation Activities EP details for each environmental aspect (identified and assessed in the Environmental Risk Assessment – *Section 5 of the EP*) specific performance objectives and standards and control/mitigation measures (controls available in **Appendix A** of this

summary) to be implemented and measurement criteria to demonstrate performance objectives are achieved.

Any changes to the scope of the activity described in the EP will be managed in accordance with Woodside's Management of Change Operating Standard and Woodside's risk methodology framework which requires a risk assessment to be undertaken for all proposed changes in scope to assess the potential impacts of the change. Risk assessment outcomes will be reviewed with regard to Regulation 17 of the Environment Regulations which requires that any new activity, or any significant modification, change or new stage of the existing activity not provided for in the EP to be reassessed by NOPSEMA for acceptance under Regulation 21 of the Environment Regulations. While a revision is being assessed, any activities adequately addressed under the existing accepted EP will still occur.

Woodside's risk methodology framework also requires a review of risks to be conducted annually to maintain currency. This review supports continuous improvement and includes consideration of risk decision making, rating and control effectiveness.

The implementation strategy detailed in the Persephone Drilling and Subsea Installation Activities EP identifies the roles/responsibilities and training/competency requirements for all personnel (Woodside and its contractors) in relation to implementing controls, managing non-conformance, emergency response and meeting monitoring, auditing, and reporting requirements during the activity. The EP details the types of monitoring and auditing that will be undertaken, the reporting requirements for environmental incidents and reporting on overall compliance of the activities with the EP.

6. CONSULTATION

Woodside conducted a stakeholder assessment for the proposed activity to identify relevant and interested stakeholders based on the locations, proposed activities and timing.

A consultation fact sheet was sent electronically to all identified stakeholders prior to lodgement of the EP with NOPSEMA for assessment and acceptance. This advice was supported by engagement with potentially affected stakeholders.

Woodside received feedback on the proposed activity from a range of stakeholders, including government agencies and commercial fishing organisations. Issues of interest or concern included the location of the proposed activities across commercial fishing areas.

Woodside considered this feedback in its development of management measures specific to the activities.

Woodside will continue to accept feedback from stakeholders during the activities.

7. CONTACT DETAILS

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APPENDIX A: Summary of Major Environmental Hazards and Control Measure to be applied to the Persephone Drilling and Subsea Installation Activities

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
PLANNED (ROUTINE AND NON-ROUTINE) ACTIVITIES		
Proximity of MODU, PIV and other project vessels to third party vessels (commercial shipping, fishing, recreational fishing charters)	Will not result in a potential impact greater than isolated and short term local concern to shipping and commercial fishing.	Compliance with Australian Maritime Safety Authority administered marine safety regulations and marine notification requirements. Establishment and enforcement of a 500 m safety/ exclusion zone around the MODU/PIV, in which only vessels authorised by the MODU/PIV are permitted to enter and operate.
Mooring of MODU, presences of subsea infrastructure including well head and movement of ROV on seabed	Mooring of the MODU and operation of the ROV will have no greater impact than localised and short-medium term effects on community/habitat structure, and full recovery is expected.	Woodside Well Location & Site Appraisal Data Sheet will be completed for each drilling scope that requires MODU anchoring (i.e. DP MODU not available) which informs the MODU mooring locations selection. Mooring Analysis Report completed & implemented during anchor deployment (consistent with industry best practice - American Petroleum Institute RP 2SK) as per Woodside Standards. Wet stored items are logged & retrieved.
MODU, PIV and other project vessel noise emissions during normal operations	MODU and vessel noise will not result in a potential impact greater than minor and temporary disruption to a small proportion of the population and no impact on critical habitat or activity.	Compliance with EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans: Support vessels will not travel greater than 6 knots within 300 m of a whale (caution zone) & approach closer than 100 m from a whale; & a vessel will not approach closer than 50 m for a dolphin &/or 100 m for a whale (with the exception of animals bow riding).
Atmospheric emissions from fuel combustion (MODU, PIV and support vessels), well unloading (flaring of gas and base oil, including hydrocarbon dropout to marine	It is considered that fuel combustion and flaring emissions will not result in a potential impact greater than a minor and temporary exceedence over air and/or water quality standards.	Compliance with MARPOL 73/78 Annex VI, & Marine Order 97 (marine pollution prevention – air pollution), as required by vessel class. A Woodside approved well unloading package will be set-up & principally designed with mechanisms to minimise potential impacts during well unloading operations. Woodside will review the contractor operational procedure to ensure it maximises flare efficiency and includes the requirements for a flare watcher. Woodside will verify relevant contractor's procedures for well unloading align with the well unloading process which

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
environment) or well kick (unplanned gas venting)		covers all aspects of primary and secondary well control for floating drilling operations (including venting).
Routine discharge of sewage, grey water & putrescible wastes, deck & bilge water, and accidental loss of solid wastes to marine environment from MODU & vessels	Will not result in a potential impact greater than minor and/or temporary contamination above background levels, water quality standards, or known effect concentrations.	Compliance with MARPOL 73/78 Annex I (oil pollution), IV (sewage), and V (garbage), as required by vessel/MODU class. Compliance with Marine Order 96 (Pollution prevention – sewage), as required by vessel/MODU class: A valid International Sewage Pollution Prevention (ISPP) Certificate; sewage treatment plant; sewage commuting and disinfecting system; and sewage holding tank. Compliance with Marine Order 95 (pollution prevention – garbage), as required by vessel/MODU class: Garbage is passed through a grinder so that it is capable of passing through a screen with no opening wider than 25 mm. Compliance with Marine Order 94 (pollution prevention – packaged harmful substances), as required by vessel/MODU class: no disposal overboard. Vessel/MODU sewerage system shall be capable of servicing the full complement of crew on board the vessel & holding tanks shall be sized appropriately to contain all generated waste (black & grey water) for the necessary duration prior to planned & acceptable discharge operations. Bilge water contaminated with hydrocarbons must be contained and disposed of onshore, except if the oil content of the effluent without dilution does not exceed 15 ppm or an IMO approved oil/water separator (as required by vessel class) is used to treat the bilge water. The Contractor Waste Management Plan is consistent with Woodside waste management plans. Chemicals will be stored safely and handled to prevent the release to the marine environment. Woodside Standard for Rig Equipment: Appropriate storage, bunding and drainage to prevent overboard discharges. Engineered barriers will be given priority over procedural barriers on the MODU. Any accidental loss of significant wastes to the marine environment will be recovered where safe and practicable to do so. Discharge of NWBM mud pit wash residue, post emptying of drilling fluid, is less than 1% by volume (10,000 ppm) base oil content. Samples of NWBM mud pit wash residue will be measured and recorded.

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
Routine discharge of drill cuttings (WBM and NWBM) to the marine environment	Will not result in a potential impact greater than minor and/or temporary contamination above background levels, quality standards, or known effect concentrations	Riser-in-place cuttings will be processed using solids control equipment prior to discharge. Cuttings must be discharged below the water line as per Woodside Standards. As per Woodside Standards WBM shall be used as the first preference in all cases; & where WBM cannot meet required specifications, NWBM may be used following a formal written commercial and/or technical NWBM justification process. Overboard disposal of NWBM is not permitted. NWBM cuttings will be treated & processed to contain on average less than 10% oil by weight prior to discharge as per Woodside Standards. NWBM system set up as per Woodside checklists to ensure appropriate containment and controls in place & audited. Woodside procedure used to assess chemicals (in standard discharge scenarios) which can fall into the following assessment types: no further assessment (good OCNS environmental performance); further assessment required (lower OCNS environmental performance or not OCNS registered); or ALARP justification required (if an environmentally sound alternative cannot be found). Bulk operational discharges conducted under MODU's PTW system (to operate discharge valves/pumps) or risk assessed using the MODU contractors risk assessment prompt cards.
Routine discharge of drilling and completion fluids and chemicals (subsea, completion, well bore clean out, cement)	Will not result in a potential impact greater than minor and/or temporary contamination above background levels, water quality standards, or known effect concentrations.	Woodside procedure used to assess chemicals (as above). Bulk operational discharges conducted under MODU's PTW system (to operate discharge valves/pumps) or risk assessed using the MODU contractors risk assessment prompt cards.
Routine discharge of subsea installation and pre-commissioning fluids and chemicals to the marine environment	Will not result in a potential impact greater than minor and/or temporary contamination above background levels, water quality standards, or known effect concentrations	Woodside procedure used to assess chemicals (as above). Requirements to identify and mitigate risks that pose a potential hazard to the environment as per Woodside subsea and pipelines commissioning standards. A procedure for pre-commissioning work shall include environmental considerations, monitoring and recording of fluids injected, displaced and discharged, and MSDS for all chemicals used. A procedure for hydrotesting work shall include ROV inspection during test to identify leakage & trigger activity to stop.

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
UNPLANNED ACTIVITIES (ACCIDENTS OR INCIDENTS		
Hydrocarbon release to the marine environment due to a loss of well integrity	Disruption of a significant portion of the population of protected species. Impacts on critical habitats or activities. No threat to overall population viability. Large scale and long-term effects to Marine primary producers. Recovery >10 years or permanent. Localised but long term effect on community/habitat structure. Community maintains ecological integrity though an unacceptable change in species composition may occur Minor long term or significant short term contamination above background and/or national/international quality standards and/or known biological effect concentrations on scale >2 km for water quality and marine sediment quality. In relation to air quality:, Slight and temporary (<1 year) localised effect to ecosystems, species and/or habitats in the area. Significant long term effect on one or more of protected area values.	**Preventative:** Well design and construction is managed and controlled by Woodside's Well Lifecycle Management Process (WLMP). The WLMP consists of six phases of activity which cover work requirements from the outset of individual Basis for Well Design creation to the point at which the well is finally abandoned or suspended and all documentation is closed out. Further information will be provided in the WOMP for each well of the Petroleum Activities Program which addresses: Basis for Well Design phase; Detailed Design phase; and Well Construction Operations phase (including suspension). The performance standards below are reflective of this process. Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011: Accepted Well Operations Management Plan (WOMP) & application to drill. As per Woodside Standards: • all permeable zones penetrated by the well bore, containing hydrocarbons or over-pressured water, shall be isolated from the surface environment by a minimum of two barriers (a single fluid barrier may be implemented during the initial stages of well construction if appropriateness is confirmed by a shallow hazard study). • discrete hydrocarbon zones shall be isolated from each other (to prevent cross flow) by a minimum of one barrier • all normally pressured permeable water-bearing formations shall be isolated from the surface by a minimum of one barrier. • barriers shall be effective over the lifetime of well construction or production. • effectiveness of primary & secondary barriers shall be verified. • Cement minimum specifications for cementing conductor, casings and liners to maintain well integrity. As per Woodside procedures: Fluid barrier comprising of drilling fluid of a suitable weight, composition & volume to counter pore pressure & over pressure zones when drilling. Subsea BOP specification & function/pressure testing in accordance with: • Original Equipment Management (OEM) Standards. • Woodside Standards and procedures. • API Standard 53 4th Edition (API RP53).

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
		Spill Response: • Spills to sea will be managed as per the Persephone Oil Spill Preparedness and Response Strategy Selection and Evaluation, Woodside's Corporate Oil Spill Response Plan and the Dampier Regional Oil Spill Response Plan. • Monitoring/observation of the spill will be undertaken to inform the spill response strategies, which may include: o Ongoing monitoring and evaluation o Containment and recovery o Shoreline assessment o Shoreline protection o Shoreline cleanup • Subsea first response toolkit & capping stack available for use. • Mutual Aid MoU (for relief well drilling) is in place.
Hydrocarbon release to the marine environment due to a vessel collision	Localised and short-medium term effect on community/habitat structure of protected species, marine primary producers and other communities and habitats. Full recovery expected. Minor and/or temporary contamination above background levels and/or national/international water quality standards. Short term contamination above background levels and/or national/international marine sediment quality standards. Minor and short term effect on one or more of the protected areas values. Full recovery	Compliance with Marine Order 30 (Prevention of Collisions) 2009 and Compliance with Marine Order 21(Safety of navigation and emergency procedures) 2012. Compliance with Australian Maritime Safety Authority administered marine safety regulations and marine notification requirements. As per Woodside requirements: • support vessel becomes designated as standby vessel for over the side and moon pool operations within the MODU/PIV area and is under the control of the OIM • maintains safety/exclusion zones by maintaining continuous surveillance through visual, radar, and radio watches, providing warning to approaching vessels, intercepting vessels that enter within the safety/exclusion zone and documenting incursions. Establishment and enforcement of a 500 m safety zone. Send consultation Fact Sheet to state and commonwealth fisheries.

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
	expected.	
Hydrocarbon release to the marine environment during bunkering activities	Will not result in a potential impact greater than localised, minor and temporary contamination above background levels and/or standards with localised, minor/negligible and temporary impacts to habitats or populations.	Compliance with MARPOL 73/78 Annex I. As per Woodside Standards: • all hoses that have a potential to cause an environmental risk due to damage or failure shall be placed on a hose register that is linked to the MODU's preventative maintenance system. • there shall be dry-break couplings and floatation on fuel hoses and procedures to ensure that hose integrity is checked. • save-alls shall be installed around loading stations. • there must be an adequate number of appropriately stocked, located and maintained spill kits. • all bulk transfer hoses shall be tested for integrity before use. A detailed bunkering plan and procedures will be developed for all vessels that will bunker in Operational Areas. The plans/procedures shall include, but not be limited to: • Bunkering capacity, frequency and volumes • Nominal limiting metocean conditions for bunkering operations • Minimum contingency bunker volume required onboard Construction Vessel before operations must cease, both for cyclonic and non-cyclonic operations • The capacity and specification of proposed bunker vessels • The capacity and specification of tugs used to support any mooring/unmooring operations • Emergency procedures in the event of spill, loss of position, mooring system failure etc Contractor bunkering procedure to be implemented during all bunkering activities, and must be assessed by Woodside as meeting at least the following requirement (controls): undertaken under the MODU/PIV PTW system; bunkering to start during daylight hours (can continue into the night); requires visual monitoring of gauges, hoses, fittings and the sea surface; and meets Woodside standard requirements.

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
Hydrocarbon release to the marine environment as a result of an object dropped (including anchors) onto subsea infrastructure (wellhead).	Disruption of a significant portion of the population of protected species. Impacts on critical habitats or activities. No threat to overall population viability. Large scale and long-term effects to marine primary producers. Recovery >10 years or permanent. Localised but long term effect on other community/habitat structure. Community maintains ecological integrity though an unacceptable change in species composition may occur. Minor long term or significant short term contamination on marine sediment and water quality above background and/or national/international quality standards and/or known biological effect concentrations on scale >2 km. Slight and temporary (<1 year) localised effect on air quality to ecosystems, species and/or habitats in the area. Significant long term effect on one or more of protected area values.	MODU and PIV Safe Work Procedures developed and followed for bulk transfer to prevent objects being dropped. • Subsea project items will be lifted over the side of the PIV in a “clear zone” away from live subsea infrastructure, and lowered to within ~10 m of the seafloor. Items will then be moved into place using ROV and PIV movement. • Standards for lifted equipment, lifting/ winching gear and devices. • Pre-use inspections on lifting/ winching gear and devices • Equipment maintained in accordance with lifting equipment register. As per Woodside Standards: Calibrated real time positioning system to be installed on the MODU and each of the AHVs, which displays the relative positions of the MODU and AHVs, mooring legs, anchors and positions of all subsea infrastructure via electronic charts supplied by Woodside. Mooring Analysis Report completed & implemented during anchor deployment (consistent with industry best practice - American Petroleum Institute RP 2SK) as per Woodside Standards. As per Woodside isolation Standards: • There must always be two independent, verified and effective barriers between a reservoir (i.e. pipeline contents) and the working environment (i.e. the ocean) for the duration of the work activity (if divers are in the water) and a minimum single proven isolation between a pressure source and the working environment (i.e. the ocean) for all ROV intervention operations. • A risk assessment is required to be performed for any subsea isolation to determine whether the proposed isolation is appropriate with respect to environmental impacts. • Isolations must be tested (proven) prior to the commencement of any subsea installation activities. A detailed set of procedures for putting isolations in place will be developed prior to commencing subsea installation activities. • Effectiveness of the isolation will be confirmed/proven via field testing. Woodside oil spill preparedness, response and monitoring arrangements.
Unplanned venting of gas during drilling (well kick)	Will not result in a potential impact greater than a minor and temporary exceedence over air quality standards.	Woodside will verify relevant contractor procedures align with Woodside standard requirements.

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
Accidental discharge of NWBM or base oil to marine environment from MODU during bulk transfer, failure of slip joint packers or emergency disconnect system	Will not result in a potential impact to protected species and water quality greater than minor and/or temporary contamination above background levels and/or national/international quality standards and/or known biological effect concentrations outside a 200 m mixing zone. It is considered that NWBM cuttings discharge from an emergency disconnect will not result in a potential impact greater than minor and/or temporary contamination above background levels, water quality standards, or known effect concentrations.	As per Woodside Standards: • all hoses that have a potential to cause an environmental risk due to damage or failure shall be placed on a hose register that is linked to the MODU's preventative maintenance system • there shall be dry-break couplings and floatation on fuel hoses and procedures to ensure that hose integrity is checked • save-alls shall be installed around loading stations • adequate/appropriate spill kits • all bulk transfer hoses shall be tested for integrity before use NWBM system set up as per Woodside checklists to ensure appropriate containment and controls in place & audited North West European Area (NWEA) Guidelines: • Emergency shutdown systems for stopping losses of containment (e.g. burst hoses) • Break-away dry-break couplings for oil based mud hoses • Constant monitoring of the offloading process • Direct radio communications • Managed under Permit to Work system • Additional operator will be used to monitor & manage NWBM operations & volumes (with suitable communication equipment). Deck areas on the MODU are bunded. Mud pits dump valve will be locked closed & operated through the MODU's PTW. At the transition of WBM to the use of NWBM, MODU personnel will 'walk the line' & ensure the valve line-up for the use of NWBM is correct prior to the re-commencement of drilling.
Accidental discharge of other hydrocarbons and/or chemicals from deck activities and accidental discharge of	Will not result in a potential impact to water quality greater than minor and/or temporary contamination above background levels, quality standards or known effect concentrations and will not	Compliance with Marine Order 94 (pollution prevention – packaged harmful substances). Compliance with Marine Order 91 (Marine pollution prevention – oil). Woodside procedure used to assess chemicals (as above).

Source of Risk (Hazard)	Potential Environmental Impact	Control/ Mitigation Measures
preservation/pre-commissioning fluids from non-live subsea infrastructure from dropped objects	result in a potential impact greater than minor and temporary disruption to a small proportion of biological populations with no impact on critical habitat or activity.	Compliance with Woodside's Environmental Performance Operating Standard. Woodside Engineering Standard – Rig Equipment. Spill response bins/kits are maintained and located in close proximity to hydrocarbon storage areas and vessel deck equipment / bunkering areas for use to contain and recover deck spills. MODU and PIV Safe Work Procedures.
Accidental loss of solid wastes to the marine environment (excludes sewage, grey water, putrescible waste and bilge water.	Will not result in a potential impact greater than minor and/or temporary contamination above background levels, water quality standards, or known effect concentrations.	Compliance with Marine Order 95 (Marine pollution prevention – garbage). The Contractor Waste Management Plan is consistent with the Woodside D&C Waste Management Plan Dampier, Broome & Darwin. Equipment and materials dropped to the marine environment are recovered where safe and practicable to do so.
Collision project vessels with marine fauna	Will not result in a potential impact greater than minor and temporary disruption to a small proportion of the population and no impact on critical habitat or activity.	EPBC Regulations 2000 – Part 8 Division 8.1. Compliance with required notifications of activities affecting cetaceans under the EPBC Regulations.
Dropped objects to the marine environment	Will not result in a potential impact greater than minor and temporary disruption to a small area of the seabed, a small proportion of the benthic population and no impact on critical habitat or activity	MODU and PIV Safe Work Procedures. Equipment and materials dropped to the marine environment are recovered where safe and practicable to do so. Personnel will be trained with regard to the prevention of dropped objects during relevant meetings and the appropriate inductions.