



WA-404-P Exploration Wellheads Environment Plan Summary

Exploration Division

July 2018

Revision 0

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1. INTRODUCTION

Woodside Energy Ltd (Woodside), as Titleholder, under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (referred to as the Environment Regulations), proposes to permanently leave in-situ, the Kelt-1, Martin-1, Noblige-2 and Remy-1 exploration wellheads in exploration permit WA-404-P, hereafter referred to as the Petroleum Activities Program.

This Environment Plan (EP) Summary has been prepared to meet the requirements of Regulations 11(3) and 11(4) under the Environment Regulations, as administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). This document summarises the WA-404-P Exploration Wellheads Environment Plan, accepted by NOPSEMA under Regulation 10A of the Environment Regulations.

1.1 Defining the Activity

The Petroleum Activities Program to be undertaken in permit area WA-404-P, involves no further activities and comprises of permanently leaving the existing Kelt-1, Martin-1, Noblige-2 and Remy-1 wellheads and associated infrastructure in-situ.

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2. LOCATION OF THE ACTIVITY

The proposed Petroleum Activities Program is located in Permit Area WA-404-P which lies on the Exmouth Plateau of the Carnarvon Basin in Commonwealth waters approximately 280 km north-west of Dampier in Western Australia.

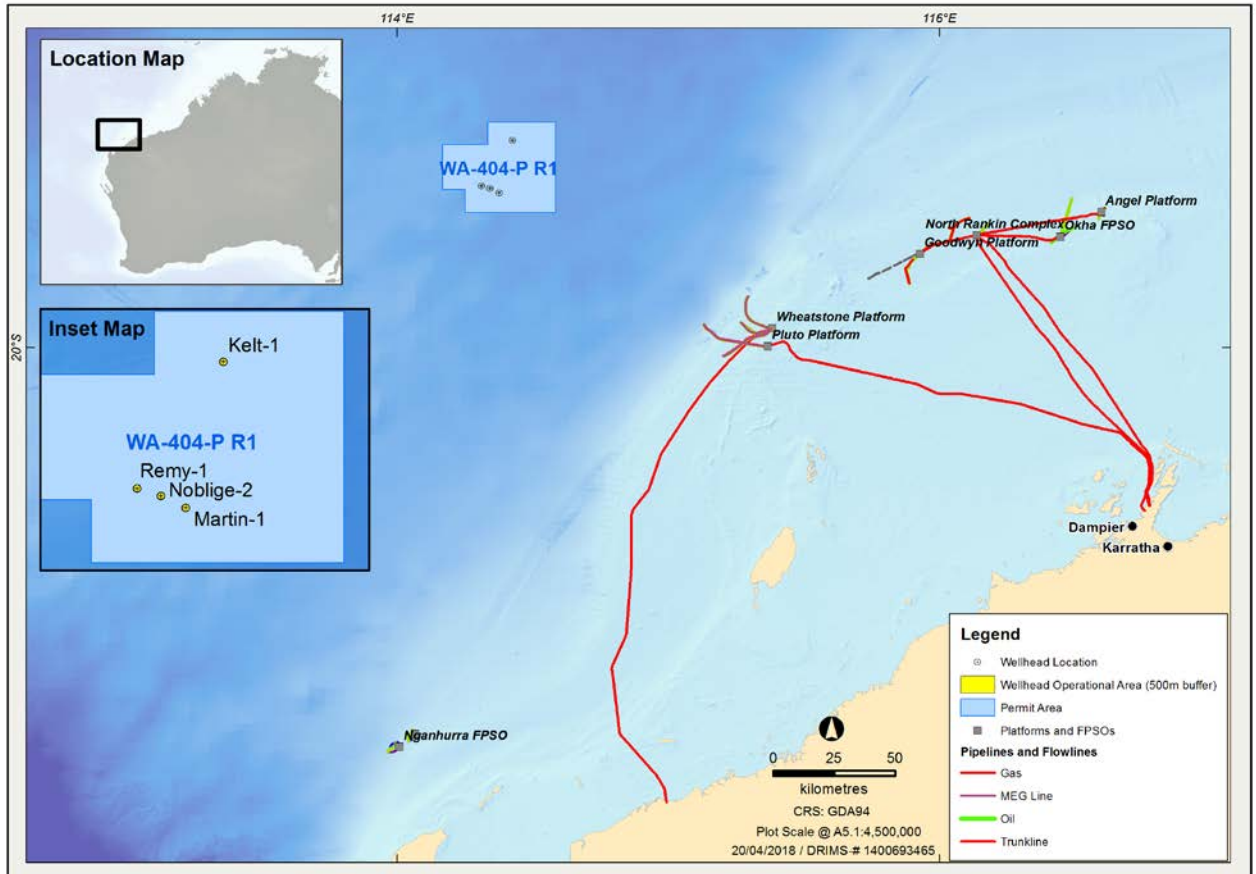


Figure 2-1: Location of Petroleum Activities Program

An Operational Area will be implemented around each of the four wellheads (500 m radius). The Wellhead Operational Area defines the spatial boundary of the petroleum activities that will be managed under the EP. Transit to and from the Wellhead 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.

Table 2-1: Locations details for the Petroleum Activities Program

Activity	Water Depth (Approx. m LAT)	Height of well structure (m)	Latitude	Longitude
Remy-1*	1,296	~1	-19°23'59.28"	114°18'42.81"
Kelt-1	1,445	2.38	-19°13'55.14"	114°25'33.29"

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Activity	Water Depth (Approx. m LAT)	Height of well structure (m)	Latitude	Longitude
Noblige-2	1,324	4.37	-19°24'35.25"	114°20'36.32"
Martin-1	1,346	3.78	-19°25'32.94"	114°22'34.14"

*Remy-1 also has 234 m of 20" well casing associated with the wellhead.

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3. DESCRIPTION OF THE ACTIVITY

3.1 Purpose of the Activity

As per subsection 572(3) of the OPGGS Act, the base case for decommissioning the four wellheads and associated infrastructure is complete removal. This was compared to other reasonable options in a comparative assessment (for full details, see **Section 3.5**). As a result of the comparative assessment, it was demonstrated that the four exploration/appraisal wellheads (Remy-1, Kelt-1, Noblige-2 and Martin-1) and 234 m of well casing being left in-situ permanently gives an equal or better environmental and safety outcome when compared to this base case. The well integrity outcome does not change for any option considered as all wells have been permanently plugged and abandoned.

As a result, the wellheads and associated infrastructure will be left in-situ permanently, to satisfy the current license commitment, under Petroleum Exploration Permit requirements issued under the OPGGS Act.

3.2 Timing of the Activities

The proposed Petroleum Activities Program involves leaving the Remy-1, Martin-1, Kelt-1 and Noblige-2 wellheads permanently in-situ in WA-404-P. This Petroleum Activities Program itself ended on acceptance of the EP by NOPSEMA. As the accepted EP proposed leaving the wellheads in place, no further action will be undertaken.

3.3 Well Exploration and Abandonment History

3.3.1 Remy-1

The Remy-1 well was drilled by the semi-submersible drilling rig Ocean America in 2010. The well was drilled under the Remy-1 Environment Plan Bridging Document and the North West Shelf Drilling and Completions EP, both approved by the Department of Mines and Petroleum (DMP), the offshore environment Regulator at the time. Water depth at the location is 1,296 m at lowest astronomical tide (LAT) and the rotary table elevation was 26.2 m.

The Ocean America arrived on location on 4 October 2010 and Remy-1 was spudded on 7 October 2010. Remy-1 was drilled to 2,329 mRT (meters below the rotary table), where the 20" casing string became mechanically stuck down hole during the running process. Several attempts were made over 24 hours to free the casing and remove the wellhead, however operations were ultimately unsuccessful and the casing was laid onto the seabed as there were no alternate recovery options available. As a result, the well casing became partially buried and the wellhead and casing were left on the seabed and the DMP advised.

As the Remy-1 well did not intersect hydrocarbons or over-pressure zones, no well barriers for abandonment were required. Woodside submitted the Remy-1 Abandonment Program to the DMP under regulation 17, Part 4 (1)(d) of the *Petroleum (Submerged Lands) (Management of Well Operations) Regulations 2004*. The DMP approved the abandonment of the Remy-1 exploration well on 25 November 2010.

The well was drilled with water based muds (WBM) (see **Section 3.5**), and some residual components of the mud may remain in trace amounts within the well.

3.3.2 Kelt-1

The Kelt-1 well is located in the northern section of exploration permit WA-404-P. The well was drilled by the semi-submersible drilling rig Maersk Discoverer under the Kelt-1 Exploration Well Environment

Plan Bridging Document and associated Drilling & Completions – North West Shelf Environment Plan Revision 5 both approved by the DMP.

The Maersk Discoverer arrived on location on 5 July 2011 and the well was spudded on the 6 July 2011. The well was drilled to a total depth of 4,260 mRT, which was reached on 5 August 2011. Woodside submitted the Kelt-1 Abandonment Program to the National Offshore Petroleum Safety Authority (NOPSA) under regulation 5.23 of the *Offshore Petroleum and Greenhouse Storage (Resource Management and Administration) Regulations 2011*. NOPSA approved the abandonment of the Kelt-1 exploration well on 8 August 2011.

The Kelt-1 exploration well abandonment activities were conducted in accordance with the NOPSA approved Kelt-1 Abandonment Program, as well as the Kelt-1 Well Operations Management Plan and Kelt-1 Drilling and Testing programmes, both of which were approved by the DMP. As the well did not intersect hydrocarbons or over-pressure zones, the plug and abandonment (P&A) program was undertaken as per the requirements for a “dry-hole” in the Woodside Engineering Standard – Well Barriers, requiring only a single permanent barrier (cement plug) to be installed.

Following the installation and testing of the permanent barrier, Woodside removed the blow out preventer (BOP) and attempted to mechanically cut the well casing between 2.9 m and 12.0 m below the mudline to retrieve the wellhead assembly. Three attempts were made over three days to mechanically cut and retrieve the wellhead from Kelt- 1, but operations were ultimately unsuccessful. The inability to cut the wellhead was mainly attributed to the missing centralization of 20” casing within 36” conductor. As such, the wellhead assembly, extending 2.38 m above the mudline, was left in-situ, and the DMP advised.

Only seawater remains within the well above the top cement plug.

3.3.3 Noblige-2

Noblige-2 is a vertical appraisal well drilled between the existing discoveries Noblige-1 and Martin- 1. The well was spudded on the 17 August 2011, reaching the total depth of 4,670 mRT on 20 September 2011. The well was drilled by the Maersk Discoverer semi-submersible drilling rig under the Noblige-2 Appraisal Well Environment Plan Bridging Document and Drilling & Completions – North West Shelf Environment Plan Revision 5 both approved by DMP.

At the completion of drilling and evaluation, the Noblige-2 well was plugged and abandoned, consistent with the Woodside Engineering Standard – Well Barriers, Woodside Well Barrier Guidelines and the approved Noblige-2 Drilling Program. The Noblige-2 Drilling Program included the provision to leave the wellhead on the seabed. NOPSA approved the Drilling Program for the Noblige-2 appraisal well on 27 July 2011. As the well intersected hydrocarbons, the P&A program was undertaken as per the requirements for a well containing hydrocarbons, requiring two permanent barriers (cement plugs) to be installed.

Following the installation and testing of the permanent barrier, Woodside removed the BOP and attempted to mechanically cut the well casing between 2.9 m and 12.0 m below the mudline to retrieve the wellhead assembly. Three attempts were made over three days to mechanically cut and retrieve the wellhead from Noblige-2, but operations were ultimately unsuccessful. The inability to cut the wellhead was mainly attributed to the missing centralization of 20” casing within 36” conductor. As such, the wellhead assembly, extending 4.4 m above the mudline, was left in-situ, and the DMP advised.

Only seawater remains within the well above the top cement plug.

3.3.4 Martin-1

The Martin-1 well was drilled by the semi-submersible drilling rig Maersk Discoverer under the Martin-1 Exploration Well Environment Plan Bridging Document. The rig arrived on location on 13 December

2010 and the well was spudded on 15 December 2010. After several interruptions to drilling due to cyclones, Martin-1 was drilled to a final total depth of 4778.0 mRT, reached on 13 March 2011. After logging, Martin-1 was suspended as 'gas proven' with a series of permanent cement plugs. The rig was released from contract on 3 April 2011.

Martin-1 was 'suspended' with permanent downhole barriers installed. These consist of a series of cement plugs (four stacked plugs on the bottom with a fifth plug above). Martin-1 was suspended for a potential future side-track.

Well abandonment procedures and reservoir isolations performed for Martin-1 well was submitted to NOPSEMA as Martin-1 Well Abandonment Assessment in 2017. The assessment demonstrated the adequacy of the downhole barriers such that the wells have been classed as permanently abandoned. NOSPEMA reviewed the submission and confirmed they are "reasonably satisfied" that the process undertaken in setting permanent downhole barriers meets the requirement of the Well Operations Management Plan (WOMP). The letter confirming satisfaction is Martin-1 - NOPSEMA Ref. R015645: ID4211: A573656, dated 4 October 2017.

The well was drilled with WBM and some residual amounts are expected to be present within the well. The well was suspended with a wellhead cap or 'trash cap' covering the well opening 3.78 m above seabed. No corrosion inhibitor was displaced under it.

3.4 Wellheads Composition

The wellheads are all made of mild steel (AISI 4130), with small amounts of elastomeric materials such as Teflon and Viton used within the seal components. All the wellheads have 36 inch diameter conductors and are all DrillQuip SS-10 model. Only Remy-1 has a mud-mat installed. All the other wellheads have a simple conductor. No Temporary Guide Base (TGB) or Permanent Guide Base (PGB) systems were installed on any of the wells.

The total weight of the steel material, which consists of the 36" conductor plus a low and high pressure wellhead elements and the 20" casing, varies very little between the wellheads. The total weight of the infrastructure left on the seabed has been estimated at 7500 kg per wellhead.

The 20" drill casing remaining on the seabed at Remy-1 is made of carbon steel grade X56 (equivalent to the German Class E 385, 7). The casing is approximately 16.1 mm thick and would weigh approximately 192 kg/m² resulting in a total weight of 45,000 kg.

3.5 Selection of Well Fluids

The top section of each well was drilled riserless with water based drilling fluid. The drilling fluid was seawater and the additives for this top section were a high viscosity pill (guar gum) and pre-hydrated gel (bentonite clay). The environmental toxicity of these chemicals is presented in **Table 3-1**.

Table 3-1: Remy-1, Martin-1, Kelt-1 and Noblige-2 top section drilling fluid formation

Component	Function	OCNS Ranking
Guar gum	Viscocifier	E
Bentonite clay	Pre-hydrated gel	E

These well fluids are listed as 'E' category fluids under the Offshore Chemical Notification Scheme (OCNS). These rankings are based on toxicity and other relevant parameters such as biodegradation, and bioaccumulation, in accordance with one of two schemes (as shown in **Table 3-1**):

- **Hazard Quotient (HQ) Colour Band:** Gold, Silver, White, Blue, Orange and Purple (listed in order of increasing environmental hazard); or

- **OCNS Grouping:** E, D, C, B or A (listed in order of increasing environmental hazard). Used for inorganic substances, hydraulic fluids and pipeline chemicals only.

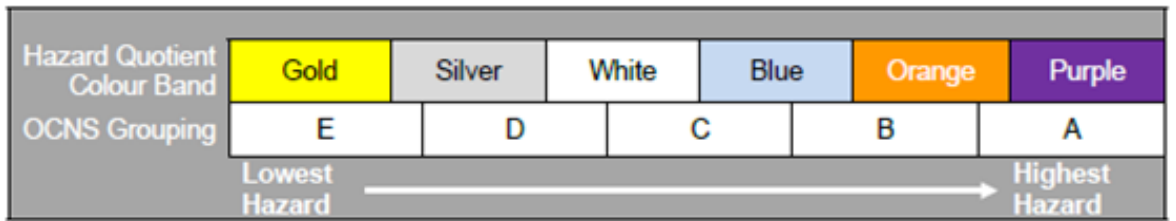


Figure 3-1: OCNS ranking scheme

Following installation of permanent reservoir isolation cement barriers, the wells (between the top cement plug and the wellhead) and the A-annulus, were filled with seawater for all wells except Martin-1. Martin-1 had WBM (Ultradrill) still inside the top section of the well. Ultradrill whole fluids and fluid components are classified as ‘non-toxic’. The drilling mud system formulation used for the drilling activity is shown in **Table 3-2**.

The Ultradrill within Martin-1 is expected to have degraded rapidly with time and with well temperature (<1 year). There may be residual amounts of these non-toxic components settled out from the seawater, if complete degradation has not occurred. These will have settled on top of the top cement plug, 2.6 km below the seabed.

Table 3-2: Ultradrill WBM drilling fluid formation

Component	Function	Concentration Range
Seawater/Drill water	-	As required
Na ₂ CO ₃	Drill water hardness control	0.25 – 0.6 kg/m ³
KCl/NaCl	Clay stabilisation	0 – 76 kg/m ³
Polyanionic cellulose	Fluid loss control and viscosifier	2.5 – 8.5 kg/m ³
Acrylic acid co-polymer	Cutting’s encapsulation and stabilisation	2.5 – 8.5 kg/m ³
Olefin ester blend	Anticrete – rate of penetration enhancer	3%
Xanthan gum polymer	Viscosifier	1.3 – 2.5 kg/m ³
Polyamine	Shale stabiliser	3%

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The following is a summary of the main environment characteristics identified for the Wellhead Operational Area:

- Located within offshore waters, within deep waters of the aphotic bathypelagic zone (depths within the Wellhead Operational Area range between 1,297 m and 1,446 m);
- Relatively flat and featureless seabed comprising of soft sediments, including fine grained muddy sands, silts and detritus material sourced from shallower waters. There is a lack of hard substratum present;
- The Exmouth Plateau Key Ecological Feature (KEF) overlaps the Remy-1 and Noblige-2 Operational Areas. The Exmouth Plateau KEF is a geomorphic feature, and may enhance upwelling of nutrient rich seawater;
- Benthic communities are expected to be of low abundance and low diversity within the Wellhead Operational Area, and consistent with much of the broader North-west Province (NWP);
- Twenty-two species considered to be Matters of National Environmental Significance (MNES) were identified as potentially occurring within the Wellhead Operational Area. No Biologically Important Areas (BIAs) overlap with the Wellhead Operational Area; and
- Four Commonwealth fisheries and four State fisheries overlap the Wellhead Operational Area, however little fishing effort occurs due to the Operational Area's water depth and distance from shore.

4.1 Regional and Deep Water Context

The Wellhead Operational Area is located in Commonwealth waters within the North-west Marine Region (NWMR) (Figure 4-1) as defined under the Integrated Marine and Coastal Regionalisation of Australia (National Oceans Office and Geoscience Australia, 2005). The NWMR is further divided into provinces, and the Wellhead Operational Area is located with the North-west Province (NWP) of the NWMR. The NWP is located between Exmouth and Port Hedland and covers a total area of 188,730 km² (DEWHA, 2008; Heap et al., 2005).

The wellheads lie within the deep waters of the aphotic bathypelagic zone of the NWP on the edge of the Exmouth Plateau within the Montebello Trough. Water depths at the four wellheads range between 1,297 m and 1,446 m where the seabed is characterised as being relatively flat and featureless comprising of soft sediments, including fine grained muddy sands, silts and detritus material sourced from shallower waters (Falkner et al., 2009). There is a lack of hard substratum present on the Exmouth Plateau, where Wellhead Operational Area is located (DSEWPaC, 2012a).

The bathypelagic zone is characterised by cold, oxygen and nutrient rich water which receives very little (<1%) sunlight. Below the thermocline, water temperature typically continues to decrease with depth and near-seabed temperatures are expected to be very low (<6°C). As a result, photosynthesis is unable to take place in this zone and nearly all available nutrients result from detritus material (i.e. the remains of plants and animals) drifting down to this zone from more productive waters of the epipelagic and mesopelagic zones. The Exmouth Plateau KEF, which overlaps the Wellhead Operational Area of Remy-1 and Noblige-2, is a region of upwelling, where deep, cool and nutrient-rich waters are forced up into the photic zone (DSEWPaC, 2012a).

These deep water areas of soft substrate typically support a low abundance, richness and diversity of benthic communities, and areas of hard substrate typically support more diverse epibenthic communities (Heyward et al., 2001b). The deep water depth and the presence of mostly fine grained

sediments with a lack of hard substrate suggests abundances and diversity will be low. Habitats within the Wellhead Operational Area are further discussed in **Section 4.3.3**.

4.2 Physical Environment

Bathymetry

The Wellhead Operational Area is located within the Exmouth Basin sub-region of the NWP, in a feature known as the Montebello Trough. Water depths at the four wellheads range between 1,297 m and 1,446 m where the seabed is characterised as being relatively flat and featureless. Although Remy-1 and Noblige-2 Operational Areas overlap the Exmouth Plateau KEF, the area it overlaps is flat, and is adjacent to where the bathymetry slopes steeply up to the relatively flat plateau.

Marine Sediments

Deep water sediments within the Wellhead Operational Area comprise fine carbonate sands and silts derived from marine detritus from the water column above. Carbonate sediments generally account for the bulk of sediment composition, with both biogenic and precipitated sediments present on the outer shelf of the Exmouth Plateau sub-region where the Operational Area lies. Marine sediment in the Wellhead Operational Area is expected to consist of fine grained muddy sands and silts, typical of the deep water seabed in the region.

4.3 Biological environment

No Critical Habitats or Threatened Ecological Communities as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are known to occur within the Wellhead Operational Area.

4.3.1 Benthic communities

Deep water areas of soft substrate like those found in the Wellhead Operational Area typically support a low abundance, richness and diversity of benthic communities. However, areas of hard substrate in deep water areas typically support more diverse epibenthic communities. Although little information exists on benthic communities over the NWP, the presence of soft sediments and limited hard substrate suggests the region may support some patchy distributions of filter feeders and other epifauna, including mobile epibenthos (e.g. sea cucumbers, ophiuroids, echinoderms, polychaetes and sea-pens (Brewer et al., 2007).

Benthic communities which may be present within the Wellhead Operational Area include epifauna (filter and deposit feeders living on the surface of the seabed, e.g. sponges) and infauna (animals living in sediments, e.g. polychaetes). The absence of hard substrate is considered a limiting factor for the recruitment of epibenthic organisms.

Sedimentary infauna associated with soft unconsolidated sediments such as those of the Wellhead Operational Area, is known to be widespread and well represented along the continental shelf and upper slopes in the NWP region. Consequently, in the context of the contiguous extent of habitats across the region, benthic habitat within the Wellhead Operational Area, which consists primarily of soft unconsolidated sediments, is considered to be of relatively low environmental sensitivity.

A deepwater ROV survey conducted by Woodside in waters between 821 and 2,038 m depths off the coast of WA identified benthic associated species across four distinct well sites. At the survey location most consistent with depths, sediment and geomorphology of the Wellhead Operational Area, benthic fauna encountered were mainly echinoderms (e.g. sea cucumbers and sea stars) (Bryce et al., 2015). Distinct signs of infaunal bioturbators and potential mounds created by burrowing fish were also noted; however, abundance was found to be generally low (Bryce et al., 2015). Although, benthic filter feeders and other epifauna and infauna are likely to inhabit the Wellhead Operational Area, water

depth and the presence of mostly fine grained sediments with a lack of hard substrate suggests abundances and diversity will be low, and consistent with much of the broader NWP.

4.3.2 Habitat Formation on the Wellheads

No surveys have been undertaken to assess the benthic habitat that has formed on these four wellheads and associated infrastructure over the last decade. However, a comparison has been drawn to a study undertaken by McLean et al. (2017). The study provides the first assessment of fish assemblages and habitat-forming marine growth associated with oil and gas wellheads and associated infrastructure in depths of 78-825 m on the north-west shelf of Western Australia. ROV video was analysed for 25 wellheads including one wellhead at 825 m water depth (PLA05). The ROV video of the PLA05 wellhead recorded one individual belonging to the family Moridae (cod-like fish). The wellhead had approximately 12% cover of epibiota, which was a similar percentage cover to the wellheads analysed in 490-550 m of water depth. The PLA05 wellhead was of a similar age to the wellheads in the Wellhead Operational Area at the time of the ROV survey (7 years old), though given the well was a production wellhead assembly rather than an exploration wellhead configuration, it had a significantly larger surface area and far more complex structure for shelter for fauna when compared to the wellheads within the Wellhead Operational Area.

4.3.3 Plankton

Phytoplankton within the Wellhead Operational Area are expected to reflect the conditions of the NWMR. Primary productivity of the NWMR appears to be largely driven by offshore influences (as reported by Brewer et al., 2007), with periodic upwelling events and cyclonic influences driving coastal productivity with nutrient recycling and advection. There is a tendency for offshore phytoplankton communities in the NWMR to be characterised by smaller taxa (e.g. bacteria), whereas, shelf waters are dominated by larger taxa such as diatoms (Hanson et al., 2007).

Zooplankton within the Wellhead Operational Area is expected to be similar to offshore waters in the NWP and may include organisms that complete their lifecycle as plankton (e.g. copepods, euphausiids) as well as larval stages of other taxa such as fishes, corals and molluscs. Peaks in zooplankton such as mass coral spawning events (typically in March and April) (Rosser and Gilmour, 2008; Simpson et al., 1993b) and fish larvae abundance can occur throughout the year (CALM, 2005).

4.3.4 Species

A total of twenty-two EPBC Act listed species considered to be MNES (i.e. listed as threatened or migratory) were identified as potentially occurring within the Wellhead Operational Area (**Table 4-1**). Of these eleven are considered threatened marine species and all are considered migratory species under the EPBC Act.

A review of the Conservation Values Atlas identified found no listed BIAs overlap the Wellhead Operational Area.

Table 4-1 Threatened and migratory marine species under the EPBC Act potentially occurring with the Well Abandonment Area

Species Name	Common Name	Threatened Status	Migratory Status	Relevant to Petroleum Activities Program ¹

¹ The habitat that the species uses has been considered and where the habitat is not considered likely to occur in the Operational Area (as defined in **Section 2**, which includes only 20 m of water above the seabed), the species is not considered relevant as it would not be impacted by the Petroleum Activities Program, and as such, have not been discussed further.

Mammals				
<i>Balaenoptera borealis</i>	Sei Whale	Vulnerable	Migratory	No
<i>Balaenoptera musculus</i>	Blue Whale	Endangered	Migratory	No
<i>Balaenoptera physalus</i>	Fin Whale	Vulnerable	Migratory	No
<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable	Migratory	No
<i>Balaenoptera edeni</i>	Bryde's Whale	N/A	Migratory	No
<i>Orcinus orca</i>	Killer Whale, Orca	N/A	Migratory	No
<i>Physeter macrocephalus</i>	Sperm Whale	N/A	Migratory	No
Reptiles				
<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Migratory	No
<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Migratory	No
<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered	Migratory	No
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Vulnerable	Migratory	No
<i>Natator depressus</i>	Flatback Turtle	Vulnerable	Migratory	No
Sharks and Rays				
<i>Carcharodon carcharias</i>	White Shark, Great White Shark	Vulnerable	Migratory	No
<i>Isurus oxyrinchus</i>	Shortfin Mako, Mako Shark	N/A	Migratory	No
<i>Isurus paucus</i>	Longfin Mako	N/A	Migratory	No
<i>Manta birostris</i>	Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray	N/A	Migratory	No
Mammals				
<i>Calidris canutus</i>	Red Knot, Knot	Endangered	Migratory	No
<i>Actitis hypoleucos</i>	Common Sandpiper	N/A	Migratory	No
<i>Anous stolidus</i>	Common Noddy	N/A	Migratory	No
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	N/A	Migratory	No
<i>Calidris melanotos</i>	Pectoral Sandpiper	N/A	Migratory	No
<i>Fregata ariel</i>	Lesser Frigatebird, Least Frigatebird	N/A	Migratory	No

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4.4 Socio-Economic and Cultural

Cultural Heritage

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

A search of the Australian National Shipwreck Database indicated that there are no known historic shipwrecks within the Wellhead Operational Area (DoEE, 2018).

There are no known National or Commonwealth heritage listed sites within the Wellhead Operational Area.

Commonwealth and State Fisheries

Little fishing effort occurs in the Wellhead Operational Area due to the water depth and distance from shore. Commonwealth fisheries designated management areas overlapping the Wellhead Operational Area include:

- North West Slope Trawl Fishery;
- Southern Bluefin Tuna Fishery;
- Western Skipjack Fishery; and
- Western Tuna and Billfish Fishery.

Four State fisheries designated management areas overlap the Wellhead Operational Area. These include:

- Mackerel Managed Fishery;
- South West Coast Salmon Managed Fishery;
- West Coast Deep Sea Crustacean Managed Fishery; and
- Pearl Oyster Managed Fishery.

Tourism and Recreational Fishing

No tourism activities have been identified which take place specifically within the Wellhead Operational Area due to the water depths and distance offshore. Recreational fishing is highly unlikely to occur in the Wellhead Operational Area.

Shipping Activity

No shipping fairways intersect the Wellhead Operational Area; however, a major route to and from the port of Fremantle lies approximately 40 km west of the Wellhead Operational Area. AMSA confirmed vessel traffic does currently occur above the Wellhead Operational Area but is sparse. Traffic associated with the main shipping fairway to the west of the Wellhead Operational Area is mainly within, or to the west of the fairway.

Oil and Gas Infrastructure

The NWMR supports a number of industries including petroleum exploration and production, as well as minerals extraction. The Wellhead Operational Area is approximately 96 km north-west of the Wheatstone Platform and 99 km north-west of the Pluto platform; Chevron and Woodside are the operators of these facilities respectively.

Defence

No known defence areas overlap the Wellhead Operational Area; however, there are designated defence practice areas in the offshore marine waters off Ningaloo and the North West Cape.

4.5 Values and Sensitivities

Many sensitive receptor locations are protected as part of Commonwealth and State managed areas, however, none of these overlap the Wellhead Operational Area. The benthic offshore environment of the Wellhead Operational Area does overlap with the Exmouth Plateau KEF. The KEF overlaps the Wellhead Operational Area for the Remy-1 and Noblige-2 wellheads. No other sensitive areas including Australian Marine Parks (formerly Commonwealth Marine Reserves), State Marine Parks and Reserves, World Heritage Areas, protected species habitats or other KEFs occur within the Wellhead Operational Area.

5. COMPARATIVE ASSESSMENT

The base case for decommissioning the four wellheads and associated infrastructure is complete removal, as per subsection 572(3) OPGGS Act. However, the Act also allows for alternative arrangements under subsection 270(3), as long as the alternative delivers equal or better environmental, safety and well integrity outcomes compared to complete removal, and that the approach complies with all other legislative and regulatory requirements. This is outlined in the Offshore Petroleum Decommissioning Guideline, effective 17 January 2018.

As part of an initial screening assessment, seven decommissioning options were identified with four deemed unsuitable. The three suitable options included:

- Complete removal of all four wellheads (base case);
- Leave in-situ all four wellheads; and
- Partial removal (leave approximately 1 m of well casing protruding above the seabed).

These were taken forward for further assessment using a comparative assessment. The comparative assessment process, based on UK Guidelines for Comparative Assessment in Decommissioning Programmes and applied to the OPGGS Act, evaluates the impacts, risks (and benefits) of each permanent wellhead management option, against a range of set criteria. The assessment criteria used for comparison of the wellhead management options included:

- Legislation/codes/standards;
- Technical feasibility;
- Health and safety;
- Environment;
- Social Economic; and
- Cost.

During the comparative assessment process, the impacts, risks and benefits of the three suitable options were identified and ranked in a multi-disciplinary workshop. The rankings were then compared.

5.1 Base Case – Wellhead Removal

Attempting to completely remove the wellheads (using a mechanical cutter) has been assessed as having High technical feasibility risks due to the water depth, limited stabilisation which cannot be overcome easily at this depth, and because the removal of three of the wellheads have already been attempted using this method, and was operationally unsuccessful.

The activity would also have High health and safety risks as a result of wellheads removal activities such as lifting a wellhead which has no dedicated lift points (which could result in loss of load onto vessel or Mobile Offshore Drilling Unit (MODU) deck, resulting in damage to personnel). However, it is acknowledged that Woodside has the ability to manage these risks similar to other field operations undertaken by Woodside.

Negligible environmental impacts would arise from this option including loss of hard substrate as the wellheads currently provide a very small amount of benthic habitat, as well as generation of emissions and waste both from vessel activities and either permanent landfill disposal or scrapping of the wellheads. Localised disturbance to the seabed and water column from extracting the wellhead from the seabed was not considered a differentiator as there would also be localised disturbance to the seabed from long term degradation of the wellheads if left in-situ or partially removed. The use of a

MODU and support vessel for the activity would also introduce a loss of containment (LOC) risk as a result of a spill directly from the MODU/vessel.

Societal risks from removing the wellheads include a short-term displacement of other users in the field during the wellhead removal campaign, e.g. commercial vessels. This was also noted by the Western Australian Fishing Industry Council (WAFIC) during stakeholder consultation. This would have a limited impact and low magnitude due to short time and low level of fishing and shipping in the area.

There would be significant cost associated with completely recovering the wellheads, even if mobilisation of a MODU to the location were covered by a larger campaign. This cost is considered disproportionate to the benefit gained, given the additional risks introduced as described above for complete removal.

5.2 Option 1 – Leaving Wellheads in-situ

The comparative assessment resulted in no technical risks, significantly less health and safety risks (which were also lower in magnitude as a result of no in-field or onshore activities being required) and minimal environmental and societal impacts and risks for this option.

There were Moderate risks against legislation, codes and standards including, acceptability under the OPGGS Act as this is not the base case and will require acceptance by NOPSEMA that this option is acceptable. There is also a Moderate risk associated with the potential acceptance for a sea dumping permit by the DoEE under the Sea Dumping Act. The Department of Primary Industries and Regional Development (DPIRD) support the complete removal of the wellheads and well casing option, unless it can be demonstrated that these structures are appropriately remediated to ensure the area is left in a condition that allows fishing operations of all types to occur in the future, and/or provides a significant benefit to aquatic resources. The wellheads are not expected to provide significant benefit to aquatic resources. The risk to future fishing operations are Slight and considered broadly acceptable when compared to the historic and current use of the area. Leaving the wellheads in-situ is not considered a potential long-term safety risk to commercial bottom trawling fishermen, largely because of the water depth, as even if a trawl vessels snagged a wellhead in this depth, it is not considered credible that it could capsize the vessel.

In summary, this option provides a better environmental outcome and lower safety risks, with one Slight risk regarding potential future benthic fishing.

5.3 Option 2 – Partial Wellhead Removal

5.3.1 Kelt-1, Noblige-2 and Remy-1

There are Moderate risks against legislation, codes and standards for partially removing the wellheads using a diamond wire saw. The option would require an accepted EP for this alternative option (as opposed to the base case which is complete removal), and potentially require acceptance for a sea dumping permit by the DoEE under the Sea Dumping Act.

A Low technical feasibility risk (i.e. not no risk) was identified for partial removal largely due to Woodside not having the same experience with this technology (industry experience risk). As with the Base Case, the activity would also have High health and safety risks, as a result of the general health and safety risks that would be identified in a safety case from this activity e.g. accommodation fires, occupational incidents, helicopter crashes, dropped objects, vessel structural integrity.

Similar environmental impacts would also arise from this option as for complete removal including localised disturbance to the seabed and water column impacts from extracting the wellhead from the seabed; and loss of hard substrate which currently provides a small amount of benthic habitat. Other environmental impacts would be the generation of emissions and waste both from vessel activities and permanent landfill disposal of the wellheads. The use of a vessel also introduces a LOC risk.

Societal risks from partially removing the wellheads include a short-term impact of displacement of other users in the field during the wellhead removal campaign. This would have a limited impact and low magnitude due to short time and low level of fishing and shipping in the area. However, the partial removal would reduce the risk of long-term (in perpetuity) impacts to commercial fishing vessels from snagging, as the wellheads (and snagging risk) would be reduced from up to 4.37 m for Noblige-2 to 1 m after cutting with a diamond wire saw. This is not a significant benefit however as there is no known bottom trawling conducted at these depths in the area and the likelihood of future fishing in the area is unknown, but based on historical trends is likely to be low.

There is a Moderate cost associated with partially recovering the wellheads, even if mobilisation of an intervention vessel to the location were covered by a larger campaign. This cost is considered disproportionate to the benefit gained, given the additional risks introduced as described above for and given that Woodside has already attempted to fulfil its primary obligation to remove.

5.3.2 Martin-1

Attempting to completely or partially remove the Martin-1 wellhead (using a mechanical or diamond wire saw) has almost all of the same risks described above for partial or complete removal of the Kelt-1, Noblige-2 and Remy-1 wellheads. Only one difference in the risk rankings for Martin-1 well was identified. This was associated with an attempt to completely remove the wellhead (using a mechanical cutter), which has been assessed as having a Low technical feasibility risk (opposed to High for the other three wells) as using a mechanical cutter is an industry standard technology, which Woodside has executed successfully many times in the past. As this wellhead has not been attempted to be removed in the past, there is no elevated risk in using this technology for this wellhead. However, this was the only difference in risk rankings between this wellhead and the risks identified and discussed above for the Kelt-1, Noblige-2 and Remy-1 wellheads.

The comparative assessment showed that for each wellhead, leaving the infrastructure in-situ was the preferred option. This approach will deliver an equal or better environmental and safety outcome compared to complete removal, and complies with legislative and regulatory requirements. Well integrity does not change for any of the options considered.

5.4 Conclusion

The comparative assessment showed that for the Kelt-1, Noblige-2 and Remy-1 wellheads and Remy-1 well casing, leaving the infrastructure in-situ was the preferred option. This is primarily based on the depth of the wellheads, which are in very deep water (1,297 – 1,445 m). Feedback received during stakeholder consultation confirmed that wellheads would not impact current other users of the sea. Future impact on commercial bottom trawl fishing at this depth was also investigated and is considered highly unlikely. This is because bottom trawling has not operated at this water depth in this area in the past. The technical feasibility of complete removal of the wellheads and well casing is considered a Moderate risk of being unsuccessful primarily due to the failure during previous attempts to remove them. Based on these results, leaving these three wellheads and well casing in-situ is the preferred option.

Even when considered separately, the best permanent management option for the Martin-1 wellhead, which has not been attempted to be removed, is to leave it in-situ. This option is considered to have the best overall performance as it results in less risk to personnel, has the least environmental impacts when compared to the base case of complete removal, and has overall higher environmental benefits, even if the benefits are small.

6. ENVIRONMENTAL IMPACTS AND RISKS

6.1 Risk Identification and Evaluation

Woodside undertook an environmental risk assessment to identify the potential environmental impacts and risks associated with the Petroleum Activities Program, and the control measures to manage the identified environmental impacts and risks to as low as reasonably practicable (ALARP) and an acceptable level. This risk assessment and evaluation was undertaken using Woodside’s Risk Management Framework.

Environmental impacts and risks include those directly and indirectly associated with the Petroleum Activities Program, and includes potential emergency and accidental events. Planned activities have the potential for inherent environmental impacts. An environmental risk is an unplanned event with the potential for impact (termed risk ‘consequence’).

Herein, potential impact from planned activities are termed ‘impacts’, and ‘risks’ are associated with unplanned events with the potential for impact (should the risk be realised), with such impact termed potential ‘consequence’.

The key steps of Woodside’s Risk Management Framework are shown in **Figure 6-1**. A summary of each step and how it is applied to the proposed Program is provided below.

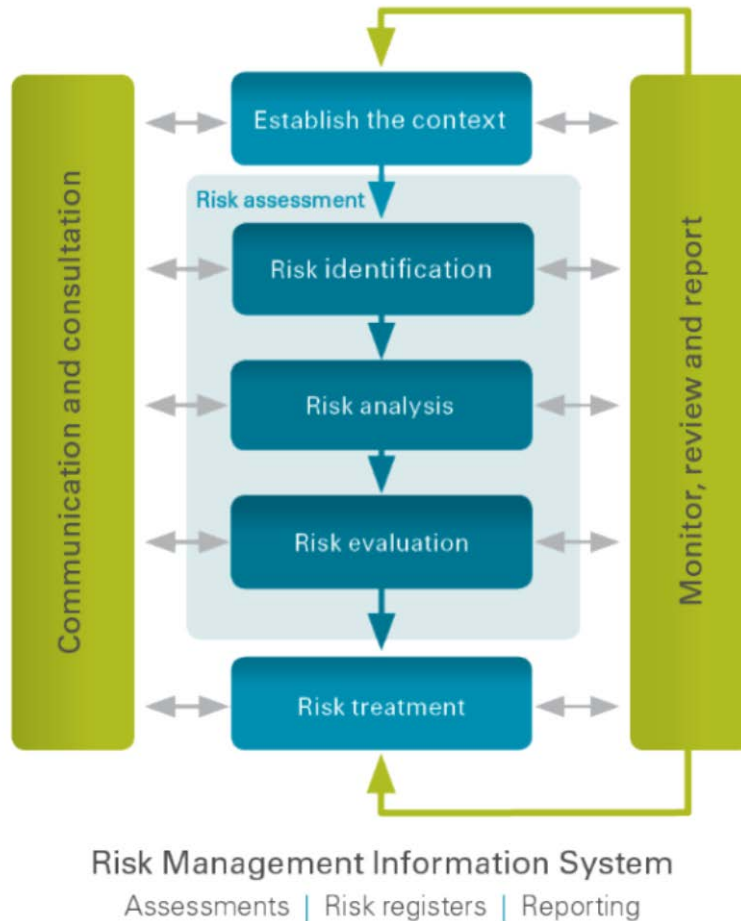


Figure 6-1: Key steps in Woodside’s Risk Management Framework

6.1.1 Establish the Context

The objective of a risk assessment is to assess identified risks and apply appropriate control measures to eliminate, control or mitigate the risk to ALARP and to determine if the risk is acceptable.

Hazard identification workshops aligned with NOPSEMA's Hazard Identification Guidance Note were undertaken by multidisciplinary teams made up of relevant personnel with sufficient breadth of knowledge, training and experience to reasonably assure that risks and associated impacts were identified and assessed.

6.1.2 Risk Identification

An Environmental Hazard Identification (ENVID) was undertaken by multidisciplinary teams consisting of relevant engineering and environmental personnel with sufficient breadth of knowledge, training and experience to reasonably assure that risks were identified and their potential environmental impacts assessed.

Impacts and risks were identified during the ENVID for both planned (routine and non-routine) activities and unplanned (accidents/incidents/emergency conditions) events.

6.1.3 Risk Analysis

Risk analysis further develops the understanding of a risk by defining the impacts and assessing appropriate controls. Risk analysis considered previous risk assessments for similar activities, review of relevant studies, review of past performance, external stakeholder consultation feedback and review of the existing environment.

The following key steps were undertaken for each identified risk during the risk assessment:

- identification of decision type in accordance with the decision support framework
- identification of appropriate control measures (preventative and mitigation) aligned with the decision type
- Assessment of the risk rating.

6.1.3.1 Decision Support Framework

To support the risk assessment process and Woodside's determination of acceptability, Woodside's HSE risk management procedures include the use of decision support framework based on principles set out in the Guidance on Risk Related Decision Making. This concept has been applied during the ENVID or equivalent preceding processes during historical design decisions to determine the level of supporting evidence that may be required to draw sound conclusions regarding risk level and whether the risk is acceptable and ALARP. This is to confirm:

- activities do not pose an unacceptable environmental risk
- appropriate focus is placed on activities where the risk is anticipated to be acceptable and demonstrated to be ALARP
- Appropriate effort is applied to the management of risks based on the uncertainty of the risk, the complexity and risk rating.

The framework provides appropriate tools, commensurate to the level of uncertainty or novelty associated with the risk/impact (referred to as the decision type A, B or C). The decision type is selected based on an informed discussion around the uncertainty of the risk/impact, and documented in ENVID worksheets.

This framework enables Woodside to appropriately understand a risk, determine if the risk or impact is acceptable and can be demonstrated to be ALARP.

Decision Type A

Decision Type A are well understood and established practice, they generally consider recognised good industry practice which is often embodied in legislation, codes and standards and use professional judgment.

Decision Type B

Decision Type B typically involves greater uncertainty and complexity (and can include potential higher order impacts/risks). These risks may deviate from established practice or have some lifecycle implications and therefore require further engineering risk assessment in order to support the decision and ensure that the risk is ALARP. Engineering risk assessment tools may include:

- risk-based tools such as cost based analysis or modelling;
- consequence modelling;
- reliability analysis; and
- company values.

Decision Type C

Decision Type C typically has significant risks related to environmental performance. Such risks or impacts typically involve greater complexity and uncertainty, therefore requiring adoption of the precautionary approach. For risks this may result in significant environmental impact; significant project risk/exposure or may elicit negative stakeholder concerns. For these risks or impacts, in addition to Decision Type A and B tools, company and societal values need to be considered by undertaking broader internal and external stakeholder consultation as part of the assessment process.

6.1.3.2 Identification of Control Measures

Woodside applies a hierarchy of control measures when considering Good Practice and Professional Judgement. The hierarchy of control is applied in order of importance as follows; elimination, substitution, engineering control measures, administrative control measures and mitigation of consequences/impacts.

6.1.3.3 Risk Rating Process

The current risk rating process is undertaken to assign a level of risk to each impact measured in terms of consequence and likelihood. The assigned risk level is the current risk (i.e. risk with controls in place) and is therefore determined following the identification of the decision type and appropriate control measures.

The risk rating process considers the environmental impacts and where applicable, the reputational and brand, legal/compliance and social and cultural impacts of the risk. The risk ratings are assigned using the Woodside Risk Matrix (refer to **Figure 6-2**).

The risk rating process is performed using the following steps:

Select the Consequence Level

Determine the most credible impacts associated with the selected event assuming some controls (prevention and mitigation) have failed (refer to **Table 6-1**). Where more than one impact applies (i.e. environmental and legal/compliance), the consequence level for the highest severity impact is selected.

Table 6-1: Woodside Risk Matrix (environment and social and cultural) consequence descriptions

Environment	Social & Cultural	Consequence Level
Catastrophic, long-term impact (> 50 years) on highly valued ecosystems, species, habitat or physical or biological attributes	Catastrophic, long-term impact (>20 years) to a community, social infrastructure or highly valued areas/items of international cultural significance	A
Major, long term impact (10-50 years) on highly valued ecosystems, species, habitat or physical or biological attributes	Major, long-term impact (5-20 years) to a community, social infrastructure or highly valued areas/items of national cultural significance	B
Moderate, medium-term impact (2-10 years) on ecosystems, species, habitat or physical or biological attributes	Moderate, medium term Impact (2-5 years) to a community, social infrastructure or highly valued areas/items of national cultural significance	C
Minor, short-term impact (1-2 years) on species, habitat (but not affecting ecosystems function), physical or biological attributes	Minor, short-term impact (1-2 years) to a community or highly valued areas/items of cultural significance	D
Slight, short-term impact (<1 year) on species, habitat (but not affecting ecosystems function), physical or biological attributes	Slight, short-term impact (<1 year) to a community or areas/items of cultural significance	E
No lasting effect (<1 month). Localised impact not significant to environmental receptors	No lasting effect (<1 month). Localised impact not significant to areas/items of cultural significance	F

Select the Likelihood Level

Select the likelihood level from the description that best fits the chance of the selected consequence actually occurring, assuming reasonable effectiveness of the prevention and mitigation controls (refer to **Table 6-2**).

Table 6-2: Woodside risk matrix likelihood levels

Likelihood Description						
Frequency	1 in 100,000 – 1,000,000 years	1 in 10,000 – 100,000 years	1 in 1,000 – 10,000 years	1 in 100 – 1,000 years	1 in 10-100 years	>1 in 10 years
Experience	Remote: Unheard of in the industry	Highly Unlikely: Has occurred once or twice in the industry	Unlikely: Has occurred many times in the industry but not at Woodside	Possible: Has occurred once or twice in Woodside or may possibly occur	Likely: Has occurred frequently at Woodside or is likely to occur	Highly Likely: Has occurred frequently at the location or is expected to occur
Likelihood Level	0	1	2	3	4	5

Calculate the Risk Rating

A likelihood and risk rating is only applied to environmental risks using the Woodside Risk Matrix. This risk level is used as an input into the risk evaluation process and ultimately for the prioritisation of further risk reduction measures. Once each risk is treated to ALARP, the risk rating articulates the ALARP baseline risk as an output of the ENVID studies.

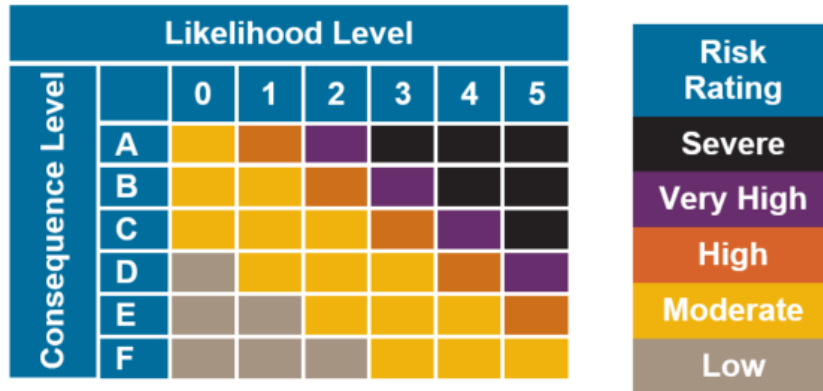


Figure 6-2: Woodside risk matrix: risk level

The ENVID (undertaken in accordance with the methodology described above) identified four sources of environmental risk, comprising three planned, which are all assessed as having a low current risk rating, and one unplanned sources of risk, which is assessed as having a low current risk rating.

The risk analysis and evaluation for the Petroleum Activities Program indicate that all of the current environmental risks and impacts associated with the activity are reduced to ALARP and are of an acceptable level (refer to **Figure 6-2**).

6.1.4 Impact and Risk evaluation

Environmental risks, as opposed to safety risks, cover a wider range of issues, differing species, persistence, reversibility, resilience, cumulative effects and variability in severity. The degree of environmental risk and the corresponding threshold for whether a risk/impact has been adapted to include principles of ecological sustainability (given as an objective in the Environment Regulations and defined in the EPBC Act), the Precautionary Principle and the corresponding environmental risk threshold decision-making principles used to determine acceptability.

6.1.4.1 Demonstration of ALARP

Descriptions have been provided below (**Table 6-3**) to articulate how Woodside demonstrates different risks, impacts and Decision Types identified within the EP are ALARP.

Table 6-3: Summary of Woodside’s criteria for ALARP demonstration

Risk	Impact (Consequence)	Decision Type
Low and Moderate	Negligible, Slight or Minor (D, E or F)	A
Woodside demonstrates these Risks, Impacts and Decision Types are reduced to ALARP: <ul style="list-style-type: none"> if controls identified meet legislative requirements, industry codes and standards, applicable company requirements and industry guidelines. further effort towards impact/risk reduction (beyond employing opportunistic measures) is not reasonably practicable without sacrifices grossly disproportionate to the benefit gained. 		
High, Very High or Severe	Moderate and above (A, B, or C)	B and C
Woodside demonstrates these higher order Risks, Impacts and Decision Types are reduced to ALARP (where it can be demonstrated using good industry practice and risk based analysis) that; Legislative requirements, applicable company requirements and industry codes and standards are met; Societal concerns are accounted for; and		

The alternative control measures are grossly disproportionate to the benefit gained.

6.1.4.2 Demonstration of Acceptability

Descriptions have been provided below (**Table 6-4**) to articulate how Woodside demonstrates how different risks, impacts and Decision Types identified within the EP are Acceptable.

Table 6-4: Summary of Woodside's criteria for Acceptability

Risk	Impact (Consequence)	Decision Type
Low and Moderate	Negligible, Slight or Minor (D, E or F)	A
Woodside demonstrates these Risks, Impacts and Decision Types are 'Broadly Acceptable', if they meet legislative requirements, industry codes and standards, applicable company requirements and industry guidelines.		
High, Very High or Severe	Moderate and above (A, B, or C)	B and C
<p>Woodside demonstrates these higher order Risks, Impacts and Decision are 'Acceptable if ALARP' can be demonstrated using good industry practice and risk based analysis, if legislative requirements are met and societal concerns are accounted for and the alternative control measures are grossly disproportionate to the benefit gained.</p> <p>In undertaking this process for moderate and high current risks, Woodside evaluates the following criteria:</p> <p>Principles of Ecological Sustainable Development (ESD) as defined under the EPBC Act;</p> <ul style="list-style-type: none"> • Internal context - the proposed controls and consequence/ risk level are consistent with Woodside policies, procedures and standards; • External context – consideration of the environment consequence • stakeholder acceptability and • other requirements – the proposed controls and consequence/ risk level are consistent with national and international industry standards, laws and policies. <p>Additionally, Very High and Severe risks require 'Escalated Investigation' and mitigation to reduce the risk to a lower and more acceptable level. If after further investigation the risk remains in the Very High or Severe category, the risk requires appropriate business engagement in accordance with Woodside's Risk Management Procedure to accept the risk. This includes due consideration of regulatory requirements.</p>		

6.2 Potential Environment Risks not included within the Scope of the Environment Plan

The ENVID identified a number of sources of environmental risk / impact that were assessed as not being applicable (not credible) within or outside the Wellhead Operational Area as a result of the Petroleum Activities Program. These sources of environmental risk / impact were determined to not form part of the EP and are described in the following sections for information only. These are described in **Table 6-5** below.

Table 6-5 Environmental risks that were assessed as not being credible.

Source of Risk	Justification for not being applicable (not credible)
Vessel based impacts and risks	Discharges (e.g. sewage, grey water), acoustic emissions, atmospheric emissions and spill risks (e.g. deck and bunkering spills) associated with vessel based operations were assessed as not credible as no vessel operations are proposed for this Petroleum Activities Program.
Helicopter operations	Interference with other aerial operations and acoustic emissions associated with helicopter operations were assessed as not credible as no helicopter operations are proposed for this Petroleum Activities Program.

<p>Displacement of commercial fishing</p>	<p>No specific tourism occurs in the Wellhead Operational Area (Section 4.4), occasionally charter boats or private motor vessels may pass through the area. As the wellheads are over 1000 m below the sea surface they will not impact charter boats or private motor vessels passing through the area. Consultation with stakeholders confirmed there were no concerns from recreational fishing stakeholders with the proposal to leave the wellheads and casing in-situ permanently.</p>
<p>Displacement of tourism operations</p>	<p>Shipping density data provided by AMSA confirms that low density shipping traffic does intersect the Wellhead Operational Area (Section 4.4). In addition, AMSA has advised that the presence of wellheads will not pose a risk to shipping in the future due to their low profile relative to the prevailing water depths. No shipping fairways intersect the Wellhead Operational Area.</p>
<p>Displacement of defence activities</p>	<p>No known defence areas overlap the Wellhead Operational Area (Section 4.4). As the wellheads are located in water depths >1,000 m, impacts to defence activities now or in the future as a result of the physical presence of the wellheads was assessed as not credible.</p>
<p>Planned or unplanned discharge of well fluid (Remy-1, Kelt-1 and Noblige-2)</p>	<p>The top sections of Remy-1, Kelt-1 and Noblige-2 including the A-annulus, comprises of seawater. There may be trace amounts of water-based drilling fluid additives (guar gum and bentonite) in these wells. Guar gum and bentonite are non-toxic and are classified as 'E' category fluids under OCNS (Section 3.4).</p> <p>If present, the guar gum and bentonite will have settled to the bottom of the well section (between 664 m and 2,434 m below the seabed). Given the small diameter of each of the well casings and the depths below the seabed at which the cement plugs are installed, the risk of planned or unplanned discharge of residual amounts of non-toxic components to the environment from Remy-1, Kelt-1 and Noblige-2 was assessed as not credible.</p>
<p>Impacts to the marine environment from WBM in Martin-1</p>	<p>WBM from the Martin-1 well were not flushed prior to abandonment and are contained within the well, above the top cement plug. The main chemical components of WBM (potassium chloride, barite and bentonite clay) are all listed by OSPAR as Posing Little Or No Risk to the Environment (PLONOR) based on results for toxicity, biodegradation and bioaccumulation. In addition, WBM biodegrade after <1 year. Therefore, there is no environmental toxicity risk.</p> <p>The residual WBM constituents that have not broken down over time are heavier than water and would have settled to the bottom of the well to sit on top of the top cement plug. The top cement plug in Martin-1 well is over 2000 m below the sea bed. The well casings are 13 3/8" or narrower. The only environmental impact residual constituents of WBM may present is possible physical effects to the environment, such as smothering. However, any fine residual components that could escape from the bottom of a narrow well casing of this depth would not be in sufficient quantities to smother, block light or otherwise impact on the environment. Therefore there is no credible risk derived from the WBM left in the permanently plugged and abandoned wells.</p>
<p>Unplanned anchoring</p>	<p>Risks associated with unplanned anchoring were assessed as not being applicable as the water depth in the Wellhead Operational Area is too deep</p>

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	for anchoring. There are also no vessel operations proposed for this Petroleum Activities Program.
Invasive marine species (IMS)	IMS management (i.e. hull fouling and ballast water) was assessed as not being applicable as there are no vessel operations proposed for this Petroleum Activities Program.
Shallow/near-shore activities	Risks associated with shallow / near-shore activities such as anchoring and vessel grounding were assessed as not being applicable as there are no vessel operations proposed for this Petroleum Activities Program.
Loss of well integrity	<p>The Kelt-1, Remy-1 and Noblige-2 Suspension Plans were submitted in accordance with the requirements of the Petroleum (Submerged Lands) (Management of Well Operations) Regulations 2004 and were accepted by the relevant regulator. The executed isolation of the reservoir section reflects the approved plans.</p> <p>Well abandonment procedures and reservoir isolations performed for Martin-1 well was submitted to NOPSEMA as Martin-1 Well Abandonment Assessment in 2017. The assessment demonstrated the adequacy of the downhole barriers such that the wells have been classed as permanently abandoned. As the wells have been abandoned with permanent downhole barriers in place, the loss of well integrity is not considered credible. As there is no credible hydrocarbon risk, no Oil Pollution Emergency Plan has been developed to support the EP.</p>

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7. ENVIRONMENTAL RISK AND IMPACTS SUMMARY

Table 7-1 presents a summary of the sources of impact/risk, analysis and evaluation for the Petroleum Activities program.

The risks identified during the ENVID (including decision type, current risk level, acceptability of risk and tools used in the demonstration of acceptability and ALARP) have been divided into two broad categories:

- planned (routine and non-routine) activities; and
- unplanned events (accidents, incidents or emergency situations).

A detailed description of credible environmental risks and potential impacts together with a summary of control measures have been presented in **Appendix B**.

Table 7-1: Environmental Risk and Impacts Register Summary

Aspect	EP Section	Source of Impact/Risk	Key Potential Environmental Impacts (Refer to relevant EP section for details)	Current Risk Rating				Acceptability of Impact/Risk
				Consequence	Potential Consequence level of impact ²	Likelihood	Current Risk Rating	
Planned Activities (Routine and Non-routine)								
Physical presence-disturbance to benthic habitats	6.6.1 (EP Summary Appendix A)	Interruption to seabed movement of sediments as a consequence of wellhead presence.	Disturbance to benthic habitats from scouring/accretion of sediments around wellhead. Presence of hard substrate allowing creation of a new habitat.	F	Environment – No lasting effect (<1 month). Localised impact not significant to environmental receptors.	-	-	Broadly acceptable
Non-routine discharges	6.6.2 (EP Summary Appendix A)	Corrosion/breakdown of wellhead over time resulting in release of trace amounts of metals.	Localised and not significant effects to sediment and water quality and marine biota in offshore waters.	F	Environment – No lasting effect (<1 month). Localised impact not significant to environmental receptors.	-	-	Broadly acceptable
Unplanned Activities (Accidents / Incidents)								
Physical presence resulting in accidental damage to trawling equipment	6.7.1 (EP Summary Appendix A)	Wellhead left in-situ resulting in accidental damage to trawling equipment.	Isolated social impact potentially resulting in accidental damage to trawling equipment.	F	Environment – No lasting effect (<1 month). Localised impact not significant to environmental receptors.	1	L	Broadly acceptable

8. ONGOING MONITORING OF ENVIRONMENTAL PERFORMANCE

The Petroleum Activities Program will be managed in compliance with the WA-404-P Exploration Wellheads EP 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 identify, mitigate and manage potentially adverse environmental impacts associated with the Petroleum Activities Program, during both planned and unplanned operations, to ALARP and an acceptable level.

For each environmental aspect (risk), and associated environmental impacts (identified and assessed in the Environmental Risk Assessment of the EP) a specific environmental performance outcome, environmental performance standards and measurement criteria have been developed. The performance standards are control measures (available in **Appendix A**) that will be implemented (consistent with the performance standards) to achieve the environmental performance outcomes. The specific measurement criteria provide the evidence base to demonstrate that the performance standards (control measures) and outcomes are achieved.

The implementation strategy detailed in the WA-404-P Exploration Wellheads 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 tools and systems collect, as a minimum, the data (evidence) referred to in the measurement criteria. The collection of this data (and assessment against the measurement criteria) forms part of the permanent record of compliance maintained by Woodside and the basis for demonstrating that the environmental performance outcomes and standards are met, which is then summarised in a series of routine reporting documents.

Monitoring of environmental performance is undertaken as part of the following:

- Environmental Performance Report will be submitted to NOPSEMA to assess and confirm compliance with the accepted environmental performance objectives, standards and measurement criteria outlined in the EP

Incidents will be reported using an Incident and Hazard Report Form, which includes details of the event, immediate action taken to control the situation, and corrective actions to prevent reoccurrence. An internal computerised database is used for the recording and reporting of these incidents. Incident corrective actions are monitored to ensure they are closed out in a timely manner.

8.1 Environment Plan Revisions and Management of Change

The activity will end upon acceptance of the EP by NOPSEMA (Section 3.4). As such, no management of change or revision will be required for this Petroleum Activities Program.

9. CONSULTATION

In support of the WA-404-P Exploration Wellheads EP, Woodside conducted a stakeholder assessment and engaged with relevant stakeholders to inform decision-making and planning for this petroleum activity in accordance with the requirements of Regulation 11A and 14(9) of the Environment Regulations.

Woodside conducted an assessment to identify relevant stakeholders, based on the location of the WA-404-P Exploration Wellheads and potential environmental and social impacts. A consultation fact sheet was sent to all stakeholders identified through the stakeholder assessment process prior to lodgement of the WA-404-P Exploration Wellheads EP with NOPSEMA for assessment and acceptance. Woodside provided information about the Petroleum Activities Program to the relevant stakeholders listed in Table 8-1. Woodside considers relevant stakeholders for routine operations as those that undertake normal business or lifestyle activities in the vicinity of the existing Petroleum Activities Program (or their nominated representative) or have a State or Commonwealth regulatory role.

Table 9-1: Relevant Stakeholder Identified for the Petroleum Activities Program

Organisation	Relevance
Department of Industry, Innovation and Science	Department of relevant Commonwealth Minister
Department of Mines, Industry Regulation and Safety (formerly <i>Department of Mines and Petroleum</i>)	Department of relevant State Minister
Australian Maritime Safety Authority	Maritime safety
Australian Hydrographic Service	Maritime safety
Department of Primary Industries and Regional Development (formerly <i>Department of Fisheries (Western Australia)</i>)	Fisheries management
Commonwealth Fisheries Association	Commercial fisheries – Commonwealth
Western Australian Fishing Industry Council	Commercial fisheries – State
Department of Defence	Defence estate management
Department of Transport	Hydrocarbon spill preparedness (Western Australian waters)
Department of the Environment and Energy	Responsible for Sea Dumping Act implementation

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10. TITLEHOLDER NOMINATED LIAISON PERSON

For further information about this activity, please contact:

Corporate Affairs Adviser

Woodside Energy Ltd

Woodside Plaza, 240 St Georges Terrace, Perth WA 6000

E: Feedback@woodside.com.au

Toll free: 1800 442 977

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11. ABBREVIATIONS

Term	Description / Definition
AFMA	Australian Fisheries Management Authority
AHS	Australian Hydrographic Service
ALARP	As Low As Reasonably Practicable
AMOSOC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
APPEA	Australian Petroleum Production & Exploration Association
BIA	Biologically Important Area
DoEE	Department of Environment and Energy
DPIRD	Department of Primary Industries and Regional Development
ENVID	Environmental hazard Identification
EP	Environment Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act, 1999 (Cth).</i>
ESD	Ecologically Sustainable Development
KEF	Key Ecological Feature
LAT	Lowest Astronomical Tide
MNES	Matters of National Environmental Significance
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NWMR	North-west Marine Region
NWP	Northwest Province
OCNS	Offshore Chemical Notification Scheme
OPGGGS Act	<i>Offshore Petroleum and Greenhouse Gas Storage Act, 2006 (Cth)</i>
PLONOR	Pose Little or No. Risk to the Environment
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council
WBM	Water Based Mud
WOMP	Well Operations Management Plan
Woodside	Woodside Energy Ltd (note references to Woodside may also be references to Woodside Petroleum Ltd or its applicable subsidiaries).

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APPENDIX A: ENVIRONMENTAL IMPACTS AND RISKS

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Physical Presence: Disturbance to Seabed and Benthic Habitat

Impacts Evaluation Summary														
Source of Risk / Impact	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (incl Odour)	Ecosystems/Habitat	Species	Socio-Economic	Decision Type	Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Disturbance to seabed and benthic habitat from wellhead remaining in-situ permanently		X			X			A	F	-	-	LC S GP PJ	Broadly acceptable	N/A
Description of Source of Impact														
<p>The physical presence of the wellheads remaining in-situ permanently has the potential to result in disturbance to the seabed and benthic habitats in the following ways:</p> <ul style="list-style-type: none"> Altering hydrodynamic conditions around the wellhead resulting scouring and accretion; Introduction of hard substrate resulting in the creation of a new habitat. <p>Each wellhead is less than 1 m in diameter and up to 4.4 m high and made from mild steel (AISI 4130).</p>														
Impact Assessment														
<p>Scouring and Accretion Around Wellheads</p> <p>The presence of the wellheads on the seafloor can interact with the hydrodynamics of the Wellhead Operational Area potentially resulting in disturbance to the seabed (scouring and accretion) which may impact on associated benthic habitats.</p> <p>A number of studies on the effects of sediment movements associated with anthropogenic structures on the seabed, such as shipwrecks and artificial reefs, indicate impacts to be limited to within 10 m of the structure (Smiley 2006; Lewis and Pagano, 2016). Sediment around the wellheads is largely comprised of fine grained sand and silts. However, as the wellheads are all located in >1,000 m water depth, seabed currents at this depth are unlikely to result in the movement of large amounts of sediments, therefore limiting the extent of scouring/accretion.</p> <p>Localised scouring and accretion has the potential to alter associated benthic communities. Given that benthic habitat within the Wellhead Operational Area primarily consists of soft unconsolidated sediments, and is considered to be of relatively low environmental sensitivity and has the ability to recover, no significant impacts to benthic communities are expected.</p> <p>Although Remy-1 overlaps the Exmouth Plateau KEF, and the Operational Area of Noblige-2 also intersects the KEF, the area they overlap is a relatively small percentage (<1%) and is also a flat section of the plateau feature and therefore there are not expected to be any significant impacts from localised scouring and accretion on the function of the KEF.</p> <p>Habitat Creation</p> <p>The seabed in the vicinity of these the wellheads is dominated by soft, unconsolidated sediments inhabited by infauna and sparsely distributed epifauna. The physical presence of the wellhead potentially provides an area for the settlement of marine organisms requiring hard substrate such as bryozoans (Van der Stap et al., 2016, Pradella et al., 2014). Whilst shallow water environments with hard substrate have been found to have a high diversity of marine life (Heyward et al., 2001), abundance is found to be generally low in deeper waters (Bryce et al., 2015). The effects of habitat creation are likely to be limited to the immediate vicinity of the wellhead structures and will ultimately decline as these structures degrade (Fowler and Booth, 2012). Therefore, the effects of habitat creation are expected to be localised.</p>														

Summary of Potential Impacts to environmental values(s)
The wellheads remaining in-situ permanently is expected to have a localised, not significant impact to environmental receptors. No further impacts to benthic habitats and/or sediment quality are likely.
Summary of Control Measures
<ul style="list-style-type: none">Woodside will engage with DoEE on their obligations under the Sea Dumping Act.

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Non-routine Discharges to the Marine Environment

Impacts Evaluation Summary														
Source of Risk / Impact	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (incl Odour)	Ecosystems/Habitat	Species	Socio-Economic	Decision Type	Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Corrosion of wellheads resulting in the non-routine discharge of trace amounts of metals to the marine environment.		X	X		X			A	F	-	-	LC S GP	Broadly acceptable	N/A
Description of Source of Impact														
<p>As the wellheads will remain in-situ permanently, over time, the wellheads will corrode (either internal or external corrosion). This could result in the release of contaminants to marine sediments, effecting benthic habitats and water quality in the surrounding water column.</p> <p>Release of Contaminants</p> <p>Each wellhead is less than 1 m in diameter and up to 4.4 m high and made from mild steel (AISI 4130). The casing on Remy-1 is made of carbon steel grade X56 (equivalent to the German Class E 385, 7). Both mild steel and carbon steel is mainly comprised of iron (~98%) and also contains small amounts of carbon, manganese, chromium, silicon, and phosphorus.</p>														
Impact Assessment														
<p>Release of Contaminants</p> <p>Corrosion of the wellheads and casing over time could result in the release of trace amount of metals (e.g. iron and manganese) to the water column and surrounding sediments. Due to the robustness of the materials involved and the deep water location of the wellheads, corrosion is likely to be a relatively slow process approximately 0.2mm/year (Melchers, 2005).</p> <p>Iron, the main constituent (~98%) of the wellheads and casing material, is not considered a significant contaminant in the marine environment and is only toxic to marine organisms at extremely high concentrations (Grimwood and Dixon, 1997). As the other constituents represent less than 1% of the wellhead composition, impacts to marine sediments, organisms are water quality as a result of their release are highly unlikely.</p> <p>Given the low toxicity of iron, the slow release rate and rapid dilution in the open ocean environment, it is likely that any impacts to marine sediments, benthic habitats, and water quality will be largely localised and not significant.</p>														
Summary of Potential Impacts to environmental values(s)														
<p>It is considered that the discharge of trace amounts of metals may result in localised impacts to marine sediments, benthic habitats and water quality and is not considered to be significant.</p>														
Summary of Control Measures														
<ul style="list-style-type: none"> Woodside will engage with DoEE on their obligations under the Sea Dumping Act. 														

Physical Presence: Accidental Future Impacts to Commercial Fishing

Impacts Evaluation Summary														
Source of Risk / Impact	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (incl Odour)	Ecosystems/Habitat	Species	Socio-Economic	Decision Type	Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Wellheads left in-situ resulting in accidental damage to trawling equipment							X	B	F	1	L	LC S GP PJ SV	Broadly acceptable	EPO 1 & 2

Description of Source of Impact

The physical presence of the wellheads and casing, that extend up to approximately 4.4 m above the seabed, has the potential in the future to displace fishers or result in future accidental damage to trawling equipment within the Wellhead Operational Area. Two of the wellheads (Kelt-1 and Noblige-2) are currently marked on nautical charts, while the remaining two (Remy-1 and Martin-1) are not. There is no exclusion zone/Petroleum Safety Zone, for any activities, within the Wellhead Operational Area.

Impact Assessment

Currently, four Commonwealth and four State fisheries overlap the Wellhead Operational Area, however, none of these fisheries currently operate at depths consistent with the Wellhead Operational Area (1,297 to 1,446 m). Of these eight fisheries, only the North West Slope Trawl Fishery employs fishing methods which could be credibly impacted by the presence of the wellheads on the seabed (i.e. trawl fishing). The Status of Fisheries Report (ABARES, 2017) for the North West Slope Trawl illustrates that there has been an overall decline in catch and effort for the fishery since it began, as well as reduced participation, with only one or two vessels operating since 2008-09. This is attributed largely to low net economic returns. Evidence suggests the fishery is unlikely to be expanding into the Wellhead Operational Area, but rather into areas affected by the recent boundary amendments as a result of the Western Australia Offshore Constitutional Settlement arrangement (ABARES, 2017; Woodhams and Bath, 2017)

Typical trawl fishing depths in Australia are currently between 350-600 m (Woodhams and Bath, 2017). The likelihood of trawl fishing gear being damaged from snagging on one of the wellheads left in-situ is, therefore, dependent on trawl fishing effort being expanded by more than twice the current maximum typical depth range, and shifted spatially to the region of the Wellhead Operational Area. Currently, effort in the fishery is focused in Commonwealth waters north of Barrow and Montebello Islands, around Rowley Shoals and adjacent or south of Scott Reef, which are south and south-east of the Wellhead Operational Area (ABARES, 2017).

Although there may be a possibility that trawl fishing depths might increase in the future, research has suggested that there should potentially be a maximum allowable limit for trawl fishing of 600 m (Clarke et al, 2015; Shrope, 2015). Clarke et al. (2015) justify this depth limit based on evidence of increased bycatch rates between 200 m and 1,300 m, leading to a higher potential for impact on biodiversity, as well as the increased vulnerability to exploitation and unsustainable fishing and decreased commercial value of deep sea species. Clarke et al. (2015) found the highest bycatch proportions from trawl fishing at depths consistent with the Wellhead Operational Area (between 1,297 m and 1,446 m).

In some international countries, fisheries have already adopted a mandatory ban on trawling below 800 m (European Commission, 2016). Although there is debate on whether this limitation is sufficient (Clarke et al., 2015; Shrope, 2015), 800 m is still well above depths consistent with the Wellhead Operational Area. Currently, trawl fishing has been excluded from Australian Marine Parks, potentially suggesting there may be support for this type of management strategy in the future. Should fisheries management in Australia adopt a maximum trawl depth, the risk to trawl fishing gear in the future would no longer be considered credible.

The current risk of trawl gear being damaged from snagging on one of the wellheads is considered not credible. In the future, this risk is not expected to increase, and in fact will more likely decrease; for example, if a depth limitation on

trawl fishing is introduced. In the unlikely event of a trawl fishing net snagging on one of the wellheads subject to this EP, the impacts to the fishery will be localised and considered not significant.

Consultation with stakeholders as part of the Comparative Assessment and for the EP confirmed there was one concern raised from commercial fishing stakeholders (DPIRD) with the proposal to leave the wellheads and casing in-situ permanently. However, based on the above, this risk is considered highly unlikely, and with the mitigation controls in place, is considered broadly acceptable.

Summary of Potential Impacts to environmental values(s)

Given the depth, adopted controls, the risk of the physical presence of the wellheads left in-situ resulting in future displacement or accidental damage to fishing equipment in the future is considered low (Isolated social impact).

Summary of Control Measures

- Woodside will engage with DoEE on their obligations under the Sea Dumping Act;
- Woodside will notify relevant State and Commonwealth fisheries that the wellheads will remain in-situ; and
- Woodside will notify AHS of wellhead locations to enable AHS to update maritime charts.

APPENDIX B: SUMMARY OF STAKEHOLDER FEEDBACK AND WOODSIDE'S RESPONSE

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Relevant Stakeholder feedback from Phase One consultation for the Petroleum Activities Program

Organisation	Method	Feedback	Woodside assessment	Woodside's response
Department of Industry, Innovation and Science	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum)	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 5 April 2018 Feedback summary: The Department acknowledged that Woodside will prepare an Environment Plan for submission to NOPSEMA to cover the proposed decommissioning of four wellheads in exploration permit WA-404-P The Department also sought clarification on two points, namely: <ul style="list-style-type: none"> Whether the three wells aside from Martin-1 had been permanently plugged as the status was unclear Whether Woodside had identified any potential environmental risks or impacts associated with leaving the wellheads and 	Woodside responded by confirming that all four wells have been permanently plugged and abandoned, and that potential environmental risks or impacts associated with leaving the wellheads and casing from Remy-1 in-situ include: <ul style="list-style-type: none"> Localised seabed and water column contamination from rust as the wellheads and drill casing corrodes over time (the casing and wellheads are made from steel); Localised sediment movement changes (e.g. burying or scouring around the wellheads 	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
		casing from Remy-1 in-situ.	and drill casing by water currents due to the presence of the well casing).	
	Email	Date: 12 April 2018 Feedback summary: DMIRS acknowledged all wells have been permanently plugged and abandoned. DMIRS did not have comments to provide on the proposed activity but requested that Woodside advises once the preferred decommissioning option is selected.	Woodside confirmed that it would advise DMIRS once the preferred decommissioning option has been selected.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Maritime Safety Authority	Email with fact sheet	Date: 26 March 2018 Feedback summary: AMSA advised that from a safety of navigation perspective, it has no preferred decommissioning method. AMSA requests that regardless of final method approved by NOPSEMA, that any remaining infrastructure that sits proud of the seafloor is notified to the Australian Hydrographic Office for incorporation into nautical charts.	Woodside confirmed that it will notify the Australian Hydrographic Office of any such remaining infrastructure that sits proud of the seafloor once the final decommissioning option has been selected and approved by NOPSEMA.	Response/Action: Woodside to liaise with AHS to ensure wellheads are marked on marine charts.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: AMSA responded to Woodside noting that the scope of the WA-404-P Wellheads EP now includes the detail on the 234 m of well casing, and that previous advice from AMSA dated 26 March remains extant.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Hydrographic	Email with fact sheet	Date: 26 March 2018 Feedback summary:	The stakeholder raised no claims or objections.	Response/Action:

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
Service		Automatic response acknowledging receipt of email.		Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: Automatic response acknowledging receipt of email.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Department of Primary Industries and Regional Development (formerly Department of Fisheries (Western Australia))	Email with fact sheet and State fisheries map	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 6 April 2018 Feedback summary: The Department advised that it generally encourages titleholders to ensure abandoned sites are stripped of unused infrastructure, however understands that in some cases the removal of all infrastructure may not result in a net environmental benefit and trusts the Regulator to evaluate and regulate such decommissioning proposals. With respect to the wellheads that are in waters deeper than 200m, the Department deems the risk of a significant impact on WA aquatic resources and fisheries associated with the proposed well abandonments to be low. However, it is not supportive of leaving a 200m+ well casing on the seabed, in principle, without careful	Woodside acknowledged the feedback from the Department, including the response that the Department would not be supportive of leaving a 200m+ well casing on the seabed, in principle, without careful consideration of removal options. Woodside advised that the feedback will be considered as part of the comparative assessment on the decommissioning options, and further consultation will be undertaken once the outcome of this assessment is finalised.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
		consideration of removal options.		
Department of Defence	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Department of Transport	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 13 April 2018 Feedback summary: The Department responded that if there is a risk of a spill impacting State waters from the proposed activities, please ensure that the Department of Transport is consulted as outlined in the Department of Transport Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (December 2017).	Woodside advised that once the selected decommissioning option has been finalised, Woodside will undertake further consultation with all relevant and interested stakeholders. This will include consultation with the Department of Transport should a risk of a spill impacting State waters arise from proposed decommissioning activities.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Commonwealth Fisheries Association	Email with fact sheet and Commonwealth fisheries map	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 13 April 2018 Feedback summary:	The stakeholder raised no claims or objections.	Response/Action:

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
		No response at the time of submission.		Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Western Australian Fishing Industry Council (WAFIC)	Email with fact sheet and State fisheries map	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet and State fisheries map	Date: 4 April 2018 Feedback summary: WAFIC responded to confirm receipt of the information, and advised that with regard to the commercial fishing sector, there is little/no interest with activities in the water depths concerned with WA-404-P. The only overlap with the industry may be with transiting vessels.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

Interested Stakeholder feedback for Phase One consultation for the Petroleum Activities Program

Organisation	Method	Feedback	Woodside assessment	Woodside's response
Australian Fisheries Management Authority (AFMA)	Email with fact sheet	Date: 26 March 2018 Feedback summary: AFMA requested that Woodside confirm the email was also sent to WAFIC and the Commonwealth Fishing Industry Association.	Woodside confirmed that WAFIC and the Commonwealth Fisheries Association were contacted regarding this activity.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Maritime Safety Authority (marine pollution)	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Conservation Foundation	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
Australian Marine Oil Spill Centre (AMOSC)	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Petroleum Production and Exploration Association (APPEA)	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Pearl Producers Association	Email with fact sheet and State fisheries map	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
	Email with updated fact sheet and State fisheries map	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Recfishwest	Email with fact sheet and State fisheries map	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet and State fisheries map	Date: 4 April 2018 Feedback summary: Recfish advised that the proximity of these activities is such that they won't affect recreational fishers.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
World Wildlife Foundation	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
Wilderness Society	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Australian Customs Service - Border Protection Command	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
Department of Biodiversity, Conservation and Attractions (formerly Department of Parks and Wildlife)	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
International Fund for Animal Welfare	Email with fact sheet	Date: 23 March 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.
	Email with updated fact sheet	Date: 4 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to consider stakeholder feedback and re-consult once decommissioning option has been selected.

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Relevant Stakeholder feedback from Phase Two consultation for the Petroleum Activities Program

Organisation	Method	Feedback	Woodside assessment	Woodside's response
Department of Industry, Innovation and Science	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum)	Email with fact sheet	Date: 30 April 2018 Feedback summary: DMIRS responded to inform that they had no further feedback to provide on this proposal.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Maritime Safety Authority	Email with fact sheet	Date: 1 May 2018 Feedback summary: AMSA advised that advice provided on 26 March remains extant for this scope of work, and also provided an update map of vessel traffic plot for the area of activity.	Woodside acknowledged that advice from AMSA dated 26 March remains extant.	Response/Action: Woodside to liaise with AHS to ensure wellheads are marked on marine charts and have reflected this as Control 2.2 in Section 6.7.1.
Australian Hydrographic Service	Email with fact sheet	Date: 30 April 2018 Feedback summary: Automatic response acknowledging receipt of email.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Department of Primary Industries and Regional Development (formerly Department of Fisheries (Western Australia))	Email with fact sheet and State fisheries map	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: Woodside to follow up with DPIRD on Phase 1 feedback.
	Email with forwarded fact sheet and State fisheries map (due to staff change at DPIRD)	Date: 16 May 2018 Feedback summary: The new contact at the Department thanked Woodside for the update on recent correspondence with the previous contact.	The stakeholder raised no claims or objections.	Response/Action: Woodside to follow up with DPIRD on Phase 1 feedback once new contact has had time to review.
	Email	Date: 23 May 2018 Feedback summary: No response at the time of	The stakeholder raised no claims or objections.	Response/Action: Woodside to follow up with a phone call to DPIRD to confirm if the Department has any

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
		submission.		further feedback on the proposed decommissioning option.
	Phone (voice message)	Date: 29 May 2018 Feedback summary: No response to phone call.	Woodside left a message to confirm if DPIRD had any further feedback on the proposed decommissioning option in permit WA-404-P, and also to request a meeting to discuss decommissioning activities involved under a separate Environment Plan.	Response/Action: Woodside to follow up with DPIRD to confirm if the Department has any further feedback on the proposed decommissioning option.
	Email	Date: 30 May 2018 Feedback summary: DPIRD responded to advise that a meeting regarding WA-404-P would be possible with the requested DPIRD representatives.	Woodside clarified that the requested meeting would be regarding separate activities to WA-404-P, and invited any further feedback on WA-404-P to be provided.	Response/Action: Woodside to await response from DPIRD.
	Email	Date: 30 May 2018 Feedback summary: DPIRD responded with feedback that reiterated advice provided by the previous Department contact dated 6 April 2018 (during Phase One consultation). DPIRD also advised Woodside to initiate and maintain ongoing consultation with WAFIC, Recfishwest, relevant representative bodies and directly with licensees in the potentially affected fisheries, and expected Woodside to re-engage once the decommissioning plan was closer to finalisation.	Woodside confirmed that it had consulted both WAFIC and Recfishwest, who had advised that they had little interest in the water depths within permit WA-404-P. Woodside requested that DPIRD confirm advice in the most recent email remained extant considering the decommissioning option had been selected.	Response/Action: Woodside to await response from DPIRD.
	Email	Date: 30 May 2018	Woodside advised that this position was consistent with	Response/Action: Woodside to await response

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
		Feedback summary: DPIRD apologised for mistaking the depth in which the wells were set. Previous advice dated 6 April was reiterated, namely that the Department deems the risk of a significant impact on WA aquatic resources and fisheries associated with the proposed well abandonments to be low. However, it is not supportive of leaving a 200m+ well casing on the seabed, in principle, without careful consideration of removal options.	advice provided during Phase One consultation, and considering the information provided to the Department since, namely the advice around the comparative assessment process and subsequent decision to leave the wellheads and well casing in situ, asked if the Department have any further feedback to provide.	from DPIRD.
	Email	Date: 30 May 2018 Feedback summary: DPIRD advised that given Woodside has undertaken a comparative assessment that considered options for removal, and on balance decided to leave the wellheads and well casing in situ, the Department would have no further comment to add.	Woodside thanked the Department for providing feedback, and acknowledged that the Department has no further comment to add on the decision to leave the four wellheads and well casing in-situ in permit WA-404-P.	Response/Action: No further action required.
Department of Defence	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Department of Transport	Email with updated fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Commonwealth Fisheries Association	Email with fact sheet and Commonwealth fisheries map	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Western Australian Fishing	Email with fact sheet and State	Date: 27 April 2018 Feedback summary:	The stakeholder raised no claims or objections.	Response/Action:

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
Industry Council (WAFIC)	fisheries map	No response at the time of submission.		No further action required.
Department of the Environment and Energy	In accordance with Regulation 31 - for previous consultation with the Department of Environment and Energy refer to the WA-34-L Wellhead Environment Plan (Control Ref A3000RF1400583549).			
	Email	Date: 16 April 2018 Feedback summary: Woodside requests an update on the status of the advice	Woodside acknowledges the response of DotEE	Response/Action: No further action required.
	Email	Date: 17 April 2018 Feedback summary: DotEE advise Woodside that advice has been received but not reviewed and will update Woodside.	Woodside acknowledges the response of DotEE	Response/Action: No further action required. Control 1.1 in Section 6.6.1 has been included to reflect the requirement for ongoing consultation.

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Interested Stakeholder feedback from Phase Two consultation for the Petroleum Activities Program

Organisation	Method	Feedback	Woodside assessment	Woodside's response
Australian Fisheries Management Authority (AFMA)	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Maritime Safety Authority (marine pollution)	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Conservation Foundation	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Marine Oil Spill Centre (AMOSC)	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Petroleum Production and Exploration Association (APPEA)	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Pearl Producers Association	Email with fact sheet and State fisheries map	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Recfishwest	Email with fact sheet and State fisheries map	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
World Wildlife Foundation	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Wilderness Society	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Australian Customs Service - Border Protection Command	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.
Department of Biodiversity, Conservation and Attractions (formerly Department of Parks and Wildlife)	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.

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Organisation	Method	Feedback	Woodside assessment	Woodside's response
International Fund for Animal Welfare	Email with fact sheet	Date: 27 April 2018 Feedback summary: No response at the time of submission.	The stakeholder raised no claims or objections.	Response/Action: No further action required.

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