

# SCARBOROUGH DEVELOPMENT TECHNICAL FACT SHEET

The Scarborough reservoir characteristics and location relative to existing Woodside-operated infrastructure, combined with Woodside's expertise in executing offshore gas and onshore liquefied natural gas (LNG) developments, makes the Scarborough acquisition and development an outstanding opportunity for Woodside to deliver value to its shareholders.

## Offshore development concept

Woodside is proposing to develop the Scarborough resource with 12 subsea, high-rate gas wells tied back to a semi-submersible platform moored in 900 m of water. The ~20,000 t topsides has processing facilities for gas dehydration and compression to transport the gas through a ~400 km pipeline to the Woodside operated Pluto LNG facility.

The Scarborough resource has been fully appraised and the reservoir consists of excellent quality sands which support recoverable volumes in excess of 0.5 Tcf per well. The Scarborough gas reservoir is relatively shallow at only 900 – 1,000 m below the mudline. The lean reservoir gas is classified as 'sweet' with no detectable H<sub>2</sub>S and only trace levels of CO<sub>2</sub>.

A phased development drilling program is proposed, with seven wells available at ready for start-up (RFSU). Given the shallow depth below the mudline and anticipated strong aquifer support, a combination of horizontal and high angle wells have been designed with maximum well lengths of ~2,500 m. The well and completion designs align with Woodside's extensive development experience offshore north-western Australia.

The proposed carbon steel trunkline will be ~400 km long, significantly shorter than recently constructed offshore gas pipelines in the region. Woodside's ongoing subsea development programs in the North West Shelf and Exmouth area provide contemporary analogues for cost and execution schedule estimates. The seabed transition zone from the deep water to the North West Shelf is well known to Woodside after previous successful projects in the area. In preparation for future expansion, Pluto LNG constructed a shore crossing for a second trunkline.

## SCARBOROUGH SNAPSHOT

<b>Commonwealth title</b>	WA-1-R
<b>Location</b>	~300 km offshore, WA
<b>Contingent Resource estimate</b>	7.3 Tcf (100%) dry gas (2C)
<b>Water depth</b>	950 m
<b>Gas composition</b>	96% methane, 4% nitrogen and 50 ppm CO <sub>2</sub>
<b>Average well recovery</b>	0.5 Tcf per well
<b>Wells at RFSU</b>	Seven
<b>Trunkline distance</b>	400 km
<b>Cost estimate (100%)<sup>1</sup></b>	Upstream: \$6.0 bn Downstream: \$2.5 – \$3.7 bn <b>Total: \$8.5 – \$9.7 bn</b>
<b>Onshore<sup>2</sup></b>	Lower-cost brownfield expansion of Pluto LNG facility

1. The cost estimate of US\$8.5 – \$9.7 billion (100% project) is a real terms 2018, Class 0, pre-concept select level figure and includes a 25% contingency. Pre-final investment decision activities are expected to be approximately \$0.5 billion (100% project).
2. Subject to all necessary joint venture approvals, regulatory and/or appropriate commercial agreements being finalised.



## Onshore development concept

The onshore development concept is a brownfield expansion of the existing Woodside operated Pluto LNG facility. LNG expansion projects have traditionally provided cost competitive new LNG capacity into the market and attractive returns on investment. Extensive onshore development studies for Pluto LNG expansion were undertaken in 2010/11, including a complete front-end engineering and design phase for a second LNG train at Pluto. Previous studies combined with Woodside's 2017 market engagement on LNG expansion, means that Woodside is well placed to assess and estimate the cost of an LNG expansion train for Scarborough.

The composition of the Scarborough gas itself is well suited to the Pluto LNG plant which is designed for lean gas and nitrogen removal. Pre-investment in the Pluto LNG site for future expansion and existing environmental approvals for a second LNG train further de-risks the project.

## Cost

The cost estimate of \$8.5 – \$9.7 billion (100% project) is a real terms 2018, Class 0, pre-concept select phase cost estimate and includes a 25% contingency. Activities prior to final investment decision are expected to cost approximately \$0.5 billion (100% project).

Woodside's position in Scarborough supports our strategy of unlocking shareholder value. Alignment of Woodside's equity in both the upstream Scarborough resource and downstream Pluto LNG infrastructure provides for greater control and certainty of development. Woodside can realise the value from development of the material unallocated 7.3 Tcf (2C, 100%) Scarborough gas field through a lower-cost brownfield expansion of our high-reliability Pluto LNG facility.

Scarborough upstream concept schematic

