

## Memorandum

**Date** 7 July 2023  
**To** Environment Approvals  
**From** Principal Climate Change  
**Subject** Orebody 32 Below Water Table Proposal – Updated Greenhouse Gas Emissions modelling

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### Purpose

The purpose of this memo is to provide a summary of the methodology for forecasting greenhouse gas (GHG) emissions and to update the forecast for the Orebody 32 (OB32) Below Water Table (BWT) Derived Proposal (the OB32 BWT Proposal). It is provided as an Appendix 17 to the OB32 BWT Derived Proposal.

### Background

BHP proposes to implement the OB32 BWT Proposal to undertake below water table mining at the existing Orebody 32 above water table mine within the Eastern Ridge hub. GHG emissions are regulated by the Western Australian Environment Protection Authority (EPA) on a proposal basis.

The EPA has published the *Environmental Factor Guideline: Greenhouse Gas Emissions* (April 2023) (EFG GHG) which require GHG emissions of a proposal to be assessed and managed through a greenhouse gas management plan where assessed Scope 1 or Scope 2 GHG emissions exceed the threshold of 100,000 t CO<sub>2</sub>-e per year.

An emissions estimate may be used to determine whether the GHG emissions of a proposal are significant. Where emissions exceed the identified threshold, the emissions estimate also informs the emissions baseline applicable to a proposal.

At the time of referral of the OB32 BWT Proposal in October 2022, BHP estimated Scope 1 GHG emissions based on activities specific to the Proposal. The emissions forecast was below the threshold of 100,000 t CO<sub>2</sub>-e pa with an annual average of less than 41,000 t CO<sub>2</sub>-e pa. As a result, BHP did not identify GHG as a key environmental factor and did not recommend that Condition 12 of Ministerial Statement 1105 (MS1105) should apply to the Proposal.

Since that time and in response to EPA feedback, BHP has developed a Strategic Proposal GHG Management Plan (GHGMP), which is intended to include GHG emissions from Derived Proposals subject to its Strategic Proposal Ministerial Statement 1105 (MS1105). As a result, BHP has now revised the emissions forecast for the OB32 BWT Proposal to include other sources which lie outside of the Development Envelope but within the Strategic Proposal boundary including the proportion of emissions from rail and power which are attributed to the OB32 BWT Proposal. The revised forecast including these additional sources indicates that the threshold will be exceeded.

### Greenhouse Gas Forecasting

The Scope 1 GHG emissions of the OB32 BWT Proposal have been predicted using methods established and in use in WAIO's Business Plans. The revised GHG forecast considers GHG emissions associated with the mine plan, (which includes planned production of waste rock and ore movements) and the proportional power generation and rail operations required to support the OB32 BWT Proposal. These are described in more detail below.

Scope 1 and Scope 3 emissions, and emissions intensity are provided below in **Table 1**. Emissions are also depicted in **Figure 1**.

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### Scope 1 emissions methodology and inclusions

BHP has adopted the Commonwealth National Greenhouse and Energy Reporting (NGER) framework as a basis for identifying and estimating all sources of Scope 1 emissions generated for Strategic Proposal activities. The following sources of direct GHG emissions were considered within scope of the emissions estimate for the Proposal.

#### Scope 1 emissions sources (Mining):

- Diesel used for heavy haulage, primarily movement of ore and waste material using haul trucks.
- Diesel used for ancillary equipment such as excavators, drills, and other equipment used to support mine development.
- Diesel energy powering dewatering activities, including abstraction of groundwater and movement of water across the operation.
- Oils and greases, primarily used by heavy equipment.
- Land clearing, made up of embodied emissions associated with vegetation<sup>1</sup>

#### Scope 1 emissions (Electricity Supply):

- Emissions associated with generation and transmission of electricity at Yarnima Power Station, to the extent that electricity is used for Strategic Proposal activities.
- Emissions associated with the electricity consumed for primary and secondary crushing of ore at mining hubs and operation of overland conveyors.
- Natural gas consumed for power generation.
- Diesel consumed for power generation, including backup and black-start operations.

#### Scope 1 emissions (Rail Operations):

- Emissions associated with the transport of ore via rail from mining hub to Port Hedland.
- Diesel consumed by locomotives and rail maintenance activities.
- Diesel power generation, supporting remote camps

Rail maintenance workshops which service rolling-stock are located in Port Hedland, outside of the Strategic Proposal project area. Electricity consumed in Port Hedland is sourced from the North-West Interconnected System and considered indirect to the Strategic Proposal.

#### Exclusions

- Consistent with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), emissions associated with landfill and wastewater effluent, which are below NGER reporting thresholds are not included as emissions sources.
- Emissions associated with WAIO activities downstream of the Strategic Proposal project area, including ship loading and ore handling at Port Hedland are not direct sources of emissions. However, such emissions are considered in the same way as Scope 3 emissions in this GHGMP.

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<sup>1</sup> The NGER Act does not provide a calculation methodology for GHG emissions associated with land clearing. Estimates in this GHGMP have been derived from the Full Carbon Accounting Model (FullCAM), consistent with the National Inventory reporting used by Department of Climate Change, Energy, the Environment and Water (DCCEEW) to determine land use, land use change and forestry (LULUCF) emissions.

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## Scope 2 Emissions

Scope 2 emissions are the indirect emissions associated with the use of electricity. As the OB32 BWT Proposal does not include any activities which consume off-site electricity, there are no Scope 2 emissions.

## Scope 3 Emissions

Iron ore produced within the Strategic Proposal project area is transported to Port Hedland via BHPIO owned and operated rail operations for export by sea. BHP's Port Hedland operation are located outside of the Strategic Proposal project area and include emissions from electricity associated with unloading, stacking and reclaiming and ship loading of iron ore. Diesel emissions are primarily associated with tugs, which berth bulk carriers, that transport iron ore by sea.

Scope 3 emissions associated with the iron ore value chain include the shipping of iron ore to BHP's customers and the emissions associated with the production of steel, using coal to reduce iron ore. Each of these activities is undertaken by third parties.

**Table 1: Summary of estimated Scope 1 and Scope 3 GHG emissions for the Proposal**

Orebody 32 BWT	Unit of Measure	Scope 1 Emissions <sup>2</sup> (Proposal)	Scope 2 Emissions	Scope 3 Emissions
Total emissions over life of Proposal	t CO <sub>2</sub> -e	1,136,230	n/a	229,595,441
Average annual emissions <sup>3</sup>	t CO <sub>2</sub> -e	59,802	n/a	12,083,971
Emissions Intensity – Scope 1	t CO <sub>2</sub> -e / t Ore	0.0067	n/a	n/a

## Management of GHG emissions

Revised Scope 1 emissions estimates of the OB32 BWT Proposal, which now consider power generation and rail operation activities, that occur within the Strategic Proposal project area as Scope 1 emissions, indicate that emissions from the OB32 BWT Proposal will exceed the EPA's GHG EFG threshold of 100,000 t CO<sub>2</sub>-e (Scope 1 or Scope 2 emissions).

As a result, BHP recommends that Condition 12 of MS1105 apply to the OB32 BWT Proposal. BHP has updated the draft Strategic Proposal GHGMP to include emissions from the OB32 BWT Proposal. The GHG reduction targets, which are aligned to the Safeguard Mechanism, will therefore apply. These reduction targets will ensure that emissions are minimised over the life of the OB32 BWT Proposal, in order to meet net zero emissions by 2050.

<sup>2</sup> Scope 1 emissions estimates, including emissions intensity include emissions from mining, electricity generation and rail activities. Consider which activities may be included within Scope 1 estimates of other proponents when benchmarking.

<sup>3</sup> Average emissions per annum over during periods of anticipated mining within the Proposal (FY25 to FY43).



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At present the Strategic Proposal GHGMP includes the first two Derived Proposals, which are the OB32 BWT Proposal and Western Ridge. BHP will submit the Strategic Proposal GHGMP to the EPA in mid-July 2023.

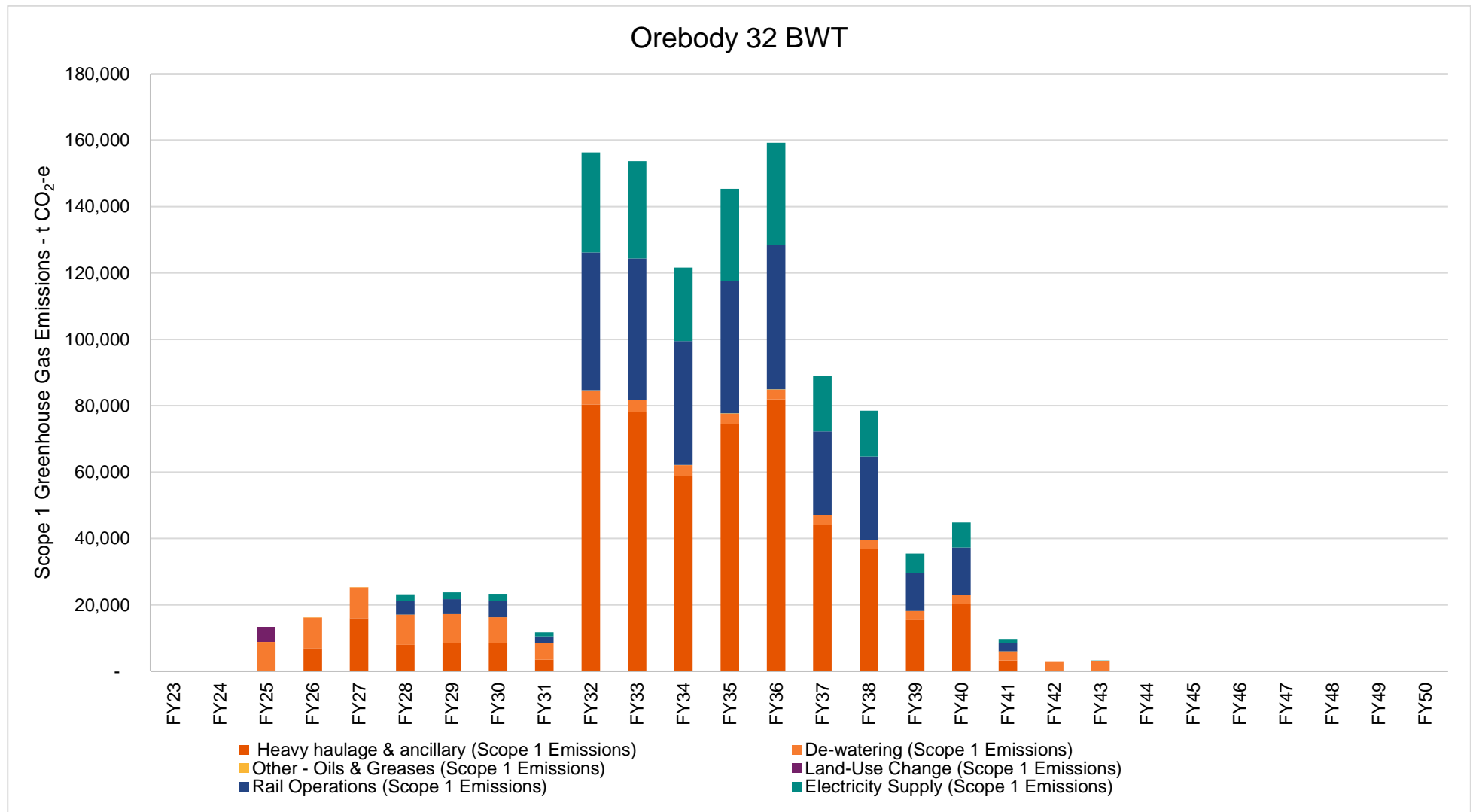


Figure 1: Emissions profile – Scope 1 GHG emissions baseline for the Orebody 32 BWT Derived Proposal