Works Approval Supporting Documentation

Brockman Syncline 4 Mine Licence Iron Ore Mine (L8232/2008)

Brockman Syncline 1 Main Development

August 2024

RTIO-1061883

Disclaimer and Limitation

This report has been prepared by Rio Tinto Iron Ore (Rio Tinto), on behalf of Pilbara Iron Company (Services) Pty Ltd, specifically for the Brockman Syncline 4 Iron Ore Mine. Neither the report nor its contents may be referred to without the express approval of Rio Tinto, unless the report has been released for referral and assessment of proposals.

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Abbreviations

AMD	Acid mine drainage
AHGF	Australian Hydrological Geospatial Fabric
BGL	Below ground level
BIF	Banded Iron Formation
CCIR	Critical Containment Infrastructure Report
CID	Channel Iron Deposit
DBCA	Department of Biological Conservation and Attractions
DWER	Department of Water and Environmental Regulation
DMIRS	Department of Mines, Industry Regulation and Safety
EC	Electrical conductivity
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
GL	Gigalitres
GWL	Groundwater Licence
HSEC	Health, Safety, Environment and Communities and Social
HVRF	Heavy Vehicle Refuelling Facility
IBRA	Interim Biogeographic Regionalisation of Australia
ILUA	Indigenous Land Use Agreement
MMIF	Marra Mamba and Brockman Iron Formation
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
Mtpa	Million tonnes per annum
NWQMS	National Water Quality Management Strategy
OWS	Oily Water Separator
PAF	Potentially acid forming
PEC	Priority Ecological Community
PDWSA	Public Drinking Water Source Area

PER	Public Environmental Review
PIL	Pilbara Biogeographic Region
ROM	Run of Mine
RT	Rio Tinto
SCARD	Spontaneous Combustion and Acid Rock Drainage
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
TLO	Time Limited Operation
TRH	Total Recoverable Hydrocarbons
WAA	Works Approval Application
WC Act	*Wildlife Conservation Act 1950*

1 Licence Holder Information

This document provides the supporting information for a Works Approval Application (WAA) being submitted by Pilbara Iron Company (Services) Pty Ltd for the proposed works at the Brockman Syncline 4 Hub.

1.1 Occupier Details

The occupier (the Licence Holder) of the land subject to this WAA is:

Pilbara Iron Company (Services) Pty Ltd

The contact person for the WAA is:

2 Premises Details

2.1 Prescribed Activity Overview

This WAA seeks approval for the proposed construction, commissioning and time limited operations (TLO) of iron ore processing facilities and other supporting facilities, dewatering discharge, fuel refuelling and storage, sewage treatment facilities and a landfill facility to support the Brockman Syncline 4 Hub (BS4 Hub).

The existing Brockman Syncline 4 (BS4) Iron Ore Mine, has previously been assessed as a 'Prescribed Premise' under schedule 1 of the *Environmental Protection Regulations 1987* and operates under Licence L8232/2008/2, granted in July 2013 under Part V of the *Environmental Protection Act 1986* (EP Act). BS4 is located approximately 55 km northwest of the township of Tom Price in the Pilbara region of Western Australia. The existing BS4 Iron Ore Mine operates under Ministerial Statement 1000 (MS 1000), dated 11 March 2015, superseding Ministerial Statement 717 (MS 717), dated 24 March 2006. Operations commenced at BS4 in 2010 and consist of the Brockman and Marra Mamba mineralised formations along the southern limb of the Brockman Syncline.

The Licence Holder is proposing to develop the Brockman Syncline Proposal (the Proposal), which includes the extension and development of new above water table (AWT) and below water table (BWT) deposits and associated activities to extend the life of the existing operations at Brockman Syncline 2 (BS2), BS4 and Nammuldi-Silvergrass. The Proposal was referred to the Environmental Protection Authority (EPA) in July 2019 (Assessment number 2219) and includes a proposed consolidation and modernisation of the Ministerial Statements (MS) for the three existing operations:

- Brockman Syncline 2 (BS2) – authorised under MS 131 and MS 867
- Brockman Syncline 4 (BS4) – authorised under MS 1000
- Nammuldi-Silvergrass – authorised under MS 925.

The Brockman Syncline 1 (BS1) development forms part of the Proposal and is required to sustain current production levels at BS4. Ore mined from the BS1 deposits is to be crushed and then transported via an overland conveyor to the existing BS4 processing infrastructure for dry processing and train load-out. The prescribed activities associated with the BS1 development are the subject of this WAA. For the purposes of this WAA, the BS1 development and the existing BS4 Operations are referred to as the BS4 Hub. Risks associated with the construction, commissioning and TLO of the prescribed activities will be assessed within this WAA, however Licence Amendment applications (LAA) under L8232/2008/2 will be sought for the ongoing operation following construction and commissioning under the Works Approval.

In summary, this WAA seeks approval for the following prescribed activities:

- Category 5 – a processing and beneficiation facility with a maximum processing capacity of 25 million tonnes per annum (Mtpa).
- Category 6 – a mine dewatering discharge point with a maximum dewatering volume of 6,400,000 tonnes per annual period.
- Category 12 – mobile crushing and screening plants with a maximum screening capacity of 10,000,000 tonnes per annual period.
- Category 85 – Biomax units and sprayfield with a maximum throughput of 31.1 m^3/day.
- Category 64 – Class II putrescible landfill with a maximum design capacity of 6,000 tonnes per year; and
- Category 73 – installation of fuel storage facilities with a total volume of 2,566 kL.

The Premises is shown in Figure 2-1 and Figure 2-2.

2.2 Legal Land Description

The Licence Holder currently holds Licence L8232/2008/2 for the BS4 Prescribed Premises. The existing Prescribed Premises are primarily located on State Agreement Mineral Lease ML4SA granted pursuant to the *Iron Ore (Hamersley Range) Agreement Act 1963* (WA) (Hamersley Range State Agreement).

The existing Prescribed Premises also co-exist with leases granted pursuant to the *Land Administration Act 1997* (WA); the Prescribed Premise boundary overlies Rocklea Pastoral Station (N050372) and Cheela Plains Pastoral Station (N050545). Rocklea Pastoral Station is held by Rocklea Station Pty Ltd (managed by Rio Tinto) and granted primarily for pastoral purposes and covers approximately 390,545 hectares. Cheela Plains Pastoral Station is held

by the State of Western Australia and granted primarily for pastoral purposes and covers approximately 188,501 hectares.

The proposed Works Approval Prescribed Premise boundary (Figure 2-2) extends onto ML4SA, Exploration Licences and Miscellaneous Licences that have been granted under the *Mining Act 1978* (WA) (Mining Act) including:

- Miscellaneous Licence L47/880 for purposes including (but not limited to) a road, pipeline, powerline, conveyor system, communications facility, bore and borefield, storage or transport facility for minerals or mineral concentrate, minesite administration facility and workshop and storage facility;
- Miscellaneous Licence L47/153 for purposes including (but not limited to) a pipeline, road, powerline, communications facility and railway and associated activities;
- Miscellaneous Licence L47/185 for purposes including (but not limited to) a road and communication facility; and
- Exploration Licence E47/1038 for the purpose of exploration[1].

2.3 Location and Siting

2.3.1 Location Context

The proposed facilities are located within the proposed Works Approval Prescribed Premise boundary, with the indicative coordinates provided in Appendix 1 and show in Figure 2-2. The orientation of the facilities may be subject to change as the geotechnical survey results become available.

[1] An application to include E47/1038 into ML4SA will be lodged prior to the development of this area.

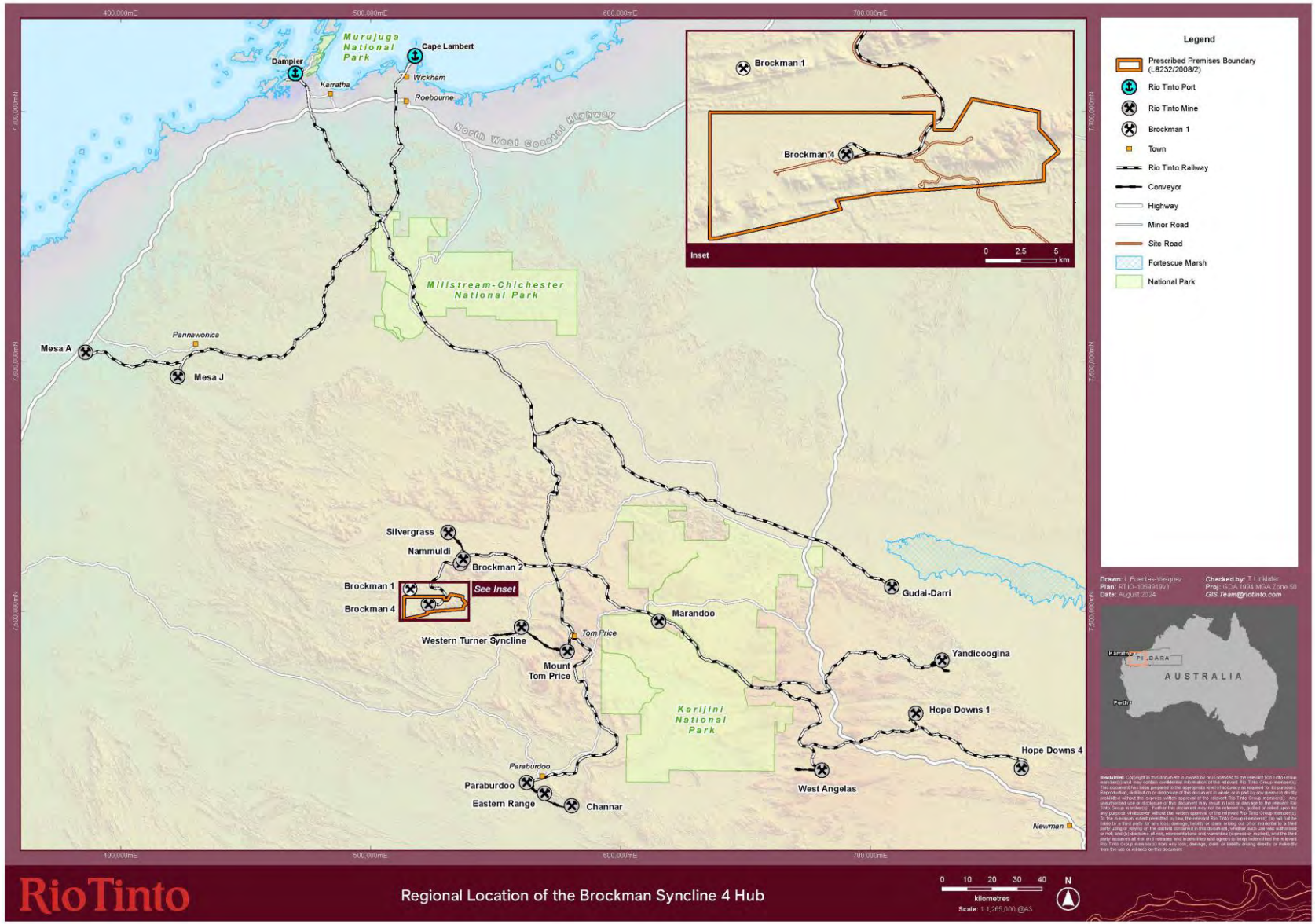

Figure 2-1. Regional location of the existing Brockman 4 Iron Ore Mine and the proposed Brockman Syncline 1 development

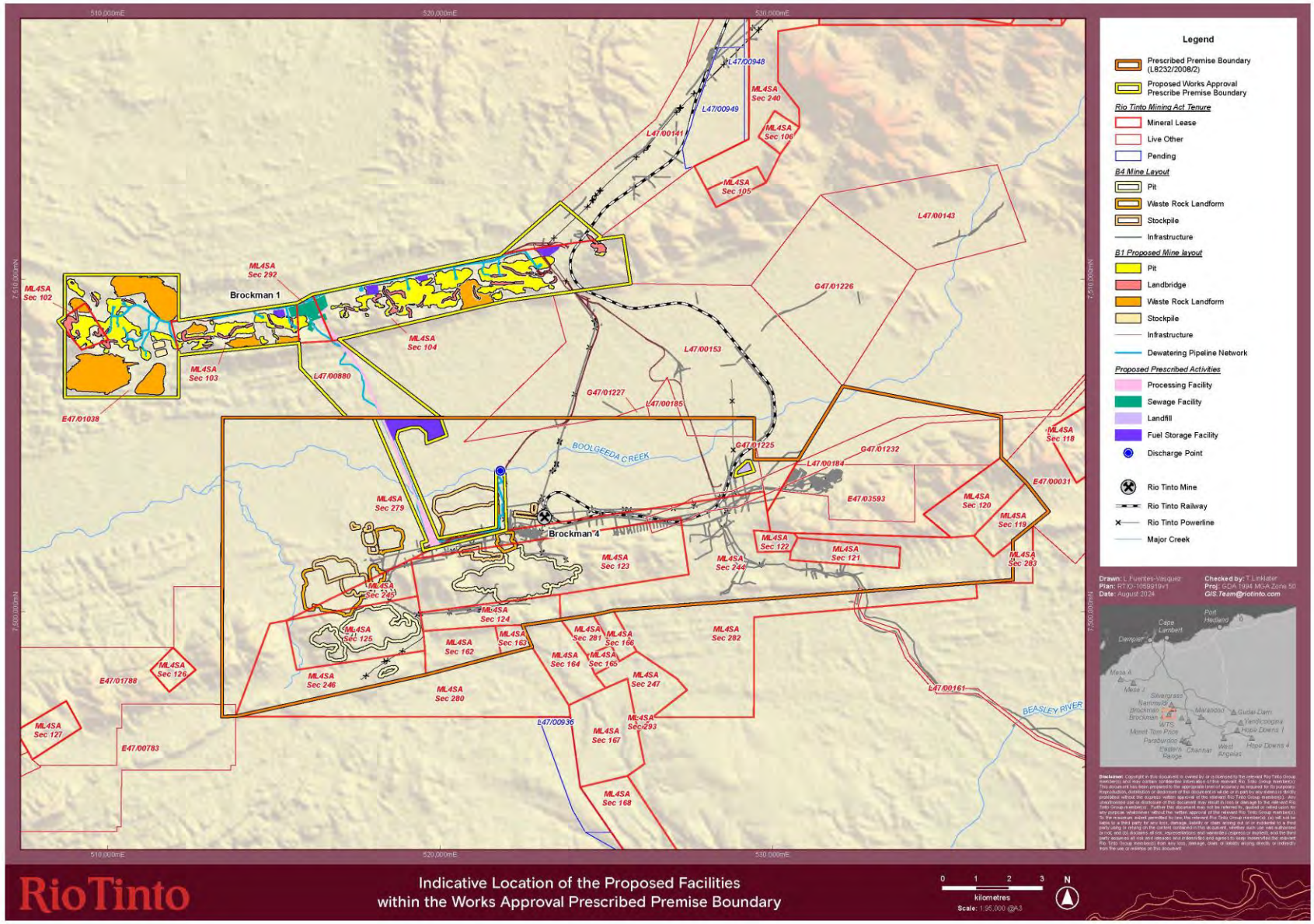

Figure 2-2. Indicative footprint of the proposed facilities within the Works Approval Prescribed Premise boundary

2.3.2 Sensitive Land Uses

Existing land uses within the proposed Works Approval Prescribed Premise boundary and surrounds include pastoral activities (Rocklea and Cheela Plains Stations), mineral exploration and mining. The Premises are remote from communities and other sensitive receptors.

The nearest premises are the existing Nammuldi, Brockman 4 and West Pilbara villages however, these facilities are operated by the Licence Holder and located within the existing Prescribed Premises and as such, will not be considered as sensitive land uses.

The closest residential area to the Premises is the township of Tom Price, approximately 45 km to the southeast (Figure 2-1). Tom Price is located in the Shire of Ashburton and holds a population of 2,874 in 2021 (ABS, 2021). The distances from the Prescribed Premises to residential and other sensitive land uses are detailed in Table 2-1.

Table 2-1. Distance from Prescribed Premises to sensitive land uses

Sensitive land uses	Distance from Prescribed Premises
Closest residential premises: Tom Price	Approximately 61 km to the southeast of the Premises.
Rocklea Pastoral Lease (N050372) and Cheela Plains Pastoral Lease (N050545)	Overlies the proposed Prescribed Premises.

2.3.3 Specified Ecosystems

The distances from the Prescribed Premises to specified ecosystems are provided in Table 2-2.

Table 2-2. Distance from Prescribed Premises to specified ecosystems

Specified ecosystems	Distance from Prescribed Premises
Department of Biodiversity Conservation and Attractions (DBCA) - Conservation Reserves and Managed Areas	No Parks and Wildlife Services Conservation Reserves or other Managed Areas are located within or near the Premises. The nearest Reserve, Karijini National Park, is located more than 60 km to the east of the Premises.
Public Drinking Water Source Area (PDWSA)	No PDWSA are located within the Premises. The nearest PDWSA, the Millstream Water Reserve, is located more than 25 km to the northeast of the Premises.
RAMSAR wetlands	No RAMSAR wetlands are located within or near the Premises.
Geomorphic Wetlands	No geomorphic wetlands are located within or near the Premises.
Threatened Ecological Communities and Priority Ecological Communities	There are no Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) located within or near the Premises. The closest TEC is the *Themeda* Grasslands on Cracking Clays which lies approximately 21.5 km to the north of the Premises. The *Triodia pisoliticola* (previously *Triodia* sp. Robe River) assemblages PEC and Brockman Iron Cracking Clay Communities of the Hamersley Range PEC is located approximately 20 km to the west and north of the Premise boundary.
Threatened Flora	There are no Threatened Flora located within or near the Premises.

2.3.4 Other environmental receptors

The distances from the Prescribed Premises to other environmental receptors or relevant factors are provided in Table 2-3.

Table 2-3. Distance from Prescribed Premises to other environmental receptors or relevant factors

Other environmental receptors or relevant factors	Distance from Prescribed Premises
Vegetation and Flora	As mentioned in Table 2-2, the Premises does not intersect any Threatened Ecological Communities (TEC) or Priority Ecological Communities PEC). The closest Environmentally Sensitive Area (ESA) is the Themeda grasslands on cracking clays (Hamersley Station, Pilbara) located approximately 20 km to the north north-east. Priority (P) flora species recognised under the *Wildlife Conservation Act 1950* (WC Act), located within the Premises include; *Hibiscus* sp. Mt Brockman ET 1354 (P1), *Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708) (P2), *Pentalepis trichodesmoides* subsp. *hispida* (P2), *Ipomoea racemigera* (P3), *Indigofera rivularis* (P3), *Eremophila magnifica* subsp. *velutina* (P3) and *Rhynchosia bungarensis* (P4). Two records of *Indigofera rivularis* (P3) is present within the proposed footprint of the dewatering infrastructure.
Fauna	Debris slope/rocky outcrop, gorge/gully & free face, and major creekline habitat types have all been identified within the Premises. These habitats are of high suitability (denning, roosting and breeding) for Matters of National Environmental Significant (MNES) fauna and occur, to limited extents, across the northern sections of the Premises. MNES fauna identified within the Premises include the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*), Ghost Bat (*Macroderma gigas*) and the Pilbara Olive Python (*Liasis olivaceus barroni*). The Northern Quoll (*Dasyurus hallucatus*) have been identified within 5 km of the Premises. The Western Pebble-mound Mouse (*Pseudomys chapmani*) and the Lined soil-crevice skink (*Notoscincus butleri*), both listed as Priority 4 under the *Wildlife Conservation Act* (1950), have also been documented in the Premises. The proposed activities overlie, to a limited extent, debris slope/rocky outcrop, gorge/gully & free face, and major creekline habitat. Impacts to these habitats have been considered in the Brockman Syncline Proposal and addressed in the supporting Brockman Syncline EMP.
Surface water	Boolgeeda Creek is an ephemeral creekline in the central valley of the Brockman Syncline, draining in a westerly to south-westerly direction between the BS1 development and existing BS4 Operations. The proposed discharge outlet and overland conveyor intersects Boolgeeda Creek. None of the other proposed facilities are located near Boolgeeda Creek. Other minor ephemeral tributaries are also located within the Premises.
Groundwater	The proposed facilities are located in areas where depth to groundwater is expected to be more than 18 m below ground level (bgl) and as such interaction with the groundwater is not expected. The location of the replacement landfill is approximately 30 m bgl.

2.4 Topography

2.4.1 Bioregions

The proposed works associated with this WAA are located within the Pilbara Bioregion (PIL) recognised under the Interim Biogeographic Regionalisation for Australia (IBRA). The Pilbara Bioregion has four subregions comprising the Hamersley, Fortescue, Chichester regions as well as the Roebourne Plains.

The Hamersley subregion (PIL3) is the southern section of the Pilbara Craton, which is described as a mountainous area of Proterozoic Sedimentary Ranges and plateau, dissected by gorges (basalt, shale and dolerite), mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* and *Triodia brizoides* on skeletal soils of the ranges (Kendrick 2003).

2.4.2 Land Systems and Topography

The dominant topographical feature of the BS4 hub is the Brockman Syncline which extends from east to west. The Brockman Ranges are formed from the steep outer rim of the Brockman Syncline, while the centre of the syncline hosts a heavily eroded broad valley associated with Boolgeeda Creek. The Brockman Ranges are incised in many places by a series of steep gullies and gorges. The highest elevations in these mountainous areas reach over 1,127 m (Mount Brockman), and downslope to foot slope gradients are very steep. Surrounding the lower flanks of the Brockman Ranges and the Brockman Syncline are relatively flat alluvial valleys including Boolgeeda Creek which flows from east to west.

The Premises predominantly occurs across the following land systems:

- Booldeega System: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.
- Table System: Low calcrete plateaux, mesas and lower plains supporting mulga and cassia shrublands and minor spinifex grasslands.
- Newman System: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.
- Platform System: Dissected slopes and raised plains supporting shrubby hard spinifex grasslands.

2.5 Geology and Soils

2.5.1 Geology

The Premises is situated in the west part of the Pilbara Craton. The cratonic basement comprises of Archean granite-greenstone overlaid by the Archean-proterozoic rocks of the Mt Bruce Supergroup. These rocks can be divided into three stratigraphic groups: the Fortesque, Hamersley and Turee Creek groups. Of these stratigraphic groups, the Hammersley Group is the most relevant to the Premises. The late Archaean to early Proterozoic rocks of the Hamersley Group can be subdivided into the Brockman Iron and Marra Mamba Iron

formations. These formations mainly comprise banded iron formation (BIF), shales and dolomites with intrusive dolerite sills and dykes.

Erosion and deposition with physical and chemical (in-situ) weathering have produced a variable surficial cover comprising unconsolidated alluvial, residual, colluvial and alluvial deposits. Within the Premises, the cementation of the weathered and decomposed material near the bedrock surface, or the surficial deposits, has generally produced an indurated crust or 'duricrust'. Where encountered, this duricrust consists of variable mixtures of soil and rock materials which reflect the composition of the parent bedrock and the weathering/alteration processes which have been active.

2.5.2 Soils

In the Pilbara, hills and rock ridges have extensive areas without soil cover. The soils that do occur are shallow and skeletal. Rocks of this formation weather very slowly, and any soil which does form tends to be transported into the surrounding valleys and plains as a result of the sparse vegetation cover and erosion force of heavy rains derived from thunderstorms and cyclones.

The soils on slopes, although having had more time to develop than the soils of the adjacent ridges, are still influenced by the parent rock and may be shallow and stony sands or loams. These soils generally display poor moisture-holding capacity and poor nutrient status. On pediments, older pediplains and alluvial plains, hard alkaline red loamy soils tend to be dominant, and may be considered as the regional mature soil type. The surface of these areas may carry a layer of small gravel, which is derived from the more resistant rocks in the area.

Brockman Syncline 4

The dominant soil types covering the BS4 area are shallow coherent and porous loamy soils with weak pedologic development. The physical and chemical properties of BS4 topsoil are within the range typical of that found elsewhere in the Pilbara. It is generally classified as sandy clay loam with a coarse material fraction value of 68.5%. Soil was classed as strongly acid (pH 5.3 to 5.6) through to neutral (6.5 to 8.0) in H_2O, non-saline and non-sodic. Both organic carbon and nutrient levels vary according to landscape position. The highest levels of organic carbon were found in the hilltop landscape; while the nutrient levels were highest in low-lying areas and drainage lines and they are typically very low in the higher portions of the landscape that account for most of the BS4 disturbance footprint. The soil organic carbon content was low and the plant-available nutrients were generally classed as ‘low’ for phosphorus and sulphur, and ‘high’ for potassium.

BS4 soils possess low hydraulic conductivity indicating that they could be naturally susceptible to increased surface run off, and thus less water availability to plants and surface erosion. Subsoil has physical properties suitable for plant growth and generally has chemical properties amenable to plant growth, although it does lack the nutrient content, organic matter and soil seed bank of topsoil.

2.6 Water Resources

2.6.1 Climate

The Pilbara region spans across three Köppen climate zones: hot (persistently dry) grassland in the west; hot (winter drought) desert in the east; and areas of hot (persistently dry) desert in the north and south. It is typically classified as an arid to semi-arid climate, but annual rainfall totals are highly variable. The spatial variability of rainfall across the Pilbara is high because of convective/cyclonic rainfall mechanisms. Mean annual evaporation rates range from 3000 mm to 4000 mm across the region, approximately an order of magnitude greater than the mean annual rainfall range of 200 mm to 500 mm. Rainfall occurs predominantly in summer, with major falls caused by tropical cyclones, monsoon lows and convective thunderstorms. Rainfall is typically greatest around the Hamersley Ranges and decreases with distance from the coast. Tropical cyclones are a feature of the region and typically occur between January and March. Extended periods of low rainfall can be common occurrences. The Pilbara hydrology is one of extremes, ranging from severe droughts to major floods. Pilbara streamflow is predominantly short-lived, ephemeral and in direct response to rainfall, and therefore has a similar seasonality and variability to rainfall. Runoff in major creeks typically occurs following significant or long duration rainfall events.

2.6.2 Hydrology

The Premise is located within the Ashburton River Drainage Basin. This basin covers an area of 77,040 km^2 and is dominated by the Ashburton River. The general flow direction of this basin is from south-east to north-west. The Hamersley and Kenneth Ranges bound the Ashburton River. The drainage pattern is typically distributary with the main tributaries being Irregully Creek, Hardey River, Duck Creek and Henry River. At Irregully Creek there are several large, mainly dry lakes. During extreme streamflow events these lakes are expected to fill up. The major pools on the mainstream are Boolaloo, Barliyunna and Mooline. The Ashburton River discharges to the ocean via a defined outlet just southwest of Onslow. The river also contributes significant groundwater recharge in the coastal plain.

Boolgeeda Creek is an ephemeral creekline in the central valley of the Brockman Syncline between the BS1 development and existing BS4 Operations and is a major tributary of Duck Creek (Figure 2-3). Boolgeeda Creek drains in a westerly to south-westerly direction to its point of confluence with Duck Creek. The Boolgeeda Creek catchment is relatively steep; therefore, it is expected that a relatively high proportion of rainfall will be converted into runoff. Boolgeeda Creek is highly ephemeral and surface water expression generally persists for days to weeks following rainfall events. There is only one known deep semi-permanent pool on Boolgeeda Creek, located 9.6 km upstream of the confluence with Duck Creek. During wetter years, this pool persists over the dry season but dries out completely during drought years.

Surplus water from the existing BS4 Operations is discharged to Boolgeeda Creek and remains within the authorised maximum wetting front of 37 km from the discharge point during natural no-flow conditions (as defined by MS 1000).

2.6.3 Hydrogeology

The BS4 deposits are hosted within a 23 km stretch of the Brockman Iron Formation, along the southern limb of the Brockman Syncline. Weathering, mineralisation and local scale fractures accounts for the majority of the permeability associated with the three major aquifers in the region; mineralised Brockman Iron Formation, karstic dolomite within the Wittenoom Formation and mineralised Marra Mamba Iron Formation. The local scale fracturing, faulting and structural deformation has resulted in hydraulic connection between the Brockman Iron Formation and Wittenoom Formation through the Mount McRae Shale and Mount Sylvia Formation. Furthermore, where present, saturated Tertiary detrital sediment may be in connection with the karstic dolomite within Wittenoom Formation aquifer.

The region is dissected by several northwest to southeast trending dolerite dykes and faults, which truncate the orebody in several areas. An extensive dolerite sill is also present in the Brockman Syncline area, intruded before major deformation occurred. The dolerite dykes and dolerite sill are highly weathered, and it is observed that these formations can create impermeable or leaky groundwater flow boundaries. This hydraulic compartmentalisation is supported by groundwater level variance on either side of these features.

Based on pre-mining groundwater level information gathered from monitoring bores, water supply bores and vibrating wire piezometers at BS1 between 2015 to 2020, the groundwater levels range between 543 to 548 mRL in the east and 496 to 497 mRL in the west.

Regional groundwater flow in the area is generally from northeast to southwest. Within the extent of BS4, groundwater flow is influenced by active dewatering and structural features. Groundwater is recharged periodically by high intensity rainfall events and flooding within the valley floor. Recharge is generally minimal from year to year, with hydrographs showing that it is very much episodic or event based.

2.6.4 Groundwater Quality

Groundwater quality in the Brockman Syncline is typically classified as fresh, with electrical conductivities varying between 500 and 1,500 µS/cm and pH values ranging between 7.2 and 8.4 (Rio Tinto 2022c). There are high carbonate concentrations in some areas associated with the presence of calcrete bands. Groundwater quality is generally within the Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000 guidelines for aquatic ecosystems, except for copper and zinc, which were recorded at elevated levels at some locations.

Groundwater has been sampled across all hydrostratigraphic units present within the Syncline since operations began. Groundwater major ion data suggest a relatively consistent water quality, with the largest variability found in chloride ion concentrations. Chloride concentrations ranged from 6 to 3,320 mg/L, with a regional average of 194 mg/L. Spatially, chloride concentration is highly variable, with changes in concentration of approximately 300 mg/L recorded over several hundred metres (Rio Tinto 2022c).

Sulfate is a naturally occurring ion found within rainwater, surface water and groundwater. Its concentration in groundwater is related to a range of different sources, including dissolution of

rock minerals but it can also indicate impacts from mining operations. Sulfate concentrations were observed to vary between 1.0 – 2,600 mg/L in monitoring bores across the Brockman Syncline (Rio Tinto 2022c).

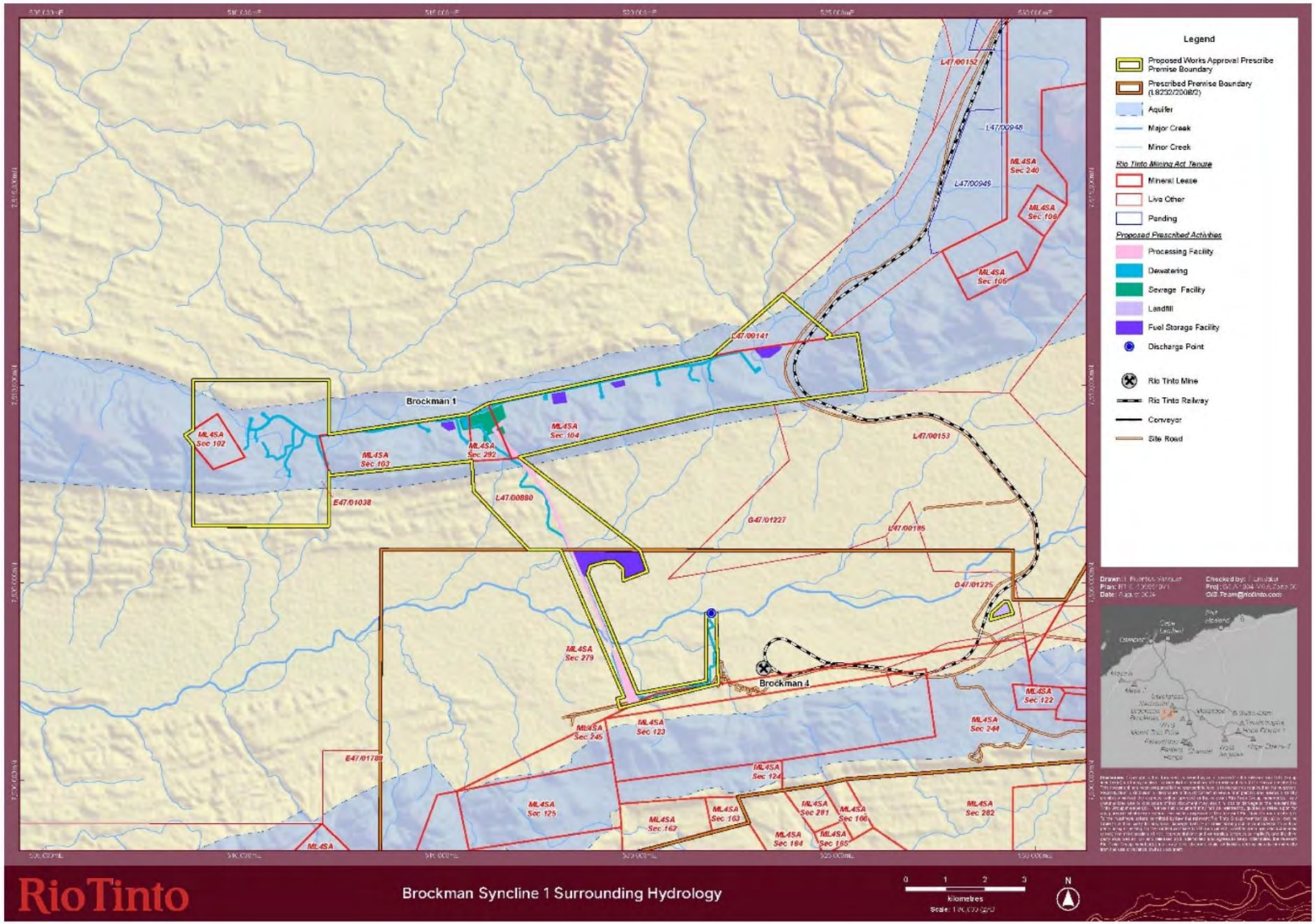

Figure 2-3. Brockman Syncline 4 Hub surrounding hydrology

2.7 Biological

The Premises is located within the Hamersley sub-region of the Pilbara Biogeographic Region (PIL) as recognised by the Interim Biogeographic Regionalisation of Australia (IBRA 2012), characterised by Proterozoic Sedimentary Ranges and plateau, dissected by gorges (basalt, shale and dolerite), mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* and *Triodia brizoides* on skeletal soils of the ranges (Kendrick 2003). No landscapes identified as elevated levels of biodiversity occur within the Premises or the proposed works area.

2.7.1 Vegetation and Flora

The Premises is located within the Fortescue Botanical District of the Eremaean Botanical Province (Beard, 1975; Kendrick, 2001). The Fortescue Botanical Province is broadly defined as tree- and shrub-steppe communities with *Eucalyptus* trees, *Acacia* shrubs, *Triodia pungens* and *Triodia wiseana* grasslands. The Premises intersects two of Beard's vegetation units, namely:

- Hamersley 18: *Acacia pyrifolia* shrubland over *Triodia pungens* hummock grassland; and
- Hamersley 82: Snappy Gum (*Eucalyptus leucophloia*) scattered low trees over *Triodia wiseana* hummock grasslands.

Given the broad nature of Beard's mapping; this vegetation association is only broadly applicable to the vegetation types occurring in the Premises.

Flora and vegetation surveys have been undertaken across the Premises and surrounds from 1995 to 2023 by Rio Tinto, Mattiske, Astron, Biota, Stantec and Biologic Environmental Survey. The combined coverage of these surveys has enabled a detailed understanding of the vegetation and a considerable reference for the distribution of species, including Priority Flora, in the area.

Thirty vegetation units, excluding disturbed or cleared areas, were identified across five major landforms over the Premises by Stantec (2021)'s consolidated mapping efforts. The Stantec (2021) report provides complete coverage of the Premises. These vegetation units are illustrated in Figure 2-4.

Previous surveys have indicated that no Environmentally Sensitive Areas (ESA), State or Commonwealth listed Threatened Ecological Communities (TECs), or Priority Ecological Communities (PECs) are present within the Premises. The nearest PECs, *Triodia pisoliticola* (previously *Triodia* sp. Robe River) assemblages community (Priority 3) and the Brockman Iron cracking clay community (Priority 1), have been recorded 20 km north of the Premises. The nearest TEC, the Themeda grasslands, is located 21 km north of the proposed Premises.

In addition, no flora listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or gazetted as Threatened (formerly Declared Rare Flora - DRF) under the Western Australian *Wildlife Conservation Act 1950* (WC Act) have been recorded or are expected to occur within the Premises. Several Priority species under the WC

Act however, have been recorded within or have the potential to occur within the vicinity of the Premises based on vegetation mapping. These include:

- Priority 1: *Hibiscus* sp. Mt Brockman (E. Thoma ET 1354);
- Priority 2: *Pentalepis trichodesmoides* subsp. *hispida* and *Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708)
- Priority 3: *Ipomoea racemigera, Indigofera rivularis* and *Eremophila magnifica* subsp. *velutina*; and
- Priority 4: *Rhynchosia bungarensis*

Three of the listed species, *Ipomoea racemigera* (P3)*, Indigofera rivularis* (P3), *Rhynchosia bungarensis* (P4) have been previously identified in riparian floristic studies of the Boolgeeda Creek (Biologic 2020c). The condition of the flora at the intersection of Boolgeeda Creek and the overland conveyor system has been typically classed as 'poor' with only a small section close to the main creek line mapped as being in 'very good' condition (Biologic 2020c). Although only a single occurrence of *Indigofera rivularis* has been recorded within the premise boundary at Boolgeeda Creek, *Ipomoea racemigera* has been recorded within the vicinity.

The P1 *Hibiscus* sp. Mt Brockman (E. Thoma ET 1354) has been recorded within the eastern margin of the Premise boundary. This species is restricted to rocky drainage lines, cliff-lines and rocky ridge habitats. It is unlikely that the species is present throughout the Premise

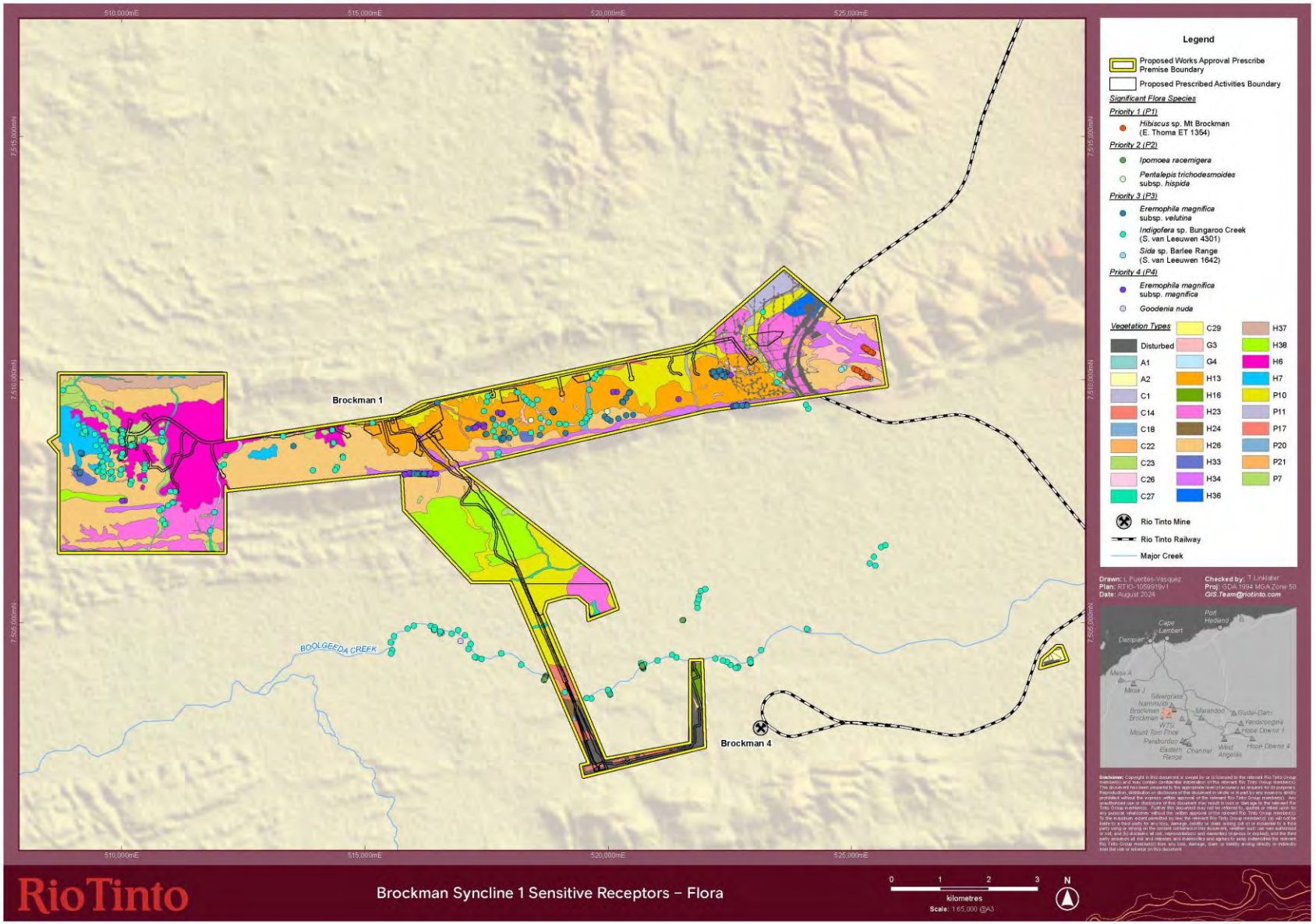

Figure 2-4. Vegetation types and Priority flora records within the proposed Premise boundary

2.7.2 Faunal habitats and fauna

Terrestrial fauna surveys have been undertaken throughout the Premises and surrounds since 2005. Fauna habitat of the Brockman Syncline area were consolidated by Stantec (2021a) based on all previous surveys that have been conducted in the area to date. The following habitats have been identified within the Premise boundary:

Table 4-1. Faunal habitat types within the Premises.

Fauna Habitat	Characteristics
Alluvial plain	Flat land area adjacent to a drainage line, composed of unconsolidated sedimentary deposits (alluvium) and subject to periodic inundation by the drainage line.
Colluvial plain	A large very gently inclined (<2%) or level element, formed by loose unconsolidated material being deposited by either rain wash, sheet wash, slow continuous downslope creep, or a variable combination of these processes.
Debris slope/rocky outcrop	A moderately inclined to steep slope, consisting of rock accumulated by gravity; a visible exposure of rock.
Disturbed	Areas associated with clearing for exploration and/or mining activities
Footslope	A slope located towards the base of the hill.
Gently sloping rise	A gently inclined slope located towards the base of the footslope.
Gorge/Gully and free face	An open incision in the landscape, with precipitous walls and a moderately inclined to very steeply inclined floor; An open drainage line, which may be deep or shallow; A vertical or near vertical landform situated part way up a slope but not comprising the entire slope.
Major creekline	A linear, generally sinuous open depression forming the floor of a major drainage line channel that is eroded or aggraded (built up) by stream flow.
Minor creekline	A linear, generally sinuous open depression forming the floor of a minor drainage line channel (1 - 10 m) that is eroded or aggraded (built up) by stream flow.
Pediment slope	A large, gently inclined (<7°) waning lower slope underlain by bedrock at varying depths, with flow lines trending normal to the long axis of the adjacent scarp.
Plateau	Relatively flat terrain that is raised significantly above the surrounding area, often with one or more sides with steep slopes.
Midslope/upper slope	A slope located towards the top of a hill or a gently inclined to steep slope located between the upper slope and foot slope landform elements.

Of the 12 habitat types present within the Premises, only three (debris slope/rocky outcrop, gorge/gully & free face, and major creekline) are considered of high suitability for MNES species. Faunal surveys over the Premises have recorded three MNES species, the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (Vu), Ghost Bat (*Macroderma gigas*) (Vu) and Pilbara Olive Python (*Liasis olivaceus barroni*) (Vu) (Stantec 2020). The Ghost Bat and Pilbara Leaf Nosed Bat have been recorded from debris slope/rocky outcrop as well as Gorge/gully and free face habitats, the Pilbara Leaf Nosed Bat was also recorded in minor creekline habitat. The Pilbara Olive Python was documented in the northeast of the Premises within major creekline habitat.

Records of other conservation significant fauna include the Western Pebble-mound Mouse (*Pseudomys chapmani*) (P4) and the Lined soil-crevice skink (*Notoscincus butleri*) (P4). Both species have been recorded along the northern margin of the Premises. The Western Pebble Mouse is present within a range of different habitats including colluvial plain, minor creekline,

gently sloping rise, midslope/upper slope and pediment slope habitats. The Lined Soil-crevice skink is less distributed among the habitat types, typically found in the major and minor creeklines as well as colluvial plain habitats (Stantec 2020). Populations of the Western Pebble-mound Mouse and Lined Soil-crevice Skink have been recorded within the surrounding area, with the Western Pebble Mouse being widely distributed in the central and southern Pilbara region (Stantec 2020). None of the threatened or priority fauna species identified above are considered critically reliant upon, or restricted to, any of the habitats within the Premises.

Both the Northern Quoll (*Dasyurus hallucatus*) (En) and Peregrine Falcon (*Falco peregrinus*) (Other Specially Protected Fauna - OS) have been recorded within 5 km from the Premise boundary. Northern Quolls are most abundant in open, rocky habitats where gorges, breakaways and free faces, can be utilised for denning purposes (van Dyck and Strahan 2008). The species also occurs near creek lines and drainage lines, where adjacent plains and vegetated areas provide habitats for foraging and dispersal of young (van Dyck and Strahan 2008). The Peregrine Falcon typically occupies cliff faces and gorge/gullies habitats as these provide favourable nesting sites. Creekline habitats may provide secondary foraging habitat. Due to the presence of these habitat types, there is the possibility for Northern Quolls and/or Peregrine Falcons to be observed within the Premises.

The proposed activities may have a localised impact on a fauna populations, however are unlikely to alter the conservation status or threaten the continued existence of any conservation significant fauna species at a local or regional scale.

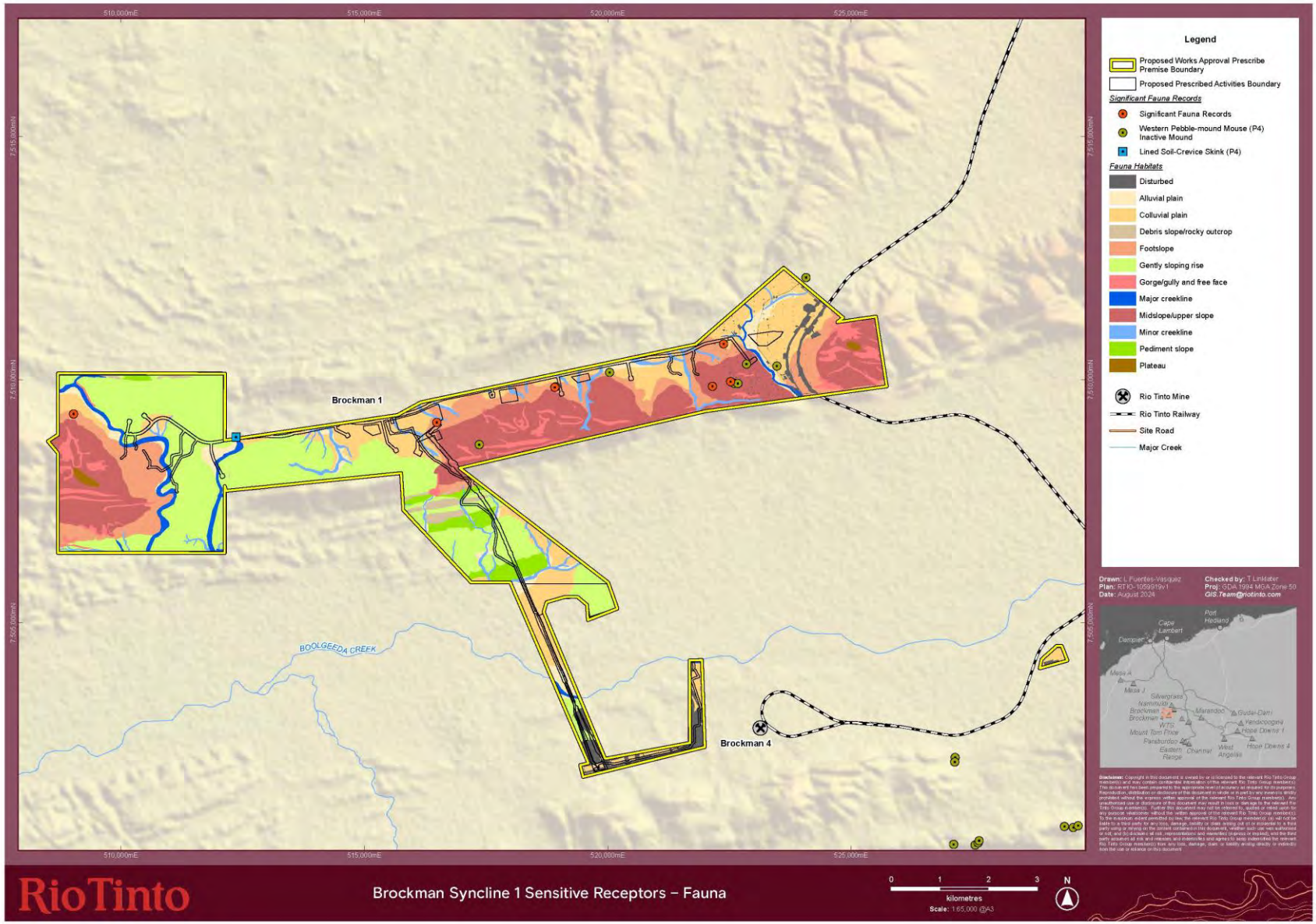

Figure 2-55. Faunal habitats with records of MNES and vulnerable fauna within the proposed Premise boundary.

2.8 Stakeholder and Community Consultation

2.8.1 Regulator Consultation

Works Approvals and Licences required under Part V of the EP Act are regulated by the Department of Water and Environmental Regulation (DWER). The Licence Holder met with DWER on 2/05/2024 to provide an overview of the BS1 development. It was agreed that a Works Approval (this application) followed by amendments to existing Licence L8232/2008/2 was appropriate.

2.8.2 Community Consultation

The Licence Holder has a long-term commitment to working with Pilbara communities and recognises that local communities have a direct interest in their activities. Substantial community consultation and public review of existing and proposed future operations at the BS4 Hub has occurred as part of the Proposal. Community consultation will continue to be undertaken with relevant stakeholders to keep them informed throughout construction, operations and during closure.

2.8.3 Aboriginal Heritage

The Premises are within the traditional lands of the Puutu Kunti Kurruma and Pinikura (PKKP) People and Muntulgura Gurama People under their respective Native Title Claim (Figure 2-66). Puutu Kunti Kurruma and Pinikura Aboriginal Corporation (PKKPAC) is the Registered Native Title Body Corporate representing Puutu Kunti Kurruma and Pinikura (PKKP) Common Law Holders. The Proponent has a Claim Wide Participation Agreement (CWPA) with the Puutu Kunti Kurruma and Pinikura (PKKP) People executed in March 2011. The CWPA commits the Proponent and the Puutu Kunti Kurruma and Pinikura (PKKP) People to work together on country to manage and maintain the areas in which the Proponent operates. There has been ongoing consultation with the Puutu Kunti Kurruma and Pinikura (PKKP) People through the PKKP co-management Committee (CMC). The CMC is a forum for PKKP and RTIO to engage on a variety of matters, including the Life of Mine and this BS1 proposal.

Wintawari Guruma Aboriginal Corporation (WGAC) is the Registered Native Title Body Corporate representing the Muntulgura Gurama People. Rio Tinto has a Commercial Agreement with the Eastern (Muntulgura) Guruma People (MG). The Company regularly consults with Muntulgura Guruma People on the protection and management of cultural heritage sites within their country as well as status of projects at and around Greater Brockman including Nammuldi. Matters relevant to the Muntulgura Guruma Peoples are discussed at monthly Wintawari Guruma Aboriginal Corporation (WGAC) board meetings. Consultation and updates on the project as it progresses, will continue with both Traditional Owner groups.

Rio Tinto and the Puutu Kunti Kuruma and Pinkikura (PKKP) People together have developed a Social Cultural Heritage Management Plan (SCHMP) as part of the EPA Part IV requirements. The SCHMP provides protocols and procedures for the management of social, cultural and heritage values. Consultation regarding management of significant heritage sites is continuing to be undertaken. The identification and management of cultural heritage is in accordance with the principles and practices outlined within Rio Tinto’s Communities and

Social Performance Guidelines, the Rio Tinto Cultural Heritage Group Procedure, and the heritage protocols within the Participation Agreement and Social Cultural and Heritage Management Plans.

The heritage values of the BS1 location are well understood (through extensive surveys, due diligence and consultation). These surveys have identified cultural heritage sites including artefact scatters, stone and quarries, waterholes and rockshelters. The Licence Holder is committed to avoiding sites of ethnographic and / or archaeological significance to Traditional Owners wherever possible at its Pilbara operations. Approval under section 18 of the *Aboriginal Heritage Act 1972* will be sought where disturbance to sites cannot be avoided. Cultural material contained within those sites which cannot be avoided will be managed in accordance with the approval conditions set by the Minister of Aboriginal Affairs and in consultation with the Traditional Owners.

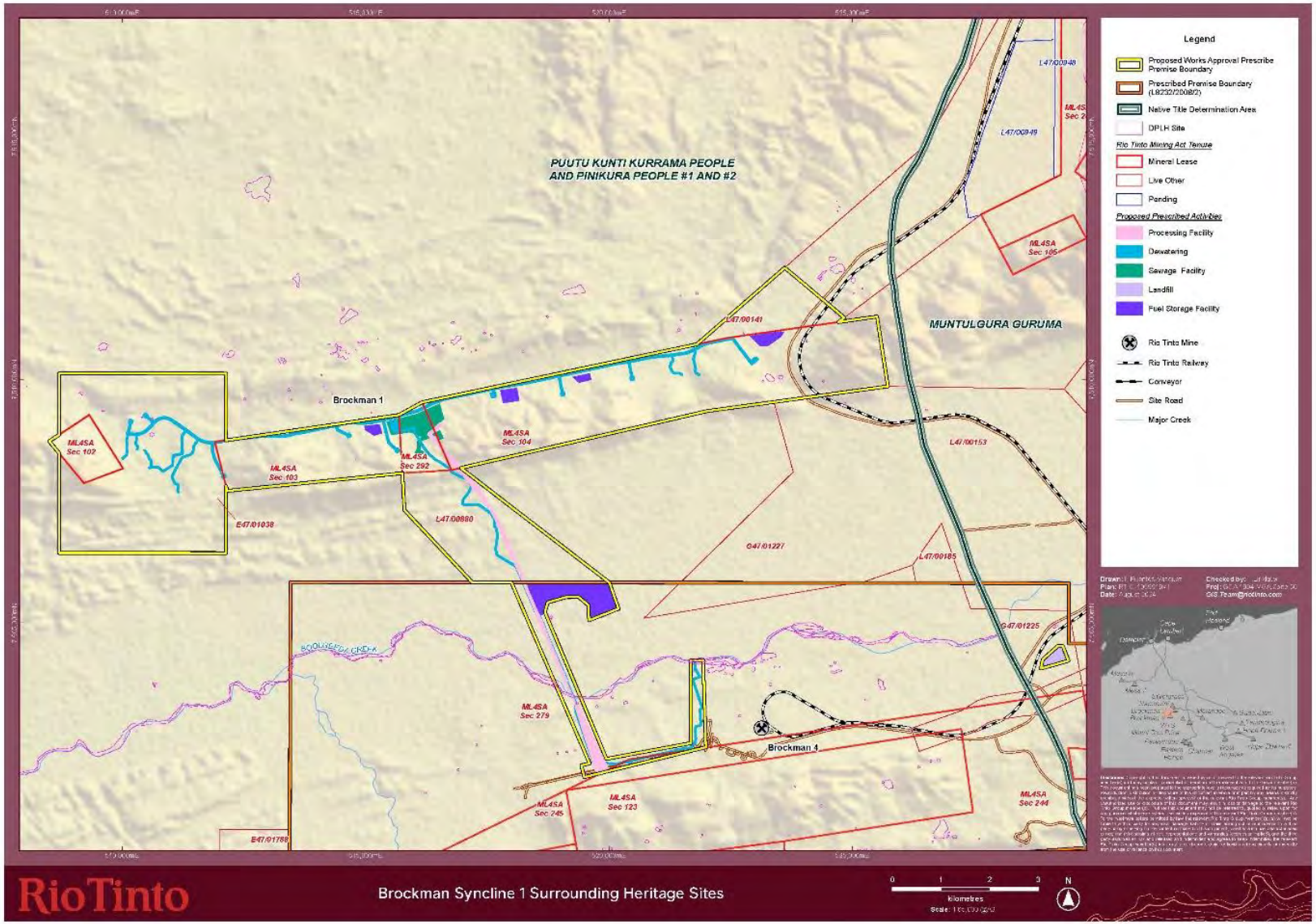

Figure 2-66. Heritage values across the Brockman 4 Hub

3 Prescribed Premises Categories

3.1 Current *Environmental Protection Act 1986* (Part V Licence)

The existing BS4 Operations has been assessed as 'Prescribed Premises', as defined by Schedule 1 of the *Environmental Protection Regulations 1987* (as amended). The Licence Holder currently holds Part V Operating Licence L8232/2008/2 for the Prescribed Premises, which includes the categories and design capacities shown in Table 3-1.

Table 3-1. Prescribed Premise category details under existing Licence L8232/2008/2

Category Number	Category Description	Category	Premises Production or Design Capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes per year or more	44,000,000 tonnes per year
6	Mine dewatering	50,000 tonnes per year or more	6,400,000 tonnes per annual period
12	Screening, etc. of material	50,000 tonnes per year or more	10,000,000 tonnes per annual period
54	Sewage facility	100 m^3 or more per day	983 cubic metres per day
64	Class II putrescible landfill site	20 tonnes or more per year	3,375 tonnes per annual period
73	Bulk storage of chemicals, etc	1,000 m^3 in aggregate	2,205 cubic metres in aggregate

Works Approval:

This WAA seeks approval for the construction, commissioning and time limited operation of new facilities within the proposed Works Approval Prescribed Premise boundary (Figure 2-2). The proposed categories and design capacities are summarised in Table 3-2.

The existing BS4 processing facilities, which have a design capacity to process up to 44,000,000 tonnes of ore per annual period (Category 5), is an existing prescribed activity assessed and approved via L8232/2008/2. No changes to the existing Category 5 production or design capacity volumes are proposed. However, construction and commissioning of additional processing facilities are proposed to be assessed via this WAA to sustain production from the BS1 development at 25 Mtpa.

A dewatering discharge outlet with a design capacity of 17.5 ML/day is proposed to be assessed via this WAA. No changes to the existing Category 6 design capacity are proposed, the cumulative discharge volumes will remain within the current limits approved via L8232/2008/2.

Screening etc. of up to 10,000,000 tonnes of material per annual period (Category 12) is also an existing prescribed activity assessed and approved via L8232/2008/2. No changes to the Category 12 design capacity are proposed. However multiple mobile crushing and screening plants will be required to support construction activities for the BS1 development and are proposed to be assessed via this WAA.

Disposal of up to 6,000 tonnes of waste per annual period (Category 64) to a replacement landfill is proposed to be assessed via this WAA. Both landfill facilities, the existing licensed putrescible landfill at BS4 and the replacement landfill, will be operational for a period of time. A LAA will be sought to increase the Category 64 assessed design capacity to 6,000 tonnes per annual period.

This WAA also seeks approval for the construction and operation of permanent and temporary fuel storage and refuelling facilities, with a combined capacity of 2,566 m^3 in aggregate. A LAA will be sought to increase the Category 73 assessed design capacity to 3,271 m^3 in aggregate to include the permanent facilities.

Disposal of up 31.1 m^3 per day of treated effluent (Category 85) to an 8 ha sprayfield is proposed to be assessed via this WAA. A LAA will be sought to increase the Category 54 assessed design capacity to include these cumulative volumes.

Table 3-2. Proposed Prescribed Premise category details under the Works Approval

Category Number	Category Description	Category	Premises Production or Design Capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	25,000,000 tonnes per annual period
6	Mine dewatering	50,000 tonnes or more per year	6,400,000 tonnes per annual period
12	Screening, etc. of material	50,000 tonnes per year or more	10,000,000 tonnes per annual period
64	Class II putrescible landfill site	20 tonnes or more per year	6,000 tonnes per annual period
73	Bulk storage of chemicals, etc	1,000 m^3 in aggregate	2,566 cubic metres in aggregate
85	Sewage facility	<100 m^3 per day	31.1 cubic metres per day

Licence Amendment/s:

Amendments to the existing Licence L8232/2008/2 will be sought for the ongoing operation of the proposed facilities within an amended Prescribed Premise boundary, following construction and commissioning under the Works Approval.

Subject to approval, the amended Licence L8232/2008/2 is proposed to include the categories and design capacities shown in Table 3-3.

Table 3-3. Proposed Prescribed Premise category details under Licence L8232/2008/2

Category Number	Category Description	Category	Premises Production or Design Capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes per year or more	44,000,000 tonnes per year
6	Mine dewatering	50,000 tonnes per year or more	6,400,000 tonnes per annual period
12	Screening, etc. of material	50,000 tonnes per year or more	10,000,000 tonnes per annual period
85	Sewage facility	100 m^3 or more per day	1,014 cubic metres per day

64	Class II putrescible landfill site	20 tonnes or more per year	6,000 tonnes per annual period
73	Bulk storage of chemicals, etc	1,000 m^3 in aggregate	3,271 cubic metres in aggregate

3.2 Other Approvals / Licences / Permits

3.2.1 *Environmental Protection Act 1986* (Part IV)

Existing Operations - Brockman Syncline 4 Ministerial Statement 1000

Operations commenced at BS4 in 2010, with the most recent addition being the Brockman 4 Marra Mamba AWT deposits. The BS4 deposits consist of the Brockman and Marra Mamba mineralised formations along the southern limb of the Brockman Syncline.

BS4 Operations include a dry crushing and screening processing plant. Ministerial Statement 1000 (MS 1000) authorises:

- Clearing of no more than 4,503 ha within the Development Envelope; and
- Dewater disposal through controlled discharge to Pulykati Wuntu (Boolgeeda Creek) with a maximum wetting footprint to extend no further than 37 km from the discharge outlet under natural no-flow conditions.

The existing BS4 Operation was referred under the EPBC Act in 2005 based on the potential presence of MNES fauna species (and their habitat), specifically Northern Quoll, Night Parrot and Pilbara Olive Python. The existing BS4 Operation was determined to be 'not a controlled action', not requiring EPBC Act assessment and approval.

The approved management plan for the BS4 Operations, the Brockman Syncline 4 Revised Proposal Monitoring and Management Plan (BS4 MMP), includes the monitoring and management of dewatering discharge from BS4 and has been implemented since 2014. The BS4 MMP focuses on the management of surface discharge of surplus water to Pulykati Wuntu (Boolgeeda Creek) to ensure that the BS4 proposal does not cause long term impacts to the values of the creek.

Brockman Syncline Proposal

Hamersley Iron Pty Limited (the Proponent) proposes to develop the Brockman Syncline Proposal (the Proposal). The Proposal was referred for assessment in July 2019 under the (WA) *Environmental Protection Act 1986* (EP Act) through the Environmental Protection Authority (EPA) (Assessment number 2219), and the (Cth.) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) through the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (EPBC 2019/8518).

The Proposal includes the extension and development of new above and below water table deposits and associated activities to extend the life of existing iron ore operations at BS2, BS4 and Nammuldi-Silvergrass. The Proponent proposes that subject to approval of the Proposal, a new consolidated MS for the Amended Proposal will be published with implementation

conditions that supersede, consolidate, and modernise those currently applicable to the existing operations.

The proposed facilities that are the subject of this WAA are considered part of the Proposal that is currently subject to assessment and will be managed via the new MS (subject to approval) and associated Environmental Management Plan (EMP). The Brockman Syncline EMP provides management for environmental values with the potential to be impacted by the Proposal, fulfilling the anticipated requirements of a new Ministerial Statement which will incorporate and supersede Condition 6 of MS 1000.

There are three key environmental factors associated with the Proposal addressed in the EMP, relevant to the management of the proposed facilities including:

- Inland Waters
    - Surplus water discharge and riparian vegetation of Boolgeeda Creek
    - Hydrology of Boolgeeda Creek
- Terrestrial Fauna
    - Matters of National Environmental Significance (MNES) fauna species and their critical (denning, roosting and breeding) habitats:
        - Northern Quoll (*Dasyurus hallucatus*)
        - Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)
        - Ghost Bat (*Macroderma gigas*) and
        - Pilbara Olive Python (*Liasis olivaceus barroni)*.
- Subterranean Fauna
    - Groundwater monitoring program

3.2.2 *Environmental Protection Act 1986* (Part V Clearing)

An application for a new Purpose Permit for the replacement landfill facility will be progressed in 2025. The assessment area for the pending Purpose Permit is approximately 15 ha and is excluded from the scope of the Brockman Syncline Proposal.

3.2.3 *Rights in Water and Irrigation Act 1914*

The License Holder abstracts groundwater from the Western, Central, Southern Stike Valley, Eastern and Brockman Syncline Southern Marra Mamba borefields under existing Groundwater Licence (GWL) 164398, issued under the RiWI Act. GWL 164398 allows for abstraction of 13,000,000 kL per annum.

Groundwater abstraction volumes and quality will continue to be managed via the existing GWL 164398 and associated Brockman Syncline 4 Iron Ore Mine Groundwater Operating Strategy, and any amendments as required.

An application for a new GWL is being progressed to support the BS1 development, with a proposed abstraction of 10,000,000 kL per annum. A supporting Brockman Syncline 1 Groundwater Operating Strategy will accompany the 5C application. Upon approval, groundwater abstraction volumes and quality for the BS1 development will be managed as per the commitments in the Brockman Syncline 1 Groundwater Operating Strategy.

3.2.4 State Agreement, Tenure and *Mining Act 1978*

The Proposal is subject to the *Iron Ore (Hamersley Range) Agreement Act 1963* (Hammersley Range State Agreement). Approval is required from the Minister for State and Industry Development to significantly modify, expand or otherwise vary activities previously approved under the Hammersley Range State Agreement. A proposal to significantly modify, expand or otherwise vary Hamersley Iron Pty Ltd's activities carried out pursuant to the Hammersley Range State Agreement will be submitted to the Department of Jobs, Tourism, Science and Innovation (JTSI) for approval by the Minister.

3.2.5 Local Government

Approval for the proposed facilities will be sought from the Shire of Ashburton as required.

4 Proposal Description

4.1 Category 5: Processing Facilities

4.1.1 Facility Overview

Processing facilities are required to support the above and below water table mining of the BS1 deposits to sustain the production capacity of the BS4 Operations. The proposed BS1 deposits are approximately 9 km north of the existing operations.

The proposed BS1 processing facilities include:

- A primary crushing facility;
- A discharge conveyor;
- An overland conveyor (OLC); and
- A surge bin facility.

A tie-in to the existing facilities at BS4 is required and includes an upgrade of the BS4 overland conveyor module, BCV2012, with the addition of single apron feeder.

The indicative location and design of the proposed processing facilities and OLC are included in Figure 4-1Figure 4-2 and Appendix 2.

4.1.2 Detailed Design

The BS4 facility is currently authorised to produce up to 44,000,000 tonnes per annual period. Approval for new processing facilities is being sought to maintain a rate of 25,000,000 tonnes per annual period.

The processing facilities at BS1 will include a centralised Run of Mine (ROM) pad. The ROM will include a single tipping point to a fixed primary crushing facility fitted with a dust collection system.

The primary crushing facility will feed onto a discharge conveyor transfer station and then onto the proposed BS1-BS4 OLC. The OLC will transport 25 Mtpa from the discharge conveyor transfer station to a surge bin facility tying into the existing BS4 conveyor network. The OLC is approximately 8 km in length from the transfer station to the surge bin at B4. The proposed surge bin facility has a capacity of up to 425 m^3, providing a level of buffering for both upstream and downstream delays. The buffering capacity of the surge bin will allow the existing BS4 conveyor network tie-in (BCV210) to receive primary crushed ore from both the existing BS4 primary crushing facility and the new BS1 primary crushing facility.

A dry baghouse dust extraction system will be installed at the primary crushing facility to extract dust from the apron feeder head end/ROM Bin, vibrating grizzly feeder dust cover, vibrating grizzly feeder undersize chute and conveyor 2113-CNV-0130 skirts. The dry baghouse uses pulses of compressed air to clean the collection bags online and will be supplied with its own air compressor. The baghouse will be located above conveyor 2113-CNV-0130, allowing the collected dust to be returned directly onto conveyor

2113-CNV-0130 without the use of an agglomerating device. Three dust suppression sprays will also be installed at the discharge points to prevent the dust blowing off the top of the conveyor ore burden.

Dust suppression spray will be installed just after the OLC loading modules prior to the dust covers on the OLC. OLC covers will be installed along the length of the conveyor to protect against water addition during heavy rain and dust generation. The OLC covers will be installed downstream of the tail end loading modules up to the skirted section at the transfer point at the top of the surge bin.

During construction, additional controls will be implemented to prevent hydrocarbon spill risks within Boolgeeda Creek. Field based refuelling will not be carried out within 30 m of the Australian Hydrological Geospatial Fabric (AHGF) centreline of Boolgeeda Creek.

An insertable dust collector will be installed at the top of the surge bin facility to capture dust generated by the falling ore stream from the OLC within the surge bin. The dust collector includes a dust collection system and extraction fan. The dust collectors use pulses of compressed air to clean the collection bags online. One air compressor will be supplied for the dust collector.

Collected dust is returned to the surge bin and will mix in with the ore in the bin. A dust suppression spray is located downstream of the load point where the apron feeder discharges onto conveyor BCV210.

Surface water management

Local surface water management structures will be installed at the ROM pad, primary crushing facility, transfer stations and surge bin facility to manage surface water flows beneath the proposed processing facilities. Surface water management structures will enable the retention of potentially sediment laden surface water, directing it to drive-in collection sumps and sedimentation ponds.

The primary crusher, transfer station, and surge bin will be situated on concrete hardstand. Concrete hardstand will be graded such that surface water run-off will be directed into a drive-in collection sump to allow for sedimentation (Figure 4-2 and Appendix 2). Sumps are designed to be drive-in to allow removal of sediments. Water from the collection sumps will be allowed to evaporate or pumped to sedimentation ponds (depending on climatic conditions and volumes reporting to sumps).

The collection sump will include oily water detectors and an alarm which will register in the plants SCADA system and stop sump water from being pumped to sedimentation ponds. If oily water is detected water will be manually transferred to an oily water treatment facility or disposed of off-site via vacuum truck or similar. A drying pad adjacent to the collection sump will allow hydrocarbon contaminated solids to be removed from the sump to dry, before being disposed of.

The OLC has an earthen foundation, assessed against 1% AEP flood event. Culverts have been designed to maintain surface water flows across the OLC foundation. The OLC will be suspended on truss across Boolgeeda Creek to maintain natural surface water flows through the creek. Culverts have been designed at strategic points to be larger and have a flat base to allow fauna to cross the conveyor alignment.

4.1.3 Proposed Construction, Commissioning and Operation

Construction of the proposed BS1 processing facilities is expected to commence in April 2026.

Commissioning will be carried out in six stages:

- Stage 1: Construction Verification – verify construction completion to design intent.
- Stage 2: Pre-commissioning – functional testing of equipment.
- Stage 3: No-load Commissioning – dynamic testing of operating systems without process materials.
- Stage 4: Load Commissioning – running the facilities with feedstock and incremental load tuning. Note during this stage the facilities will be running under operational conditions.
- Stage 5: Care Custody and Control – operations and maintenance teams will seek to rectify any operating issues and aim to achieve stable performance from the new plant.
- Stage 6: Performance Verification – ramp up production rate and confirm achievement of designed through-put.

Commissioning of Stages 1 to 3 are expected to commence in Q1 2027 and are proposed to be completed under the Works Approval. Commissioning of Stages 4 to 6 are expected to commence in Q1 2028 (following submission of a compliance document).

The construction, commissioning and operation schedule is provided in Section 5.

4.1.4 Compliance and Reporting

Subject to approval, the proposed BS1 processing facilities will be operated in accordance with the requirements of an amended Licence L8232/2008/2 and are expected to be operational for approximately 25 years. Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

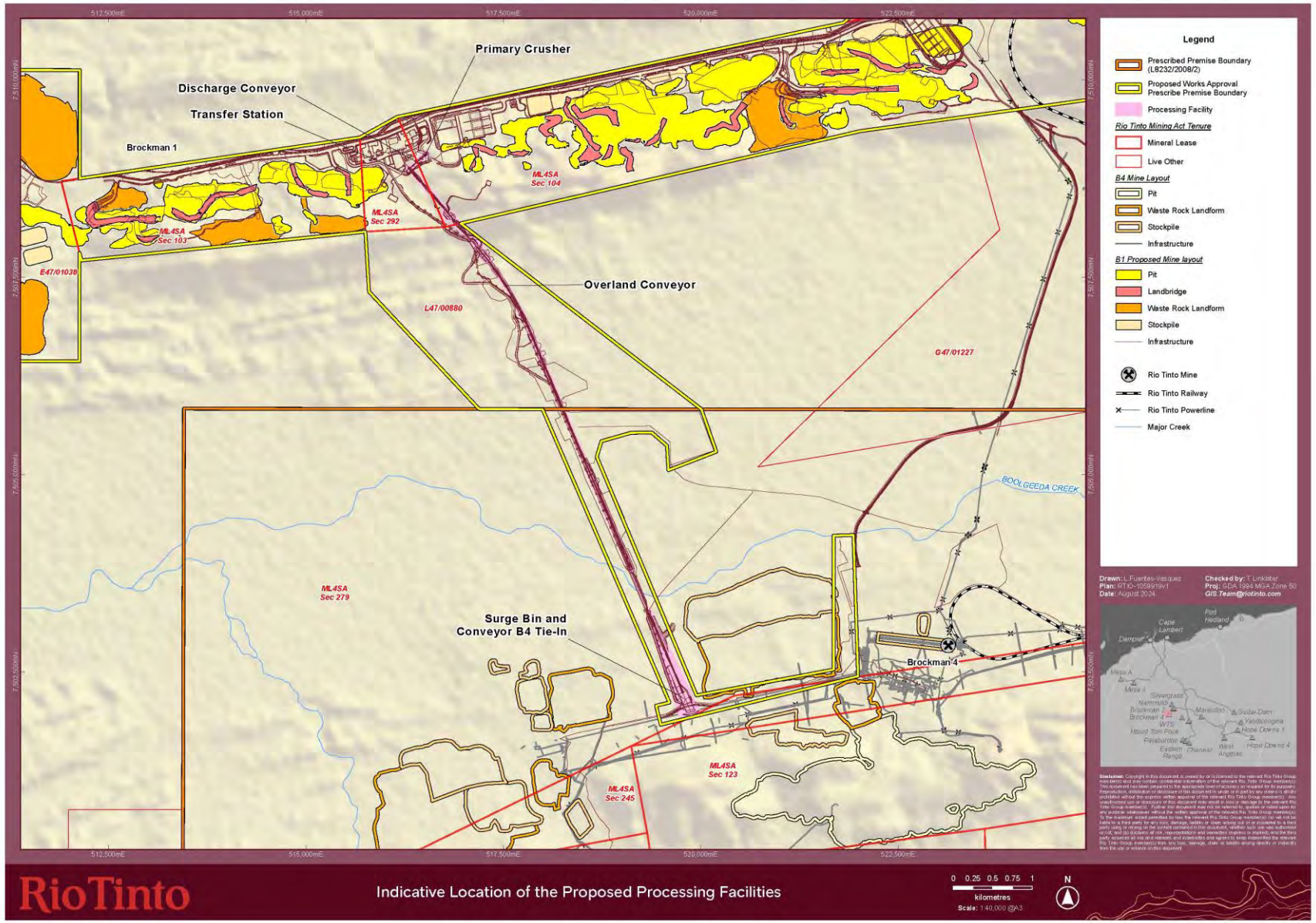

Figure 4-1. Indicative location of the proposed processing facilities at Brockman Syncline 1

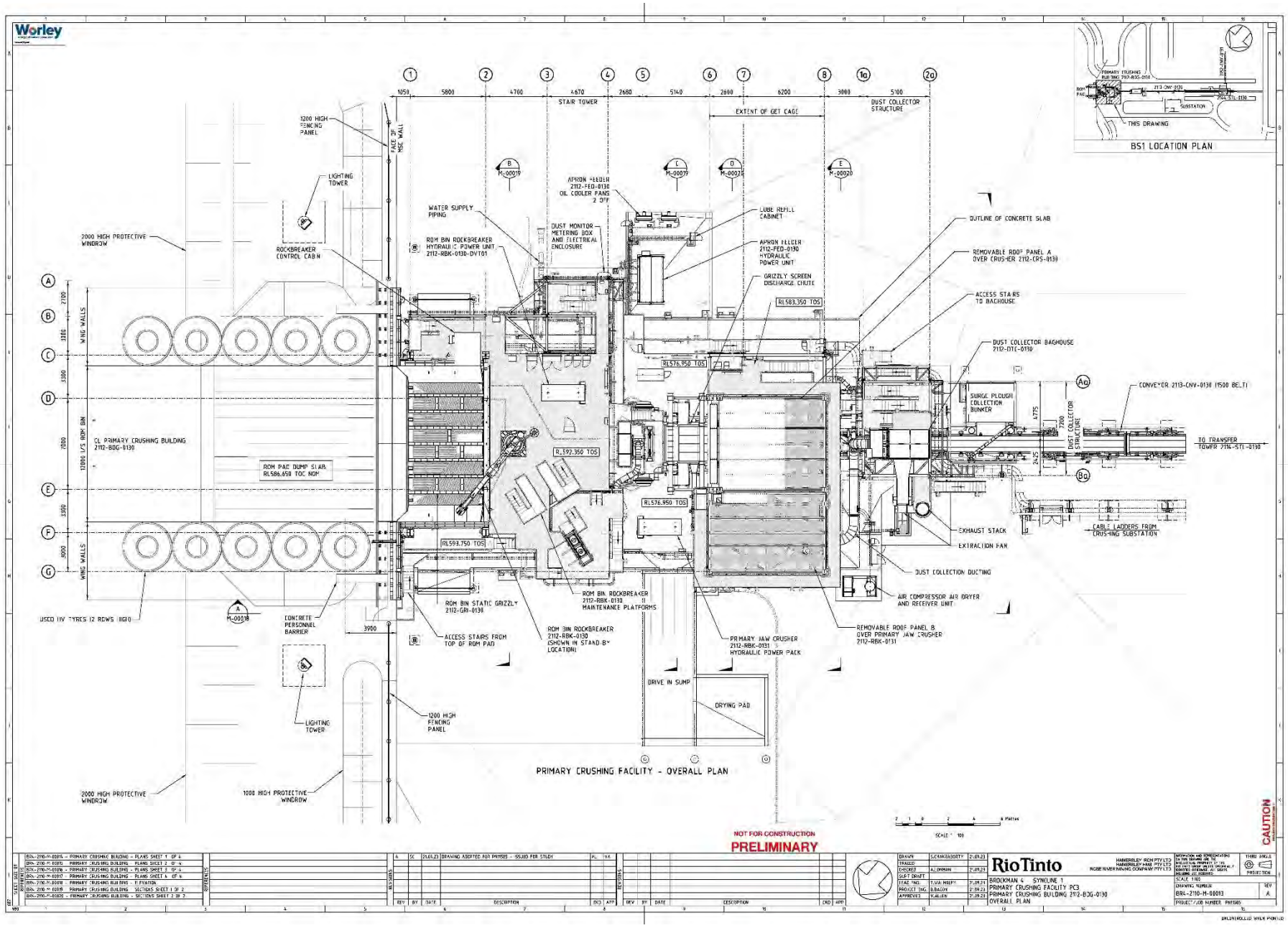

Figure 4-2. Indicative design of the proposed primary crushing facility at BS1.

4.2 Category 6: Dewatering Discharge

4.2.1 Facility Overview – Dewatering Discharge Point

Water balances have been developed to understand water supply and demand requirements and potential surplus water management for the BS4 Hub. Surplus water generated from dewatering will be used on-site and volumes in excess to operational needs will be discharged to Boolgeeda Creek. To support the BS1 development a duplicate discharge outlet will be constructed adjacent to the existing licensed discharge point, replicating the existing design.

The BS1 ore bodies extend below the water table, consequently, dewatering will be required to mine. The proposed dewatering infrastructure consists of an in-pit and ex-pit dewatering bore network. Water extracted from the dewatering bores will be used to meet the processing, fire and dust suppression water requirements. Dewatering volumes exceeding operational requirements will be pumped to the duplicate discharge point at Boolgeeda Creek.

The transfer system will be capable of transferring the full peak pit dewatering rate of 36.4 ML/day. This will allow pit dewatering to continue at the maximum rate during periods where BS1 dust suppression and process water usage is minimal due to rainfall or plant shutdowns.

Based on the results of numerical groundwater modelling and water balance calculations it is estimated that a maximum total of approximately 6.4 GL is expected to be discharged to Boolgeeda Creek in any year. The rate of discharge will be dependent on water use on-site however, when required, a combined daily maximum volume of up to 30 ML/day of surplus water may be discharged from both outlets to Boolgeeda Creek.

Modelling of the surface discharge extent in Boolgeeda Creek has been undertaken. Based on peak discharge of up to 6.4 GL per annum (during periods of no natural flow), it is estimated that surface flows will extend up to 37 km downstream of the discharge points. Controlled discharge to the environment via Boolgeeda Creek with a wetting front not exceeding 37 km, under no-flow conditions, will be managed via the new Ministerial Statement (subject to approval) and the associated Brockman Syncline EMP.

4.2.2 Detailed Design

Surplus water will be delivered, via approximately 22 km of pipeline, from the BS1 dewatering bores to the new gabion discharge point at Boolgeeda Creek at a maximum rate of discharge of 17.5 ML/d. The pipeline will be primarily above ground with sections buried for access, safety in design or to maintain cultural values. The pipeline will follow existing tracks and contours to minimise earthworks; cut and fill is required in areas where new sections of track is required due to the terrain.

The duplicate discharge point replicates the design of the existing outlet and will be located immediately downstream of the current licenced discharge point. The indicative location and layout of the proposed discharge point are shown in Figure 4-3 and Figure 4-4 respectively. To minimise the risk of erosion the outlet design includes non-woven geotextile membrane covered by approximately 500 mm high gabion structures. This erosion control structure will

be constructed beneath the pipe discharge point extending approximately 75 m into Boolgeeda Creek, baffling discharge water prior to entering the creek line.

A flow meter will be installed at the discharge point to record discharge volumes. The extent of the discharge will also be monitored as required by the Ministerial Statement and the associated Brockman Syncline EMP.

4.2.3 Proposed Construction and Operation

Construction of the discharge point is proposed to commence in Q3 2026. Operation of the discharge point will begin immediately upon the completion of construction.

The construction and operation schedule is provided in Section 5.

4.2.4 Compliance and Reporting

Subject to approval, the proposed discharge point will be constructed and operated in accordance with the requirements of the Works Approval, including:

- The combined discharge volumes to Boolgeeda Creek will not exceed 6.4 GL per annual period.
- Dewater discharge to extend no further than 37 km along Boolgeeda Creek.

Water quality will be monitored as per the Brockman Syncline EMP, in in accordance with the Australian & New Zealand Guidelines for Fresh & Marine Water Quality (ANZG 2018) framework or its revisions. The low number of semi-permanent or permanent pools observed on Boolgeeda Creek indicate that impacts on aquatic faunal communities as a result of dewatering discharge are likely to be low, the focus of the monitoring in the Brockman Syncline EMP is on Duck Creek. One site on Boolgeeda Creek, downstream of the maximum predicted 37 km discharge footprint, near the confluence with Duck Creek, has been monitored annually since 2010 (and will continue to be so) as part of monitoring for Duck Creek. No changes to the water quality of the semi-permanent pool downstream of Boolgeeda Creek are expected with the discharge of BS1 dewatering water.

The conditions for the management of discharge are proposed to be transferred, as appropriate, into Licence L8232/2008/2 once a Licence Amendment is approved. Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

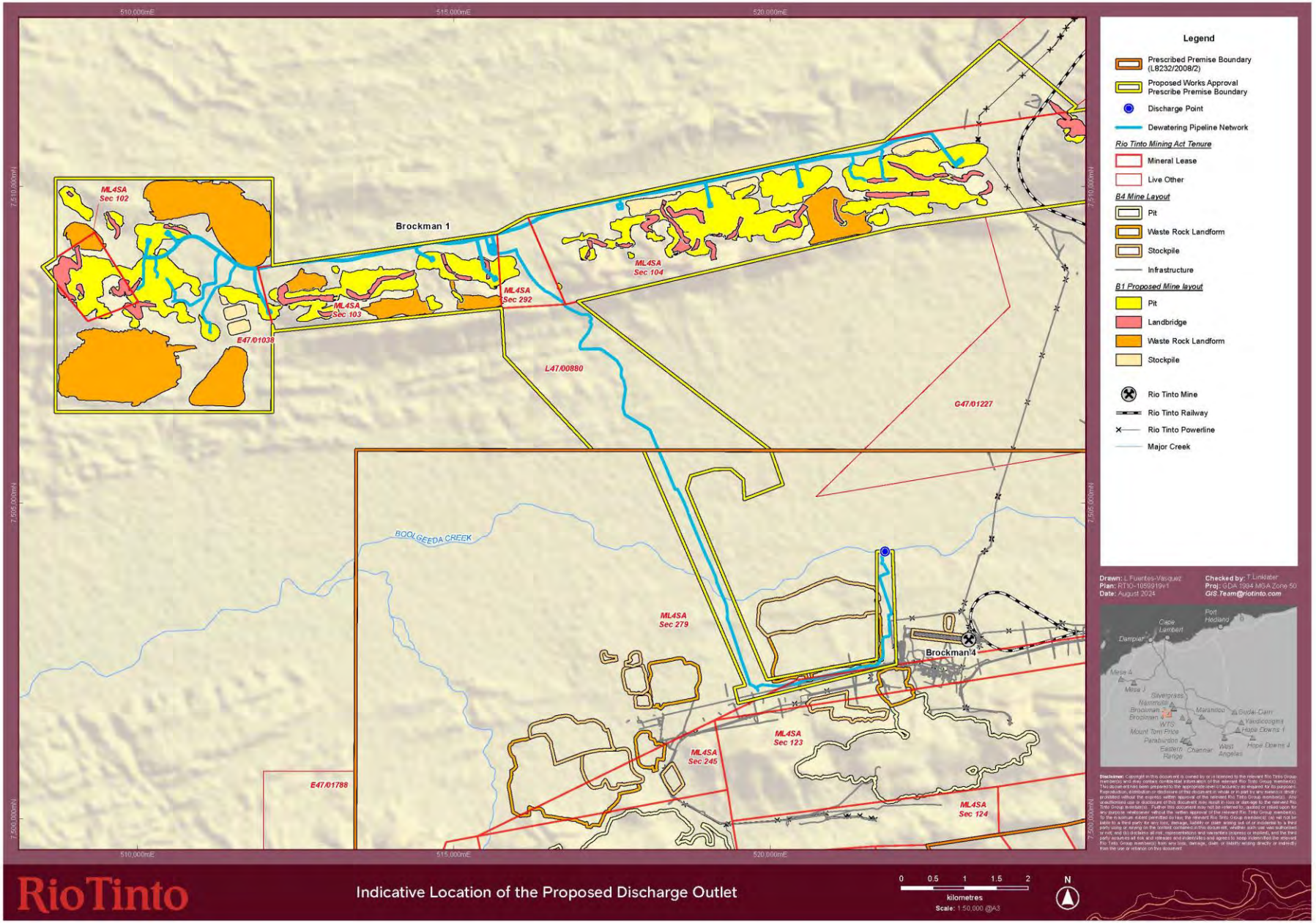

Figure 4-3. Indicative location of the proposed duplicate discharge outlet

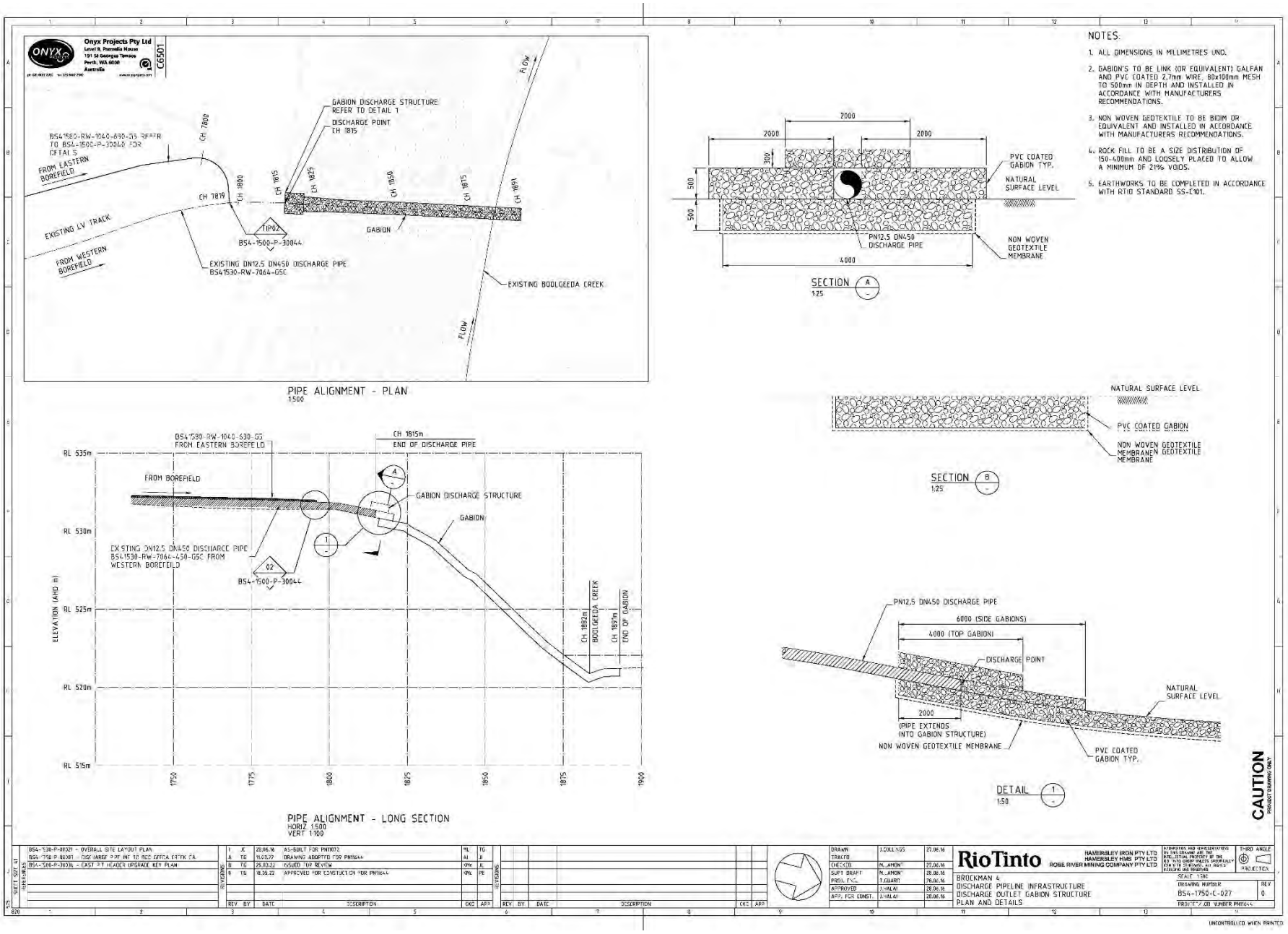

Figure 4-4. Detailed design of the proposed discharge outlet

4.3 Category 12: Screening etc. of material

4.3.1 Facility Overview

Mobile crushing and screening plants are required to support construction activities for the BS1 development. The combined design capacity of mobile crushing and screening plants will not exceed 10,000,000 tonnes per annual period. The proposed crushing and screening plants will operate within the Works Approval Prescribed Premise boundary to provide competent material during construction.

4.3.2 Detailed Design

Mobile crushing and screening plants are expected to include a Primary Jaw Crusher (300 m^3/hr capacity), secondary Cone Crusher (175 m^3/hr capacity), and Heavy Duty Screen or similar. The specific make of the mobile crushing and / or mobile screening plant will be determined based on availability, however, specifications and environmental controls are similar. Borrow material is loaded into a jaw crusher via a hopper. The processed material is delivered to screens to ensure material meets size specification before being used during construction (

Dust will be managed using dust suppression on work areas, access roads and stockpiles to minimise dust during storage and handling of crusher feed material and screened material as required.

During operation, hydraulically angle-adjustable stockpiling conveyors (if fitted) will be utilised to minimise drop heights and reduce dust generation.

The mobile crushing and screening plants will be placed on a cleared construction laydown area which has surface water management controls including:

- Diversion of uncontaminated stormwater around the area; and
- Locating the plant 50 m from permanent water bodies.

The mobile crushing plants includes dust suppression at primary sources of dust i.e. at the hopper and jaw crusher, on the main conveyor and discharge conveyor.

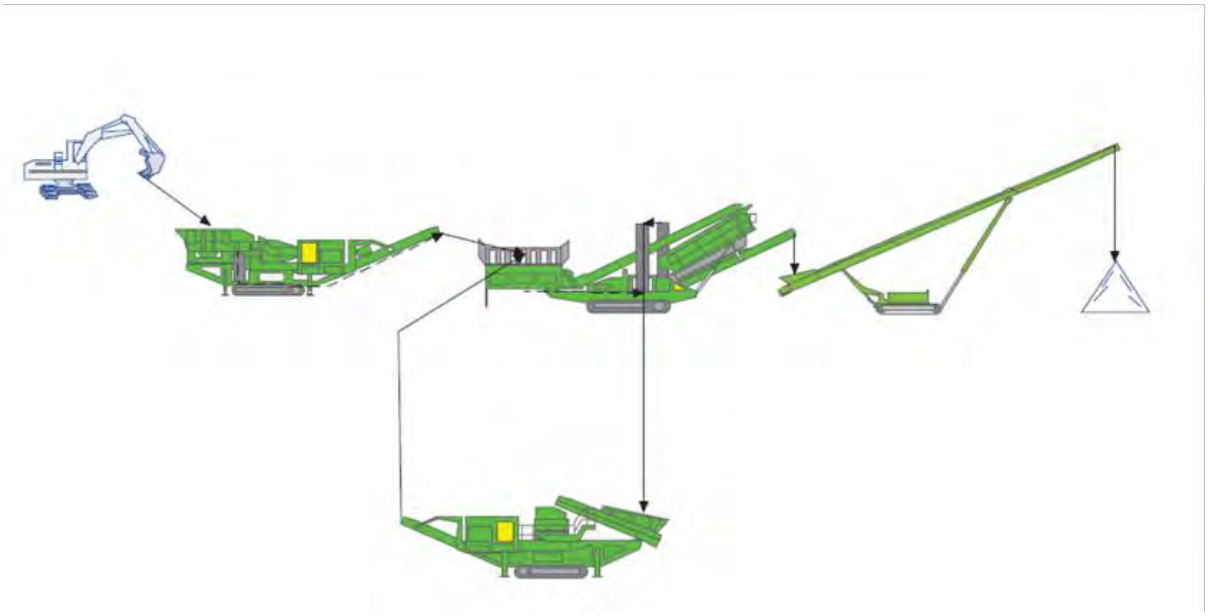

Figure 4-5. Indicative process of the proposed crushing and screening facilities at BS1

4.3.3 Proposed Construction, Commissioning and Operation

Earthworks for the BS1 development are expected to commence in Q2 2025. The crushing and screening plants will be mobilised to site in May 2025 to generate select fill material for construction. Setup and commissioning of the crushing and screening plants will be completed within a month of mobilising to site. Commissioning is limited to setting the crusher aperture and checking the dust suppression sprays are functioning.

Operation is proposed to commence immediately upon the completion of commissioning. Given the short commissioning requirement, it is requested operation of the plant commence without the need for a compliance document to be submitted. The mobile crushing and screening plants will be operated in accordance with the Rio Tinto Iron Ore (WA) Mobile Crushing and Screening Management Plan (RTIO-HSE-0235877).

The construction, commissioning and operation schedule is provided in Section 5.

4.3.4 Compliance and Reporting

Subject to approval, operation of the proposed mobile crushing and screening plants are expected to commence in early Q2 2025. Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

4.4 Category 85: Sewage Facilities

4.4.1 Facility overview

Permanent sewage treatment facilities are required to support the BS1 development. Biomax units will be located within the Non-Process Infrastructure (NPI) hub at the following locations with design capacities indicated:

- HVRF – 1.5 kL/day
- Tyre change – 1.5 kL/day
- HME Workshop – 7.4 kL/day
- Administration – 20.7 kL/day

The total combined design capacity is 31.1 kL/day. The indicative location and layout of the proposed Biomax units shown in Figure 4-6 and Figure 4-7.

The treated wastewater will be piped to a combined sprayfield area (8 ha) approximately 450 m south of the BS1 NPI hub. A 16 ha sprayfield footprint area, comprising two designated 8 ha sprayfield cells, has been allocated (Figure 4-6). Within this proposed sprayfield footprint, and to allow for flexibility, one 8 ha area will be constructed and operated.

The existing WWTP throughput at the BS4 Operations totals 983 m^3/day. Once the Biomax units are constructed and commissioning has been completed, the cumulative volumes are proposed to be transferred onto Licence L8232/2008/2 under Category 54.

4.4.2 Detailed Design

Collected wastewater from the NPI hub facilities will be treated in Biomax units with disposal to an 8 ha sprayfield. Units consist of one or more semi buried concrete chambers that through different stages of natural biological digestion and chlorine contact treat domestic wastewater to a suitable quality for sprayfield disposal.

Units have been designed to treat effluent targeting the following parameters under optimal conditions (not reflective of the Pilbara climate);

- Biochemical Oxygen Demain : ≤20 mg/L
- Total Suspended Solids: ≤30 mg/L
- Faecal Coliforms: ≤10cfu /100mL
- Residual Free Chlorine: >0.5 mg/L
- pH: 6.5 – 8.5
- Total nitrogen: < 30 mg/L
- Total phosphorous: < 8 mg/L

Units operate on a five-stage treatment flow as outlined below;

- Anaerobic chamber – anaerobic treatment
- Aerobic chamber – aerobic treatment

- Clarification chamber – sludge settlement and removal
- Disinfection chamber – contact time with chlorine
- Pump out chamber – discharge to disposal

Anaerobic Chamber

The anaerobic chamber receives raw wastewater. Approximately 30-50 % of solids settle out where they undergo anaerobic digestion. Anaerobic digestion is carried out by micro-organisms in the absence of free oxygen. Settled sludge and skimmed material from the clarification chamber is then returned to this chamber for digestion.

Aerobic Chamber

The aerobic chamber receives effluent flow from the anaerobic chamber. Air is introduced to liquid in the chamber through an aerator and diffusers, maintaining aerobic (free dissolved oxygen) conditions. Aerobic digestion is carried out by micro-organisms in the presence of free oxygen.

Clarification Chamber

The clarification chamber receives effluent flow from the aerobic chamber. Biological sludge (sludge) settles out from the effluent under quiescent conditions. Settled sludge from the bottom of the chamber and floating material are returned to the anaerobic chamber. Effluent is drawn from below surface level and flows through the chlorinator to the disinfection chamber. The return of sludge to the anaerobic chamber ensures continuous fluid movement in the unit even with zero inflow.

Disinfection Chamber

The disinfection chamber receives effluent that has passed through an automatic gravity chlorinator as it flows from the clarification chamber. The disinfection chamber is designed to provide a minimum of 30 minutes contact time between effluent and chlorine to achieve bacterial die-off.

Pump-out Chamber

The pump-out chamber receives effluent flow from the disinfection chamber. A submersible pump controlled automatically by a level switch operates to pump the treated effluent to the sprayfield. A high-water level alarm is fitted to the pump-out chamber.

Sprayfield

Treated effluent (31.1 m^3/day) from the Biomax units will be pumped to and disposed of at a centralised sprayfield. A 16 ha sprayfield footprint has been nominated to allow for flexibility, within this footprint an 8 ha sprayfield cell will be constructed and operated. The 8 ha sprayfield satisfies the principles of treating wastewater to a Soil Risk Category D as per the Water Quality Protection Note 22: Irrigation with nutrient-rich wastewater (DoW 2008).

The sprayfield location meets the following requirements;

- Acceptable surface topography that minimises potential for run off and pooling.
- Avoids natural water courses and flood prone areas.

- Has separation from occupied buildings and potable water infrastructure.

Effluent will be dispersed onto the sprayfield through low height and low mist sprinklers to minimise misting beyond the perimeter. The sprayfield will be surrounded by a containment bund windrow, stock fence, and an access track. Access to the sprayfield will be restricted and warning signs will be located around the perimeter indicating the area is designated for treated wastewater disposal.

4.4.3 Proposed Construction, Commissioning and Operation

Units will be installed on site from September 2026 as per the manufactures design requirements, installer and site processes and procedures and adhering to Australian codes, standards and regulations.

Units will be commissioned following site approved energisation and commissioning procedures. Following physical completion of construction, unit energisation, and dry commissioning of mechanical components, an initial biological load will be inserted into the unit to initiate the biological digestion processes. Effluent quality will be monitored over an initiation period to verify the biological treatment process is stable and the unit is operating as designed.

The Biomax units will be commissioned for a period of one month. At the end of the commissioning period, a commissioning compliance report will be submitted to the DWER. Monitoring of discharge effluent quality will be undertaken in principle accordance of Category D level of treatment (WQPN 22) and will not exceed target values specified in Australian Guidelines for Sewerage Systems – Effluent Management (ANZECC 1997).

Units contain two mechanical components: an air blower and discharge pump. Alarms are provided to warn of failure of either of these components. Units contain inbuilt emergency storage of approximately two days of normal flow in case of system fault.

The following is a brief outline of standard operating requirements;

- Daily
    - Respond to any alarm
- Quarterly
    - Comprehensive service including;
        - Clean air blower air filter pads
        - Check alarm operation
        - Check aeration system
        - Clean down system
        - Replenish chlorine tablets
        - Clean effluent filter
- Periodically
    - De-sludge anaerobic chambers

The construction, commissioning and operation schedule is provided in Section 5.

4.4.4 Compliance and Reporting

Subject to approval, effluent quality during commissioning and operations will be monitored in accordance with requirements specified in Table 4-1.

Table 4-1. Proposed monitoring regime for treated wastewater from the Biomax units

Sampling Location	Parameter	Frequency
Sampling point at each Biomax on the Effluent Discharge Line	Biochemical oxygen demand (mg/L)	Fortnightly samples of effluent discharge quality during commissioning. Quarterly samples of effluent discharge quality during operation.
	Total Suspended Solids (mg/L)	
	Total Nitrogen (mg/L)	
	Total Phosphorus (mg/L)	
	pH (pH units)	
	Thermotolerant coliforms (cfu/100mL)	
	Volumes (kL)	Monthly

Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

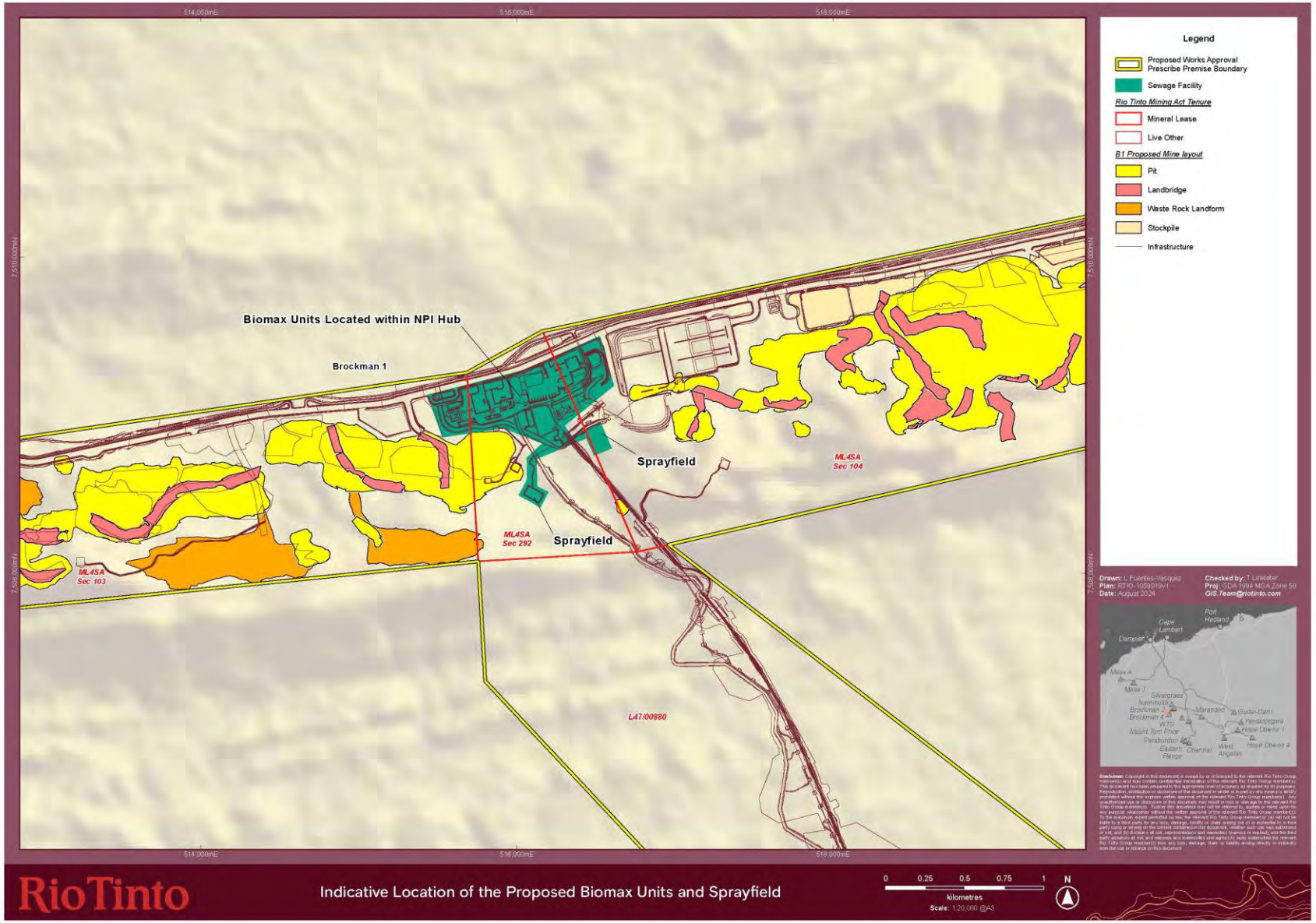

Figure 4-6. Indicative location of the proposed Biomax units and sprayfield footprint

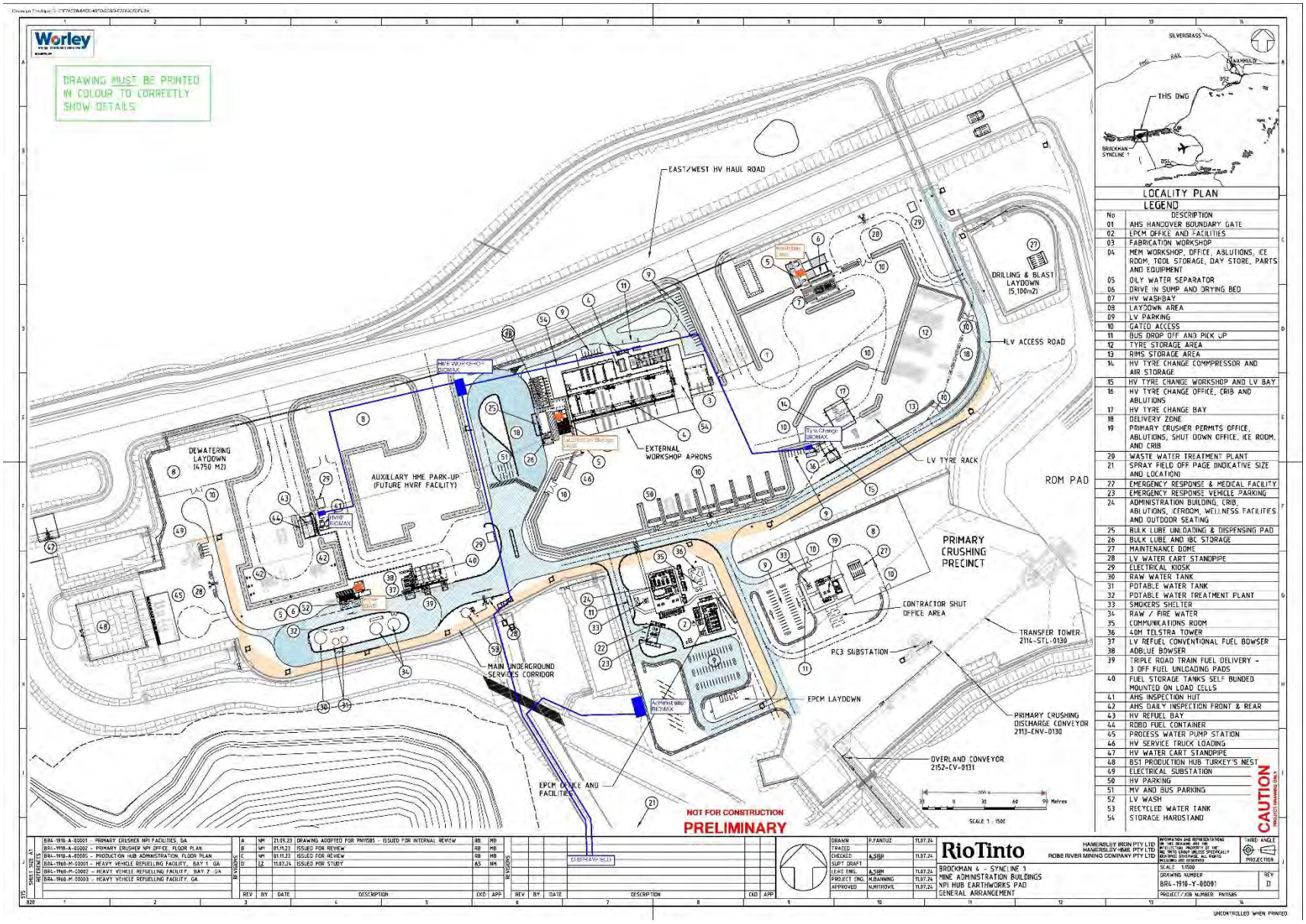

Figure 4-7. Indicative design and layout of the proposed Biomax units

4.5 Category 64: Landfill expansion

4.5.1 Facility overview

The proposed replacement landfill will have a design capacity of 6,000 tonnes per annum, with an estimated life of 10 years. Both landfill facilities, the existing licensed Class II putrescible landfill at the BS4 Operations (L8232/2008/2) and the replacement landfill, will be operational for a period of time. The replacement landfill is proposed to be located directly north and abutting the existing facility. The location of the proposed facility is shown in Figure 4-8.

As per the proposed landfill management commitments, the closest water course is greater than 1000 m away and groundwater is approximately 30 mbgl dependent on season.

4.5.2 Detailed design

The replacement landfill will be an open trench construction. Each trench will be constructed as the previous trench reaches capacity. Waste will be disposed progressively from one end to another. The tipping face will be no longer than 30 m wide. Waste will be covered with fill removed during the trench construction to reduce the likelihood of windblown waste and to minimise attracting vermin. Given the shape of the area, trench length will vary from 50-300 m long with a maximum depth of 6 m.

The compound will be surrounded by a 1.8 m cyclone fence with access via a locked gate. Signage will be installed near the access gate to communicate the accepted waste streams to the facility.

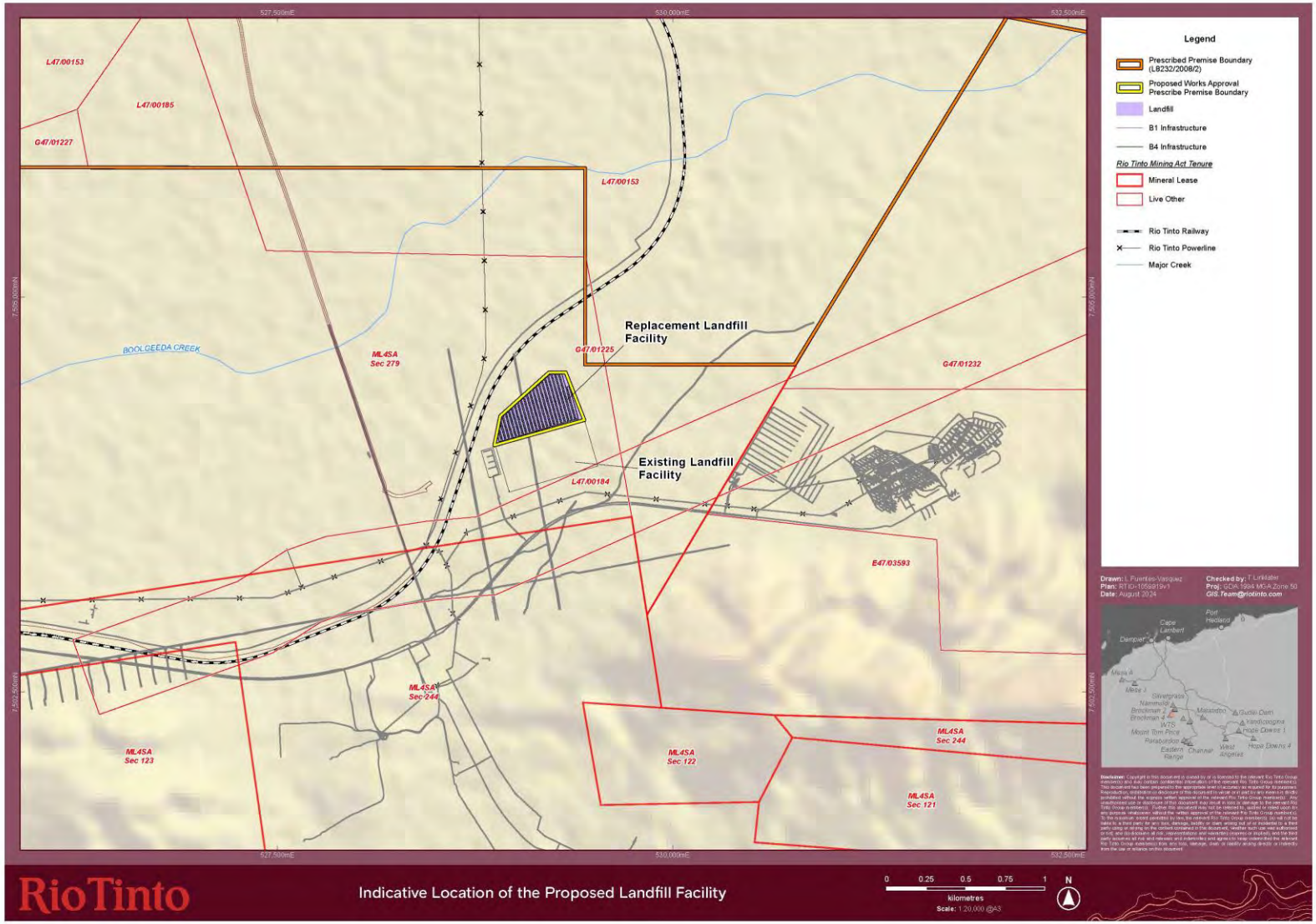

Figure 4-8. Indicative location of the proposed replacement landfill facility

4.5.3 Proposed Construction, Commissioning and Operation

Construction Phase

The construction phase will involve the following:

- Earthworks
    - Removal of existing topsoil stockpiles.
    - Clearing of approximately 14.3 ha. Topsoil and vegetation stripping in accordance with the RTIO Soil Resource Management Plan and reused for rehabilitation of the facility if practicable.
    - Trench locations are to be opened in stages as required. Each trench is expected to be, on average, between 50 – 300 m long x 11 m in width with four cells within each trench. Each trench will have a maximum depth of up to six meters.
    - Excavated material will be placed at the ends of the trench and used for covering material. Trenches under construction will be barricaded and windrowed off at all times to ensure only one 30 m tipping face is open at a time.
    - Trenches are placed according to the prevailing wind direction to prevent windblown rubbish from occurring.
- Stormwater management
    - Windrows will be established approximately 400 mm high around the perimeter of each trench to divert stormwater away from the active landfill area, prevent storm water from coming into contact with waste and provide a safety barrier.
    - A sump or bunding will be constructed to collect any surface water that has come into contact with waste.
    - Ramping to the open trench features a 200 mm high roll over bund to prevent stormwater entering the trench.
- Fencing / Supporting infrastructure
    - The facility will be surrounded by a 1.8 m high cyclone mesh fence with the bottom portion of the fence line buried to deter fauna ingress to the facility.
    - Facility will have lockable gates which are secured when the facility is unattended.
    - A 500 mm windrow will be constructed along the fence line to ensure waste is not washed or blown beyond the facility boundary and to ensure all stormwater is retained onsite.

When construction is completed, a compliance document detailing compliance with commitments made in the WAA will be submitted to the DWER.

Time Limited Operations

It is requested that Time Limited Operation be undertaken under the Works Approval, to allow for the assessment and determination of a LAA. Conditions are proposed to be included in the Works Approval to regulate the waste disposal during the time limited operational phase. The conditions of the Works Approval are proposed to be transferred, as appropriate, into the

Licence and transition to operation under Licence conditions will commence once a Licence Amendment is approved.

Operations

The replacement landfill will be operated as per the existing BS4 landfill. The following waste streams will be accepted at the facility, as defined in the Landfill Definitions (Landfill waste classification and waste definitions (DWER, 2019)) and currently authorised under L8232/2008/2:

- Clean Fill;
- Uncontaminated Fill;
- Inert Waste Type 1;
- Special Waste Type 1; and
- Putrescible Waste.

The disposal of waste will commence as soon as construction is completed and will be managed as per site operating requirements as specified in the Iron Ore (WA) Landfill Management Work Practice (RTIO-HSE-0014175). Key management measures include:

- Tipping area not greater than 30 m in length and at least 2 m above ground level height.
- Waste is to be covered at least weekly with a minimum of 200 mm of cover material so that no waste is left exposed. Covering is to be with soil or another inert approved material.
- Signage at the entrance of the facility informing users of the management practices, accepted waste types, and landfill manager contact details.
- Security fencing to 1.8 m high.

Groundwater Monitoring

Groundwater levels within the locality of the proposed landfill are approximately 30 mbgl (prior to trenches being dug). There is no requirement specified in L8232/2008/2 to monitor groundwater quality on site. Given the similar depths to groundwater at the existing facility and the proposed replacement landfill, no groundwater quality monitoring is proposed.

4.5.4 Compliance Reporting

Subject to approval, operation of the replacement landfill is expected to commence in Q1 2027. Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

4.6 Category 73: Bulk Fuel Storage

4.6.1 Facility Overview

Permanent refuelling facilities and lubrication facilities are required to support the mining fleet for the BS1 development. The following infrastructure will be located within NPI hub:

- Road train / tanker unloading to supply fuel to the Heavy Vehicle Refuelling Facility (HVRF);
- 4 x 200 kL diesel fuel storage tanks;
- Heavy vehicle (HV) refuelling bays with delivery pump and fuel arm to suit the HV fleet and associated bunds as per *Australian Standard 1940-2004* (AS 1940-2004): *The storage and handling of flammable and combustible liquids*;
- Bulk lubrication storage tanks;
    - 1 x 55 kL oil storage tank
    - 4 x 30 kL oil storage tanks
    - 1 x 85 kL waste oil storage tank
    - 6 x 1 kL oil storage tanks
- Spillage drive-in collection sumps with drying pad; and
- Oily water collection and treatment (treated water discharging to storage tank for dust suppression).

The NPI hub is accessed via the primary HV haul road and via a light vehicle (LV) road. The indicative location and layout of the proposed NPI hub are included in Figure 4-10 and Appendix 2.

Additional temporary refuelling facilities are proposed to support the construction and early mining fleet for the BS1 development. Each location will contain the following infrastructure in accordance with Australian Standard 1940-2004 (AS 1940-2004): The storage and handling of flammable and combustible liquids.

- Road train unloading and LV refuelling containerised skid with HDPE lined earthen spill containment bund.
- Self-bunded diesel fuel storage tanks.
- Flow control, level monitoring, and overflow protection equipment.
- HV refuelling delivery pump and fuel arm self-bunded equipment skid to suit the HV fleet on HDPE lined earthen spill containment bund refuelling bay.

The following refuelling locations and fuel storage volumes are proposed. The design drawing reference for each facility has been noted and is included in Appendix 2.

- Temporary NPI – 2 x 200 kL storage tanks (BR4-6100-G-00011)
- East EPCM – 3 x 110 kL storage tanks (BR4-6100-G-00004)
- East Bulk Earthworks – 3 x 110 kL storage tanks (BR4-6100-G-00004)
- Overland Conveyor Bulk Earthworks – 1 x 110 kL storage tank (BS1DES-G-SKETCH-00023)
- West Bulk Earthworks – 3 x 110 kL storage tanks (BS1DES-G-SKETCH-00022)

The proposed permanent and temporary fuel storage capacity is 1066 m^3 and 1,500 m^3 in aggregate respectively. The total Category 73 proposed fuel storage capacity under this WAA is 2,566 m^3 in aggregate.

The indicative footprint of the facilities is provided in Figure 4-9. The fuel storage and refuelling facilities will be located within this footprint however the final location and orientation may be subject to change.

4.6.2 Detailed Design

4.6.2.1 Permanent Facilities

Road Train / Tanker Unloading

A road train / tanker unloading facility will be provided to supply fuel to the HVRF. Road tankers will be unloaded on a concrete hardstand which will drain into the adjacent pump station bunded area, which reports to the oily water collection and treatment system.

Tanker unloading pumps will unload the tankers. The pumps will be located within the HVRF pump station bund. The transfer of fuel from the road tankers to the fuel storage tanks will be metered.

The road train / tanker unloading facility will also include a LV refuelling station. A single bowser will be located on the end of the delivery pad within the bunded area and connected to the metering system.

Fuel Storage

Diesel fuel will be stored at the refuelling facility in four (4) 200 kL self-bunded fuel storage tanks. The tanks will be designed and constructed in accordance to AS 1940-2004: The storage and handling of flammable and combustible liquids and Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) licensing requirements. All fuel storage tanks and transfer points will be above ground, self-bunded or within bunded areas / secondarily contained (in accordance with AS 1940-2004).

Concrete hardstands will not be installed under fuel storage tanks that are self-bunded due to the risk of a hydrocarbon spill being mitigated by the self-bunding outer tank that contains any hydrocarbon leaks from the inner tank.

Heavy Vehicle Refuelling Bays

The HVRF will include a single refuelling bay designed to support the HV fleet (including haul trucks and the nominated other heavy ancillary support vehicles including water carts, service trucks and graders). Vehicle refuelling will occur over a concrete hardstand (with associated sumps and oily water collection and treatment system) via a fuel arm designed to suit HV fleet.

Bulk Lubrication Storage

The bulk lubrication storage facility will include storage tanks within a concrete bunded area for fleet maintenance lubricants, oils and waste oils. Storage tanks will be unloaded and

unloaded via road tanker over concrete bunded loading and unloading pad. Lubricants and oils will be reticulated within adjacent heavy vehicle maintenance workshop. Spills and runoff from the concrete bund will report to an oily water collection and treatment system.

Oily Water Collection and Treatment

Concrete hardstand will be installed under all areas where there is potential for hydrocarbon spills to direct water to the oily water collection and treatment system, including at the refuelling facility, lubrication facility and vehicle washdowns within the NPI hub.

Road tanker unloading pads, HV refuelling bay and pump station bunded area, lubrication storage containment bund and wash down pads will all be graded such that water will be directed into a drive-in collection sump. Sumps are designed to be drive-in to allow removal of sediments that settle in the collection sump. A drying pad adjacent to the collection sump will allow hydrocarbon contaminated solids to be removed from the sump to dry before being disposed of. Water from the collection sump will overflow into a pump pit. The oily water from the pump pit will be transferred to the Oily Water Separator (OWS).

Coalescing tube OWSs are proposed. Coalescing tube OWS separate oil and water using gravity. Oily water is pumped into the separator where solids sink, and oil rises to the top across tubes resulting in two flows out of the system; treated water and separated hydrocarbons. The OWS will incorporate a spill recovery system to separate fuel in the case of larger spills to a maximum size. Larger incidents will cause the system to shut down, preventing the OWS operating outside acceptable parameters. The OWS is designed to treat oily water so that effluent has a Total Recoverable Hydrocarbons (TRH) concentration is below 15 mg/L. Treated oily water will be used for dust suppression. Waste oil will be collected, transported offsite and disposed of at an appropriate facility by a licensed contractor.

4.6.2.2 Temporary Facilities

Road Train / Tanker Unloading

Road train / tanker unloading facilities will be provided to supply fuel to the temporary refuelling locations. Road tankers will be unloaded on a HDPE lined earthen spill containment bund.

Tanker unloading pumps will unload the tankers. The unloading and LV refuelling equipment skid will be self-bunded. The transfer of fuel from the road tankers to the fuel storage tanks will be metered.

Fuel Storage

Diesel fuel will be stored at the refuelling locations in self-bunded fuel storage tanks. The tanks will be designed and constructed to as per AS 1940-2004: The storage and handling of flammable and combustible liquids and DEMIRS licensing requirements. All fuel storage tanks and transfer points will be above ground, self-bunded or within bunded areas / secondarily contained (in accordance with AS 1940-2004).

Concrete hardstands are not proposed to be installed under fuel storage tanks that are self-bunded owing that the risk of a hydrocarbon spill from a self-bunded tank is negligible, with the outer tank containing any hydrocarbon spills.

Heavy Vehicle Refuelling Bays

The refuelling locations will include a single HV refuelling bay designed to support the fleet of HV (including haul trucks and the nominated other heavy ancillary support vehicles including water carts, service trucks and graders). Vehicle refuelling will occur over a HDPE lined earthen spill containment bund.

Spill Containment and Treatment

HDPE lined earthen spill containment bunds will be installed under each location where there is potential hydrocarbon spillage during loading or unloading. In the event of spillage within containment bunds, contaminated soil will be removed and replaced as required. Contaminated soil to be treated and disposed of in line with regulations.

4.6.3 Proposed Construction, Commissioning and Operation

Construction of the permanent refuelling facility and lube storage at the NPI hub will commence in September 2026. Commissioning for the permanent refuelling facility is expected to commence in May 2027. Commissioning activities will include two phases – Phase 1: dry commissioning of all systems to test the functionality of the facility. Phase 2 will involve wet commissioning using diesel fuel to complete the testing and verify the electrical safety systems. It is anticipated that both phases of commissioning will be completed by August 2027.

Temporary facilities are proposed to be constructed as required for primary contract packages during the BS1 development. The indicative construction dates for the temporary facilities are provided below. The design drawing reference for each facility has been noted and is included in Appendix 2.

- Temporary NPI – June 2025 (BR4-6100-G-00011)
- East EPCM – June 2025 (BR4-6100-G-00004)
- East Bulk Earthworks – April 2025 (BR4-6100-G-00004)
- Overland Conveyor Bulk Earthworks – July 2025 (BS1DES-G-SKETCH-00023)
- West Bulk Earthworks – July 2025 (BS1DES-G-SKETCH-00022)

Commissioning for the temporary fuel facilities will be commenced immediately post construction. Commissioning activities will include two phases – Phase 1: dry commissioning of all systems to test the functionality of the facility. Phase 2 will involve wet commissioning using diesel fuel to complete the testing and verify the electrical safety systems. It is anticipated commissioning of temporary facilities will be completed within 1 month of construction.

The construction, commissioning and operation schedule is provided in Section 5.

4.6.4 Compliance and Reporting

Subject to approval, fuel storage and refuelling facilities will be constructed and operated in accordance with the commitments within this Works Approval application, including:

- Fuel storage tanks will be designed and constructed and tested to AS 1940-2004: *The storage and handling of flammable and combustible liquids*;
- Fuel storage tanks will be above ground, self-bunded or within bunded areas / secondarily contained to ensure any spills are contained;
- Concrete hardstand will be installed under proposed fuel storage and refuelling facilities where there is potential for hydrocarbon spills;
- Potentially contaminated surface water will be directed to the oily water collection and treatment system; and
- Spill response will be provided.

The commitments for the management of fuel storage and refuelling are proposed to be transferred, as appropriate, into Licence L8232/2008/ once a Licence Amendment is approved. Compliance with the conditions of the Licence will be presented in the Annual Environmental Report.

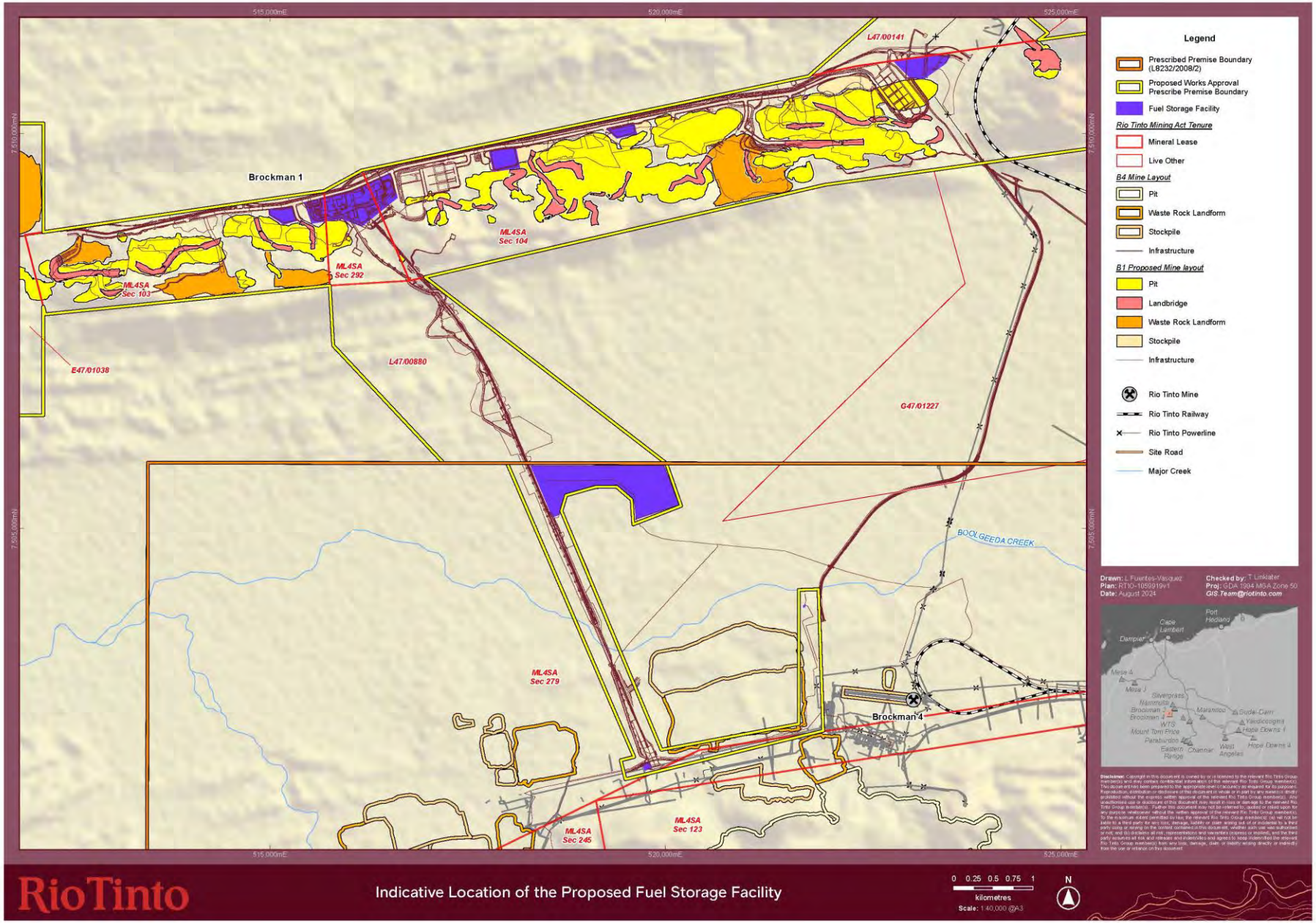

Figure 4-9. Indicative location of the proposed refuelling facilities

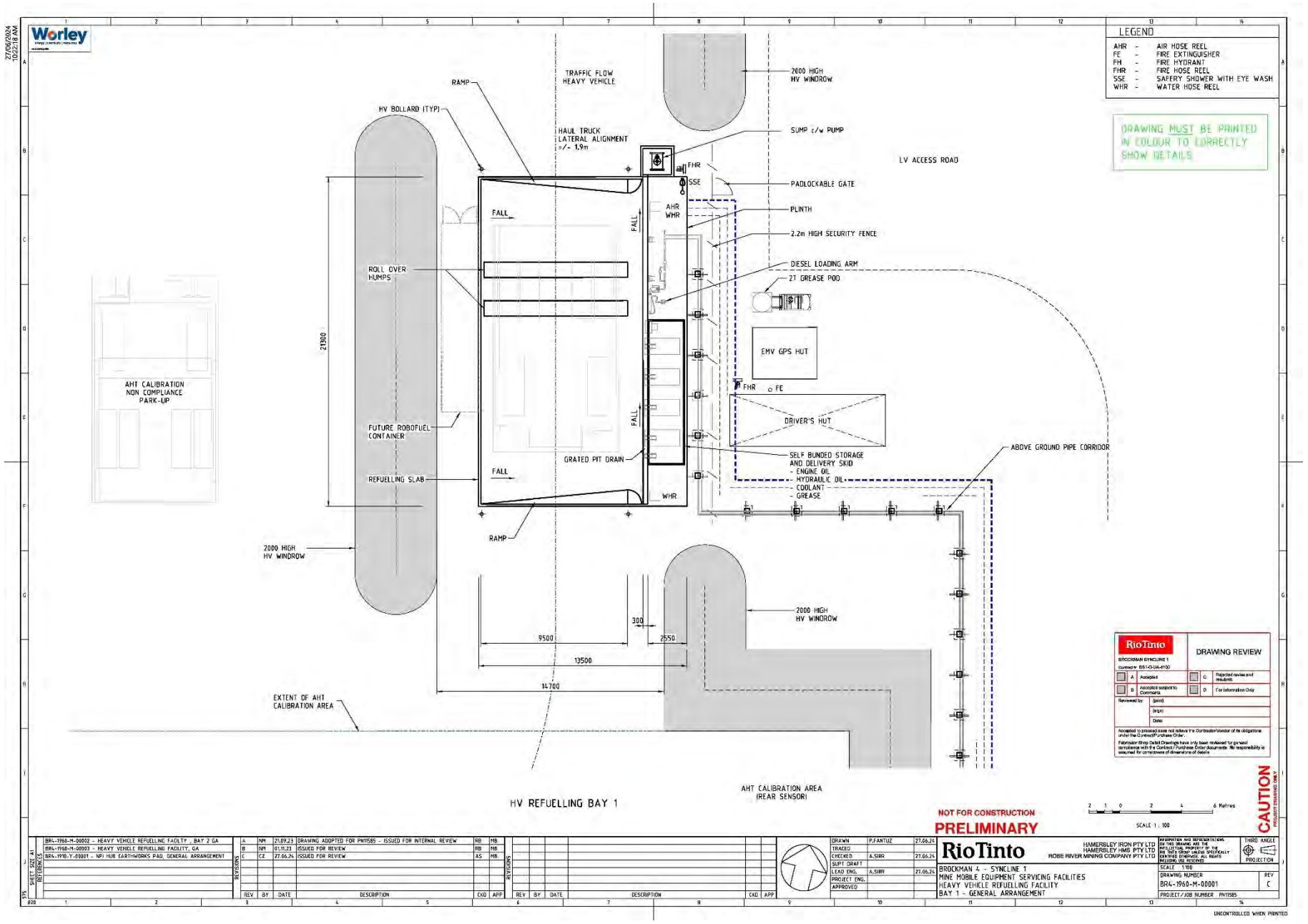

Figure 4-10. Indicative design of the proposed refuelling facility at BS1

5 Construction, Commissioning and Operation Schedule

A proposed construction, commissioning and operation (including a time limited operational phase) schedule for all activities subject to this WAA is included in Table 5-1 and summarised below to provide context for the proposed sequencing of activities and resulting licensing processes.

- Category 5: The construction of the ore processing facilities is proposed to commence in Q2 2026 Commissioning of Stages 1 to 3 are expected to commence in Q1 2027 and are proposed to be completed under the Works Approval. Commissioning of Stages 4 to 6 are expected to commence in Q1 2028 (following submission of a compliance document) for a duration up to 12 months. The Licence Holder seeks to commence commissioning Stages 4 to 6 under the Licence.
- Category 6: The construction of the dewatering infrastructure is proposed to commence in Q3 2026 and is expected be completed in Q1 2027. Operation of the discharge point will begin immediately upon the completion of construction. It is requested that time limited operation be undertaken under the Works Approval, to allow for the assessment and determination of a Licence Amendment application.
- Category 12: The mobile crushing and screening plants will be used to support construction activities at the BS1 development from Q2 2025 to Q1 2027. Commissioning is limited to setting the crusher aperture and checking the dust suppression sprays are functioning. Operation is proposed to commence immediately upon the completion of commissioning. Given the short commissioning requirement, it is requested operation of the plant commence without the need for a compliance document to be submitted.
- Category 85: The construction of the Biomax units and sprayfield is proposed to commence in Q3 2026 and is expected be completed in Q2 2027. Commissioning includes dry commissioning which is proposed to be completed during construction. Wet commissioning is proposed to be completed within 1 month of completion of construction.
- Category 64: The construction of the replacement landfill facility is proposed to commence in Q4 2026 and is expected be completed in Q1 2027. The landfill construction will include the installation of the perimeter fence, access gates and signage. When the current landfill reaches capacity, topsoil will be stripped within the footprint of the replacement landfill and one or two cells will be constructed with stockpiling of fill placed within the compound. Conditions are proposed to be included in the Works Approval to regulate the construction of the proposed facilities. Once construction is completed, a compliance document detailing compliance with the conditions of the Works Approval will be submitted.
- Category 73: Temporary bulk fuel storage facilities are proposed to be constructed as required for primary contract packages during the BS1 development, commencing in Q2 2025. The construction of the permanent bulk refuelling facilities is proposed to commence in Q3 2026 and is expected be completed in Q2 2027. Commissioning of permanent and temporary fuel storage facilities requires dry and wet commissioning. Temporary facility commissioning is expected within 1 month of the completion of

construction. Commissioning of the permanent bulk refuelling facilities is proposed to extend over three months from Q2 2027 to Q3 2027.

Conditions are proposed to be included in the Works Approval to regulate the construction of the proposed facilities. Once construction of each facility is completed, a compliance document detailing compliance with the conditions of the Works Approval will be submitted.

Staged LAA are proposed following the construction of the facilities that are the subject of this WAA to streamline the amendment process. During the intervening time, it is requested that time limited operation be undertaken under the Works Approval. Conditions are proposed to be included in the Works Approval to regulate proposed activities during the time limited operational phase. The conditions of the Works Approval are proposed to be transferred, as appropriate, into the Licence and transition to operations under Licence conditions will commence once the Licence Amendment is approved.

Table 5-1. Indicative construction, commissioning and operation schedule

Activity	Proposed Construction	Compliance Documentation	Commissioning Timeframe	Time limited operation commences under Works Approval	Proposed duration of time limited operation under Works Approval	Licence Amendment Application	Operation under Licence, as amended
Stage 1							
Mobile Crushing and Screening (Category 12)[2]	May 2025	Not required	Not required				
Fuel storage and refuelling facilities (Category 73) Temporary facilities [3]	May 2025 – February 2026	Submitted following construction of temporary facilities – Feb 2026	1 month (Feb 2026 – Mar 2026)				
Dewatering discharge (Category 6)	June 2026 - August 2026	Submitted following construction of discharge point – August 2026	Not required	August 2026	180 calendar days	Stage 1 application submitted October 2026	**January 2027**
Stage 2							
Landfill facilities (Category 64)	Oct 2026 – January 2027	Submitted following construction of landfill January 2027	Not required	January 2027	330 calendar days[4]	Stage 2 application submitted August 2027	**November 2027**

[2] Mobile crushing and screen plants are required to support construction activities for the BS1 development, no changes are proposed to the current conditions and design capacity approved under L8232/2008/2. Activity not proposed for inclusion within Stage 1 LAA.

[3] Temporary fuel storage and refuelling facilities are required to support construction activities for the BS1 development, these temporary facilities will not be included within the Category 73 assessed design capacity approved under L8232/2008/2. Activity not proposed for inclusion within Stage 1 LAA.

[4] We kindly request the Department's consideration of an extended time limited operation period to minimise the administrative burden and workload associated with multiple staged licence amendment applications under assessment.

Fuel storage and refuelling facilities (Category 73) Permanent facilities	Sept 2026 – June 2027	Submitted following construction of permanent facilities – June 2027	4 months (May 2027 – August 2027)	August 2027	120 calendar days		
Biomax units and sprayfield (Category 85)	Sept 2026 – May 2027	May 2027	1 month (May 2027 – June 2027)	June 2027	180 calendar days		
Stage 3							
Processing facilities (Category 5)	April 2026 – January 2028	Submitted following construction and commissioning Stage 1-3 of processing facilities January 2028	Stages 1 – 3 12 months (Jan 2027 – Jan 2028) to commence under Works Approval Stages 4 – 6 12 months (Jan 2028 – Jan 2029) to occur under Operational Licence	January 2028	180 calendar days	Stage 3 application submitted March 2028	**June 2028**

Note – Indicative timeframes only.

Construction and commissioning Stages 1-3 of processing facilities will occur concurrently (construction verification and pre-commissioning is undertaken following construction of each part of the facilities).

6 Risk Identification and Assessment

A risk assessment has been prepared to identify the potential emissions from the proposed activities and the potential sources, pathways and receptors of those emissions, and proposed controls to manage potential emissions to determine a risk rating. The risk assessment has been based on the DWER Guidance Statement: *Risk Assessments* (released by the then named Department of Environmental Regulation in 2017) and the Rio Tinto risk assessment process, based on the following risk rating matrix (Table 6-1):

Table 6-1. Risk Rating Matrix

	Consequence				
Likelihood	**Slight**	**Minor**	**Moderate**	**Major**	**Severe**
Almost Certain	**Medium**	**High**	**High**	**Extreme**	**Extreme**
Likely	**Medium**	**Medium**	**High**	**High**	**Extreme**
Possible	**Low**	**Medium**	**Medium**	**High**	**Extreme**
Unlikely	**Low**	**Medium**	**Medium**	**Medium**	**High**
Rare	**Low**	**Low**	**Medium**	**Medium**	**High**

Risk = consequence x likelihood

The following criteria (DWER 2017) are used to determine the consequence and likelihood of a risk event occurring (Table 6-2 and Table 6-3).

Table 6-2. Consequence Matrix

Consequence	Consequence description	
	Environment	**Health**
Severe	On-site impacts: catastrophic Off-site impacts (local scale): high level Off-site impacts (wider scale): mid level Mid to long term or permanent impact to an area of high conservation value or special significance	Loss of life Adverse health effects: high level or ongoing medical treatment Local scale impacts: permanent loss of amenity
Major	On-site impacts: high level Off-site impacts (local scale): mid level Off-site impacts (wider scale): low level Short term impact to an area of high conservation value or special significance	Adverse health effects: mid level or frequent medical treatment Local scale impacts: high level impact to amenity
Moderate	On-site impacts: mid level Off-site impacts local scale: low level Off-site impacts wider scale: minimal	Adverse health effects: low level or occasional medical treatment Local scale impacts: mid level impact to amenity
Minor	On-site impacts: low level Off-site impacts (local scale): minimal Off-site impacts (wider scale): not detectable	Local scale impacts: low level impact to amenity
Slight	On-site impacts: minimal	Local scale impacts: minimal impacts to amenity

Table 6-3. Likelihood Matrix

Likelihood	Likelihood description
Almost certain	The risk event is expected to occur in most circumstances.
Likely	The risk event will probably occur in most circumstances.
Possible	The risk event could occur at some time.
Unlikely	The risk event will probably not occur in most circumstances.
Rare	The risk event may only occur in exceptional circumstances.

The potential emissions, sources, pathways and receptors that have been identified for the construction, commissioning and operation of the proposed facilities are outlined in Table 6-4. This table also identifies the potential impacts, proposed controls and associated risk ratings. A detailed risk assessment will be undertaken for any activity which has been identified as having a 'Medium' risk rating or higher (Section 7). Detailed risk assessment includes:

- A description of the potential emissions, sources, pathways and receptors.
- Any controls that have been identified for the risk event.
- An assessment of the consequence and likelihood.
- Risk rating.

Table 6-4. Risk Assessment

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Construction	Construction of all facilities	Dust	Air: windborne particulate (dust) emissions generated during construction activities including clearing and vehicle movements.	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, dust generated during construction is not expected to affect public health or amenity.	Dust will be managed via the requirements of the Ministerial Statement and Brockman Syncline EMP, the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures, including: - Clearing will be managed to ensure that areas are only cleared as required and rehabilitation of cleared areas is implemented progressively; - Dust suppression will be implemented (including use of water trucks, control of vehicle movements / restricted speeds, approved dust suppression products e.g. DustMag) during construction as required; and - Targeted dust monitoring as required. Standard management procedures are expected to effectively mitigate the risk of dust emissions during construction.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.1
				Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance within and adjacent to the Premises.	Declining health of vegetation including reduced ability for photosynthesis due to dust deposition / smothering. Given that native vegetation is expected to be reasonably tolerant to dust deposition, dust generated during operations is expected to have a negligible impact on vegetation health.					
		Noise	Air: windborne noise emissions generated during construction activities	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, noise generated during construction is not expected to affect public health or amenity.	*Environmental Protection (Noise) Regulations 1997* and standard operating procedures are expected to effectively mitigate the risk of noise during construction. Specific controls are not proposed. BS1 Blast Management Plan implemented for all blasting activities and includes an assessment of proximity to sensitive receptors, including heritage rock shelters and bat cave locations.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.2
				Terrestrial ecosystems: Native fauna, including the Pilbara Leaf-nosed Bat and Ghost Bat.	Noise may disrupt nocturnal foraging behaviour of the Pilbara Leaf-nosed Bat and / or Ghost Bat.					
		Light	Air: light spill generated during construction activities	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, light emissions are not expected to affect health or amenity.	Light spill will be managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures, including: - Lighting design in areas that require night lighting will ensure light is directed to work areas and minimal light spill occurs (including use of directional lighting and covered lenses). Standard management procedures are expected to effectively mitigate the risk of light spill during construction.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.4
				Terrestrial ecosystems: Nocturnal native fauna, including the Pilbara Leaf-nosed Bat and Ghost Bat.	Light spill may disrupt nocturnal foraging behaviour of the Pilbara Leaf-nosed Bat and / or Ghost Bat: Most construction activities will be conducted in daylight hours. Light spill during construction is expected to be limited at night (when nocturnal native fauna are foraging), and as such, is expected to have a negligible impact on native fauna.					

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Construction	Construction of all facilities	Hydrocarbons from fuel storage and refuelling during construction	Hydrocarbon spill causing soil contamination	Land	Soil contamination	Hydrocarbons used during construction will be managed via relevant legislation (including *Australian Standard AS 1940-2004: Storage and handling of flammable and combustible liquids*), the requirements of the Works Approval, Licence L8232/2008/2 and standard operating procedures, including: - Vehicle refuelling will occur over concrete hardstand or compacted, lined earthen pad (with the exception of field-based refuelling where a drip tray will be used); - Field based refuelling will not occur within 30 m of the AHGF centreline of Boolgeeda Creek; - Fuel storage tanks will be designed and constructed to AS 1940-2004: *The storage and handling of flammable and combustible liquids*; - Fuel storage tanks will be above ground; - Fuel storage tanks will be self-bunded; - Concrete hardstand or compacted, lined earthen pad will be installed under hydrocarbon storage and refuelling facilities where there is potential for hydrocarbon spills; - Management structures (bunding / secondary containment) will be installed at all hydrocarbon storage facilities to ensure any spills are contained; and - Spill response will be provided. Standard hydrocarbon management procedures are expected to effectively mitigate the risk of hydrocarbon spills during construction.	Minor	Unlikely	**Medium**	Detailed assessment provided in Section 7.6
			Seepage of hydrocarbon spill to groundwater causing contamination	Groundwater of beneficial use (suitable for stock watering): None, the vertical distance to groundwater is more than 10 m.	Groundwater contamination with potential impacts to beneficial use of the groundwater (and declining health of any vegetation dependent on groundwater): Given the vertical distance to the groundwater, any hydrocarbon spills from storage and refuelling during construction are not expected to seep to groundwater (or affect any associated terrestrial ecosystems).				
				Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within and adjacent to the Premises					
		Solid / Liquid Waste	General wastes generated during construction activities	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, general wastes are not expected to affect public health or amenity.	General wastes will be managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including: - Sufficient recycling and general waste collection areas will be established and labelled with the relevant waste type to facilitate the management of waste; - Recyclable materials will be separated from other waste and recycled wherever possible; and - Non-recyclable materials will be disposed of at an approved landfill facility. Standard waste management procedures are expected to effectively mitigate the risk of general wastes during construction.	Minor	Rare	**Low**	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.7
				Terrestrial ecosystems: Native fauna	Local increase in feral fauna (scavengers attracted to putrescible wastes) could result in predation and replacement of native fauna.					

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Category 5: Processing of Ore	Operation of processing facilities	Dust	Air: windborne particulate (dust) emissions generated during operation of processing facilities, transport of ore product, stockpiling of ore product	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, dust generated during processing is not expected to affect public health or amenity.	Dust emissions will be managed via the requirements of the Ministerial Statement and Brockman Syncline EMP, the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures, including: - Surge bin will be equipped with an insertable type dust collector at the top of the bin structure; - Load points from the surge bin onto the conveyor include skirts and covers to reduce spillage and bulk ore conditioning spray; - Regular inspection and maintenance will be undertaken to collect and remove material that may present a potential dust risk; and - The overland conveyor is covered for approximately 90% to prevent dust generation. Appropriate design, management, inspection and maintenance of processing facilities is expected to mitigate the risk of dust during operations. All significant bat roosts (including category 2 roosts and apartment block roosts) will be protected within Mining Exclusion Zones and Mining Restriction Zones.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.1
				Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within and adjacent to the Premises.	Declining health of vegetation including reduced ability for photosynthesis due to dust deposition / smothering: Given that native vegetation is expected to be reasonably tolerant to dust deposition, dust generated during processing is expected to have a negligible impact on vegetation health.					
				Terrestrial ecosystems: Native fauna, including the Pilbara Leaf-nosed Bat and Ghost Bat	Dust may affect the quality of foraging habitat and disrupt nocturnal foraging behaviour of the Pilbara Leaf-nosed Bat and / or Ghost Bat: Dust may affect only a small proportion of the foraging habitat and as such, is expected to have a negligible impact on native fauna.					
		Noise	Air: windborne noise emissions generated during operation of the processing and screening facilities	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, noise generated during processing is not expected to affect public health or amenity.	*Environmental Protection (Noise) Regulations 1997* and standard operating procedures are expected to effectively mitigate the risk of noise during operations. Specific controls are not proposed. BS1 Blast Management Plan implemented for all blasting activities and includes an assessment of proximity to sensitive receptors, including heritage rock shelters and bat cave locations. Significant bat roosts (including Category 2 roosts and apartment block roosts) will be protected within Mining Exclusion Zones and Mining Restriction Zones in accordance with the Brockman Syncline EMP. Vibration limits will be applied to Category 2 and 3 roosts in accordance with the Brockman Syncline EMP.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.2
				Terrestrial ecosystems: Native fauna, including the Pilbara Leaf-nosed Bat and Ghost Bat.	Noise may disrupt nocturnal foraging behaviour of the Pilbara Leaf-nosed Bat and / or Ghost Bat: Noise is expected to be limited at night in comparison to the day and as such, is expected to have a negligible impact on native fauna.					
		Light	Air: light spill generated during operation of the processing facilities	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, light spill generated during processing is not expected to affect public health or amenity.	Light spill will be managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures, including: - Lighting design in areas that require permanent night lighting will ensure light is directed to work areas and minimal light spill occurs (including use of directional lighting and covered lenses). Appropriate design, management, inspection and maintenance of lighting at processing facilities is expected to mitigate the risk of light spill during operations.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.4
				Terrestrial ecosystems: Nocturnal native fauna, including the Pilbara Leaf-nosed Bat and Ghost Bat.	Light spill may disrupt nocturnal foraging behaviour of the Pilbara Leaf-nosed Bat and / or Ghost Bat: Light spill may affect only a small proportion of foraging habitat and as such, is expected to have a negligible impact on native fauna.					

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Category 5: Processing of Ore	Operation of processing facilities	Discharge to environment	Release of sediment laden surface water from the primary crushing facility run-off to the environment	Surface Water: None, the primary crushing facility is located more than 4 km north of Boolgeeda Creek. Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within or adjacent to the Premises.	Deterioration of surface water quality as a result of sedimentation (and declining health of any riparian vegetation): Given the distance to the nearest receptor, any unplanned discharge of process water (with elevated iron levels) is not expected to migrate to surface water (or affect any associated terrestrial ecosystems).	Potential sediment laden run-off will be managed via the requirements of the Works Approval, Licence L8232/2008/2 and standard operating procedures, including: - Surface water management structures will be installed to direct surface water flows around the primary crushing facility and Run of Mine pad to (i) direct surface water flows around the facility; and (ii) prevent the ingress of water into the facility. - Concrete hardstand will be installed under the primary crushing facilities, transfer station, overland conveyor drive station and surge bin where there is potential for sediment laden surface water; - Potentially sediment laden surface water will be retained on site (directed to sedimentation ponds / silt traps) to allow for sedimentation before being discharged. Appropriate design, management, inspection and maintenance of processing facilities is expected to mitigate the risk of release of sediment laden run-off to the environment during operations.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.5
			Unplanned release of process water with elevated iron levels, seepage to groundwater causing contamination	Groundwater of beneficial use (suitable for stock watering): None, the vertical distance to groundwater is more than 10 m. Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within or adjacent to the Premises. Riparian vegetation of Boolgeeda Creek is located more than 4 km from the processing facilities.	Deterioration of groundwater quality with potential impacts to beneficial use of the groundwater (and declining health of any vegetation dependent on groundwater): Given the distance to the groundwater, any unplanned discharge of process water (with elevated iron levels) is not expected to seep to groundwater (or affect any associated terrestrial ecosystems).	Potential unplanned releases of process water will be managed via the requirements of the Works Approval, Licence L8232/2008/2 and standard operating procedures, including: - Surface water management structures will be installed to direct surface water flows around the primary crushing facility and Run of Mine pad to direct surface water flows around the facility and prevent the ingress of water into the facility. - Concrete hardstand will be installed under the primary crushing facilities, transfer station, overland conveyor drive station and surge bin where there is potential for sediment laden surface water; and - Potentially sediment laden surface water will be retained on site (directed to sedimentation ponds / silt traps) to allow for sedimentation before being discharged. Appropriate design, management, inspection and maintenance of processing facilities is expected to mitigate the risk of release of iron rich process water to the environment during operations.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail on controls provided in Section 7.5
			Migration of water with elevated iron levels from processing to surface water, causing eutrophication	Surface Water: None, the distance to the nearest receptor (Boolgeeda Creek) is more than 4 km. Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within or adjacent to the Premises. Riparian vegetation of Boolgeeda Creek is located more than 4 km from the processing facilities.	Deterioration of surface water quality as a result of elevated iron levels causing eutrophication (and declining health of any riparian vegetation): Given the distance to the nearest receptor, any unplanned discharge of process water (with elevated iron levels) is not expected to migrate to surface water (or affect any associated terrestrial ecosystems).				
Category 5: Processing of Ore	Operation of processing facilities	Discharge to environment	Hydrocarbon spill causing soil contamination	Land	Soil contamination	Hydrocarbons will be managed via the requirements of the Works Approval, Licence L8232/2008/2 and standard operating procedures, including:	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
			Seepage of hydrocarbon spill to groundwater causing contamination	Groundwater of beneficial use (suitable for stock watering): None, the vertical distance to groundwater is more than 10 m. Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within or adjacent to the Premises. Riparian vegetation of Boolgeeda Creek is located more than 4 km from the processing facilities.	Groundwater contamination with potential impacts to beneficial use of the groundwater (and declining health of any vegetation dependent on groundwater): Given the vertical distance to the groundwater, any hydrocarbon spills during processing are not expected to seep to groundwater (or affect any associated terrestrial ecosystems).	- Concrete hardstand will be installed under the processing facilities where there is potential for hydrocarbon contaminated surface water; - Potentially contaminated surface water will be collected and directed to a drive-in collection sump; - Provision of hydrocarbon sensors to prevent hydrocarbons being pumped to sedimentation ponds or drains; - Fuel storage tanks will be self bunded; - Provision of management structures (bunding / secondary containment) at all hydrocarbon storage facilities to ensure any spills are contained; and - Provision of spill response. Appropriate design, management, inspection and maintenance of hydrocarbon storage and use at the processing facilities is expected to mitigate the risk of a hydrocarbon spill during operations.				However, further detail on controls provided in Section 7.5
Category 6: Mine Dewatering	Operation of discharge point	Discharge to environment	Erosion causing sedimentation	Surface Water: Boolgeeda Creek. Boolgeeda Creek is ephemeral, one deep semi-permanent pool (dry during drought years). Terrestrial ecosystems: Riparian vegetation of Boolgeeda Creek.	Deterioration of surface water quality (increased sedimentation) as a result of erosion / scouring at the discharge point. Declining health of vegetation: smothering of riparian vegetation as a result of increased sedimentation during discharge.	Dewatering water will in the first instance be utilised on site to supply water for operational purposes (processing and dust suppression). Discharge of surplus water will be managed via the requirements of the Ministerial Statement and Brockman Syncline EMP, the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including: - The extent of surface discharge along Boolgeeda Creek and the health of riparian vegetation along the discharge extent will be managed as required by the conditions of the Ministerial Statement; - Combined discharge volumes to Boolgeeda Creek will not exceed 6.4 GL per annual period via the dewatering discharge points; - A flow meter will be installed at the duplicate discharge point to record the discharge volume; - The duplicate discharge point will include a rip rap apron at the outlet, in addition to rip rap protection within the portion of the creek bed deemed susceptible to erosion; and - The discharge point will include gabion style baffling extending into the creek to slow the discharge water prior to entering the creek flow minimising erosion potential. Appropriate design, management, inspection and maintenance of the discharge point is expected to mitigate the risk of erosion during operations.	Moderate	Unlikely	**Medium**	Detailed assessment provided in Section 7.5
			Discharge of potentially contaminated water to the environment	Surface Water: Boolgeeda Creek. Boolgeeda Creek is ephemeral, one deep semi-permanent pool (dry during drought years).	Deterioration of surface water quality as a result of hydrocarbon contamination or elevated nutrient levels (eutrophication) in discharge water.	Discharge of surplus water will be managed via the requirements of the Ministerial Statement and Brockman Syncline EMP the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including:	Moderate	Unlikely	**Medium**	Detailed assessment provided in Section 7.5

Source		Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
				Terrestrial ecosystems: Riparian vegetation of Boolgeeda Creek.	Declining health of vegetation.	- Water quality sampling at Duck Creek[5] will meet specified agreed water quality requirements developed in accordance with the Brockman Syncline EMP; and - The health of riparian vegetation along the discharge extent will be managed as required by the conditions of the Ministerial Statement. Appropriate design, management, inspection and maintenance of the discharge point is expected to mitigate the risk of discharge of potentially contaminated water during operations.				
Category 12 Mobile Crushing and Screening	Operation of the Mobile Crushing and Screening Plant	Dust: Release of particulate matter during crushing and screening activities	Air: Transport through air then transport through the respiratory system	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Human health Impacts – respiratory illness. Given the distance to the nearest receptor, dust generated during onsite crushing and screening is not expected to affect public health or amenity.	Dust will be managed via the requirements of the Ministerial Statement and Brockman Syncline EMP, the Works Approval, Part V Licence L8232/2008/2 - Dust suppression will be implemented (including use of water trucks, control of vehicle movements / restricted speeds, approved chemicals e.g. DustMag). A Construction Environmental Management Plan (CEMP) will be implemented and adhered to during construction. Mobile crushing and screening plants will only be operational during construction of the BS1 development then demobilised from site. Mobile crushing and screening plants will be operated in accordance with the Rio Tinto Iron Ore (WA) Mobile Crushing and Screening Management Plan (RTIO-HSE-0235877). Standard management procedures are expected to effectively mitigate the risk of dust emissions during construction.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.
			Air: Transport through air then deposition	Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within and adjacent to the Premises.	Smothering and the potential suppression of photosynthetic and respiratory functions of vegetation. Given that native vegetation is expected to be reasonably tolerant to dust deposition, dust generated during processing is expected to have a negligible impact on vegetation health.					
				Terrestrial ecosystems: Native fauna	Dust may impact habitats which represent shelter, foraging and dispersal habitats for native fauna. Given the large distance to the nearest receptor and short-term duration of construction activities, dust is expected to have a negligible impact on native fauna.					
				Terrestrial ecosystems: Native fauna.	Local increase in feral fauna (scavengers attracted to putrescible wastes) could result in predation and replacement of native fauna.					

[5] The low number of semi-permanent or permanent pools observed on Boolgeeda Creek indicate that impacts on aquatic faunal communities are likely to be low, therefore the focus of the monitoring is on Duck Creek. One site on Boolgeeda Creek, downstream of the maximum predicted 37 km discharge footprint, near the confluence with Duck Creek, has been monitored annually since 2010 (and will continue to be so) as part of monitoring for Duck Creek.

Source		Potential Emissions	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Category 85: Biomax units and Sprayfield	Operation of Biomax units and sprayfield	Odour	Air	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Negligible odour impacts, given the distance to the receptors, odour emissions are not expected to affect health or amenity.	The Biomax units will be appropriately designed and operated to mitigate the risk of odour emissions. Inspection and maintenance will be undertaken. Standard maintenance procedures are expected to effectively mitigate the risk of odour emissions	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.
		Raw sewerage	Sewage spill during operation of the Biomax untis causing soil contamination / seepage to groundwater / eutrophication of surface water.	Groundwater: 19 mbgl throughout the year. Surface Water: Boolgeeda Creek is located approximately 4km away to the south.	Minimal impacts expected to potential receptors given the distance to each receptor.	The Biomax units will be appropriately designed and operated to mitigate the risk of sewage spills Surface water management structures (including perimeter bund and sumps) will ensure any spills are contained. Spill response will be provided. Inspection and maintenance will be undertaken. Standard management procedures are expected to effectively mitigate the risk of sewage emissions.	Moderate	Rare	Medium	Detailed assessment provided in Section 12.1
			Sewage spill during operation of the Biomax untis causing risk to human health.	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health: None, given the distance to the nearest receptors spills are not expected to affect health.		Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.
		Treated effluent	Discharge of inadequately treated effluent to land (spray field) / seepage to groundwater / eutrophication of surface water	Terrestrial ecosystems Groundwater: 19 mbgl throughout the year Surface Water: Boolgeeda Creek is located approximately 4 km to the south	Elevated nutrient levels in soil / groundwater. Impacts to native vegetation / ingress or spread of weeds. The above impacts will be minimal given the distance to receptors, the ephemeral nature of the creeks, high evaporation rates and appropriate sizing of the sprayfield.	The Biomax units will be appropriately designed and operated to mitigate the risk of sewage spills. The treated effluent will be disposed of to an appropriately sized sprayfield, as per WQPN 22 guidance (DoW 2018). Surface water management structures (including windrow to separate the pipeline from the LV access track). Spill response will be provided. Inspection and maintenance will be undertaken. Monitoring of discharge effluent quality will be undertaken in principle accordance of Category D level of treatment (WQPN 22) and will not exceed target values specified in *Australian Guidelines for Sewerage Systems – Effluent Management* (ANZECC 1997). Standard management procedures are expected to effectively mitigate the risk of elevated nutrient levels in soil / seepage to groundwater as a result of discharge of inadequately treated effluent.	Moderate	Rare	Medium	Detailed assessment provided in Section 7.5.
		Treated effluent	Discharge of inadequately treated effluent causing risk to human health	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village	Health: None, given the distance to the nearest receptors spills are not expected to affect health.		Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.

Source		Potential Emissions	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Assessment Required?
Category 73: Bulk Fuel Storage	Operation of fuel storage facility	Hydrocarbons from fuel storage and refuelling	Hydrocarbon spill causing soil contamination	Terrestrial ecosystems: Native fauna	Soil contamination	Hydrocarbons will be managed via relevant legislation (including *Australian Standard AS 1940-2004: Storage and handling of flammable and combustible liquids*) as well as the requirements of the Works Approval and the Part V Licence L8232/2008/2 (e.g. Condition 13: Stormwater management). Hydrocarbons will also be managed using standard operating procedures, including: - Fuel storage tanks will be designed and constructed to AS 1940-2004: *The storage and handling of flammable and combustible liquids*; - Management structures (bunding / secondary containment) will be installed at all hydrocarbon storage and refueling facilities to ensure any spills are contained; - Appropriate labelling of storage areas and storage containers; - Spill response will be provided; - Suitable impact or collision protection installed around the facility to prevent vehicle impacts; - Suitable impact or collision protection installed around the facility to prevent vehicle impacts; - The fuel storage area will have a roll-over bund installed to prevent release of hydrocarbons in the event of a spill or leak during refueling; - Overfill protection will be provided by an alarm sounding and the flow of liquid being stopped before the tank overflows; - Appropriate incident response equipment (spill kit, fire extinguishers) will be installed within the fuel storage; - Leak detection system will be installed with an audible alarm; - Refueling apron to be established on compacted and lined surface; - Diesel storage tanks to be double-walled; and - Any potentially contaminated surface water will be directed to installed grates and sumps which will be equipped with oily water alarms.	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required.
			Seepage of hydrocarbon spill to groundwater causing contamination	Groundwater of beneficial use (suitable for stock watering): None, the vertical distance to groundwater is more than 10 m bgl.	Groundwater contamination with potential impacts to beneficial use of the groundwater. Given the vertical distance to the groundwater, any hydrocarbon spills from storage and refuelling during operations are not expected to seep to groundwater (or affect any associated terrestrial ecosystems).					
				Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance located within and adjacent to the Premises						
Category 64: Class II putrescible landfill site	Operation of landfill facility	Dust	Air: windborne particulate (dust) emissions generated from unsealed surfaces during operation of landfill facility	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village	Health and amenity: Given the distance to the nearest receptor, dust generated from the landfill is not expected to affect public health or amenity.	Dust emissions will be managed via the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures, including: - Clearing will be managed to ensure that areas are only cleared as required upon the grant of the new Purpose Permit;	Minor	Rare	Low	Risk pathway is low, detailed assessment is not required. However, further detail is provided in Section 7.1d

				Terrestrial ecosystems: Vegetation, including vegetation communities of elevated conservation significance within and adjacent to the Premises.	Declining health of vegetation including reduced ability for photosynthesis due to dust deposition / smothering. Given that native vegetation is expected to be reasonably tolerant to dust deposition, dust generated from the landfill is expected to have a negligible impact on vegetation health.	- Rehabilitation of cleared areas will be implemented as construction is completed; - Dust suppression will be implemented ((including use of water trucks, control of vehicle movements / restricted speeds, approved chemicals e.g. DustMag) during operations; - Weather forecasts will be monitored, activities that have the potential to generate high dust levels may be restricted if there is a risk of windy conditions; and - Waste in landfill facility will be covered so that no waste is left exposed. Appropriate design, management, inspection and maintenance of landfill facilities is expected to mitigate the risk of dust emissions.				
		Odour associated with putrescible waste.	Air: windborne odour generated during disposal of putrescible waste	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, any odour associated with putrescible waste is not expected to affect public health or amenity. Odour emissions should also be negligible for a properly functioning landfill.	Putrescible wastes will be disposed of at landfill facility, managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including. - Total landfill waste will be up to 6,000 tonnes per annual period. - Landfill facility will only accept approved types of waste; - Landfill facility will include a sign which clearly defines what waste is accepted; and - Waste will be covered so that no waste is left exposed. Appropriate design, management, inspection and maintenance of landfill facilities is expected to mitigate the risk of odour emissions.	Minor	Rare	**Low**	Risk pathway is low, detailed assessment is not required. However, further detail is provided in Section 7.3
Category 64: Class II putrescible landfill site	Operation of landfill facility	Solid Waste	Air: Windblown litter	Residential: None, the nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village.	Health and amenity: Given the distance to the nearest receptor, any windblown litter associated with disposal of waste to the landfill is not expected to affect public health or amenity.	Wastes will be managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including: - Sufficient recycling and general waste collection areas will be established and labelled with the relevant waste type to facilitate the management of waste; - Recyclable materials will be separated from other waste and recycled wherever possible; - Non-recyclable materials will be disposed of at an approved landfill facility; - Total landfill waste will not exceed 6,000 tonnes per annual period; - Landfill facility will only accept approved types of waste; - Landfill facility will be fenced to an appropriate height, gated and locked to contain windblown waste and exclude scavenging animals; - Fencing surrounding the will be regularly inspected for damage and cleared of waste; - Landfill facility will include a sign which clearly defines what waste is accepted; and - Waste will be covered so that no waste is left exposed. Appropriate design, management, inspection and maintenance of landfill facilities is expected to mitigate the risk of windblown litter.	Minor	Unlikely	**Medium**	Detailed assessment provided in Section 7.7
				Terrestrial ecosystems: Native fauna	Local increase in feral fauna (scavengers attracted to putrescible wastes) could result in predation and replacement of native fauna.		Minor	Unlikely	**Medium**	Detailed assessment provided in Section 7.7
		Liquid Waste	Seepage of landfill leachate to soil or groundwater, adverse	Land	Soil contamination (nutrients, heavy metals)		Minor	Unlikely	**Medium**	Detailed assessment provided in Section 7.7

			impacts to the health of vegetation dependent upon groundwater.	Groundwater of beneficial use (suitable for stock watering): None, the vertical distance to groundwater is approximately 30 mbgl. Terrestrial ecosystems: Riparian vegetation of Boolgeeda Creek is located approximately 1 km from the landfill facility.	Deterioration of groundwater quality with potential impacts to beneficial use of the groundwater (and declining health of any vegetation dependent on groundwater): Given the vertical distance to the groundwater, any landfill leachate is not expected to seep to groundwater (or affect any associated terrestrial ecosystems)	Wastes will be managed via the requirements of the Works Approval, Part V Licence L8232/2008/2 and standard operating procedures including: - Landfill facility will be located more than 100 m from any permanent or perennial watercourse; - Landfill facility will be located so that vertical distance between the waste and the highest seasonal and expected post mining ground water level is no less than 10 m (putrescible landfill); - Landfill facility will only accept approved types of waste; - Landfill facility will include a sign which clearly defines what waste is accepted; - Surface water management structures (i.e. bunding) will divert surface water away from landfill facility; - A sump or bunding will collect any surface water that has come into contact with waste; and - Waste will be covered so that no waste is left exposed. Appropriate design, management, inspection and maintenance of landfill facilities is expected to mitigate the risk of soil, groundwater or surface water contamination from landfill leachate.				
			Migration of landfill leachate could result in contamination or elevated nutrient levels (eutrophication) in surface water.	Surface water: None, the distance to the nearest receptor (Boolgeeda Creek) approximately 1 km. Boolgeeda Creek is ephemeral, there are no permanent or semi-permanent pools in the vicinity Terrestrial ecosystems: Riparian vegetation of Boolgeeda Creek is located approximately 1 km from the landfill facility.	Surface water contamination or eutrophication (and declining health of riparian vegetation): Given the distance to the nearest surface water, any landfill leachate is not expected to migrate to surface water (or affect any associated terrestrial ecosystems).				

7 Emissions, Management and Controls

The Licence Holder operates under an integrated Health, Safety, Environment and Communities and social (HSEC) Management System which includes processes, procedures and plans that ensure environmental controls are developed for key environmental risks, legal compliance is maintained and continuous improvement is achieved through a formal review process.

Subject to approval, the construction, commissioning and operation of the proposed facilities will be in accordance with the requirements of the HSEC Management System, the Ministerial Statement and the conditions of proposed Works Approval and subsequent Licence L8232/2008/2 (as amended).

7.1 Dust Emissions

7.1.1 Description of Risk Event

Construction

An increase in local dust emissions is expected during construction of the proposed facilities. Particulate dust emissions from construction activities including clearing and vehicle movements have the potential to adversely affect public health and amenity at dust sensitive receptors, however, the facilities are remote from communities and other dust sensitive receptors. The existing West Pilbara, Brockman 4 and the Nammuldi Villages are the nearest premises. As such, impacts from nuisance dust emissions generated during construction are expected to be limited. The risk to public health and amenity is therefore considered low.

Dust emissions from construction activities also have the potential to result in declining health of vegetation including reduced ability for photosynthesis due to dust deposition / smothering however studies examining the impacts of dust on plant health in semi-arid environments (Butler 2009) found that the Pilbara environment is naturally dusty with wind-blown dust a significant contributor to ambient dust levels in the region and native vegetation is expected to be reasonably tolerant to dust deposition. As such, dust emissions generated during construction are expected to have a negligible impact on vegetation health in the Pilbara.

Dust emissions are also expected to be limited to the duration of the construction activities.

Operation

Potential dust emissions from the operations include:

- dust lift off from unsealed surfaces may occur in windy conditions; and
- vehicle movement on unsealed roads.

Dust emissions generated during operation of the proposed processing facility and ore movement infrastructure are expected to be limited.

Processing facilities

Sources of dust include:

- Ore processing at BS1; and
- Transport of ore product from BS1 to B4.

Dust emissions generated during operation of the proposed processing facilities are not expected to significantly increase in comparison to dust emissions generated from surrounding existing operations. Water sprays will be maintained throughout operation to preserve surface moisture content of ore during transport, minimising dust generation.

While dust suppression of the ore will minimise dust emissions generated, dust emissions from operation of the proposed processing facilities have the potential to affect public health and amenity, however, the nearest dust sensitive receptors are the residents of the existing West Pilbara Village, located approximately 12 km from the proposed processing facilities. The risk to public health and amenity is therefore considered Low.

Landfill facilities

Sources of dust include:

- Dust lift off from unsealed surfaces in windy conditions.
- Vehicle movement on unsealed surface

Dust emissions from the operation of the proposed landfill facility has the potential to affect public health and amenity, however, the nearest dust sensitive receptors are the residents of the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Villages, located approximately 2 km from the landfill facility. The risk to public health and amenity from dust emissions is therefore considered low.

7.1.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of dust at its Pilbara operations. Dust emissions will be managed via the requirements of the Ministerial Statement and Brockman Syncline Environmental Management Plan, the Works Approval, Licence L8232/2008/2 and standard operating procedures, including:

Construction

- Clearing will be managed to ensure that areas are only cleared as required and rehabilitation of cleared areas is implemented progressively.
- Dust suppression will be implemented (including the use of water trucks, control of vehicle movements / restricted speeds, and approved chemical agents ie DustMag) during construction.

Operation

- Dust suppression will be implemented (including the use of water trucks, control of vehicle movements / restricted speeds, and approved chemical agents ie DustMag) during operations.

  Processing facilities

  Existing processing facilities include dust suppression and dust extraction to minimise and manage dust during processing. Specific controls for managing dust in the proposed processing facilities will include:

  - Surge bins will be equipped with an insertable type dust collector;
  - Load points from the surge bin onto each conveyor include skirts and covers to reduce spillage and dust suppression sprays; and
  - Regular inspection and maintenance will be undertaken at processing facilities to collect and remove material that may present a potential dust risk.

  Landfill facilities

  Specific controls for managing dust at the proposed landfill facilities will include:

  - Waste in putrescible landfill facilities will be covered weekly to at least 200 mm so that no waste is left exposed (including at final landform design).
  - Cells will only be constructed immediately ahead of being required. This reduces the surface area of open ground.
  - In windy conditions, dust suppression will be utilised along access roads.

Appropriate design, management, inspection and maintenance of proposed facilities is expected to mitigate the risk of dust emissions.

Monitoring of in-situ water content in the ore product will be undertaken to inform the application of water for dust suppression in processing.

Monitoring of dust levels will also be undertaken to guide the management of dust levels to further mitigate the risk to the health and amenity of employees from dust emissions.

7.1.3 Residual Risk to the Environment

The License Holder considers that the risk to the environment from potential dust emissions from the proposed facilities is ‘low’ given the distance from dust emitting sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.2 Noise Emissions

7.2.1 Description of Risk Event

Construction

An increase in local noise is expected during construction of the proposed facilities, which has the potential to affect public health and amenity at noise sensitive receptors however, the facility is remote from communities and other noise sensitive receptors. The existing West Pilbara Village, Brockman 4 Village and the Nammuldi villages. These accommodation facilities are a Rio Tinto owned premise located within the Prescribed Premises and therefore, not required to comply with the 'assigned levels' for occupied premises under the *Environmental Protection (Noise) Regulations 1997*. However, Rio Tinto has well established strategies for the management of noise at its Pilbara operations to ensure noise levels are within acceptable criteria to protect the health and amenity of the camp residents. As such, impacts from potential noise generated during construction on the camp residents are expected to be limited. The risk to public health and amenity is therefore considered low.

All blasts will be assessed against proximity to sensitive receptors prior to commencement. A Blast Management Plan will be prepared for the BS1 development to control risks to sensitive receptors including heritage sites and bat caves.

Native fauna are also potentially sensitive receptors to noise. Given that the species forage at night, noise from construction of the proposed facilities may disturb nocturnal foraging behaviour of Pilbara Leaf-nosed Bats and/or Ghost Bats. However, the increase in local noise emissions from construction is expected to be limited at night (when nocturnal native fauna are expected to be foraging) and is also expected to be limited to the duration of the construction activities. The risk to native fauna is therefore considered low.

Operation

Noise will be generated during operation of the proposed processing and screening facilities.

Processing facilities

Processing facilities will operate on a continuous 24 hour basis. Sources of noise include:

- Operation of existing primary and secondary crushers, vibrating screens, stackers, reclaimers and train load out.
- Operation of new surge bins and screens.
- Operation of existing and new conveyors.
- Warning alarms (irregular).

Noise emissions from operation of the proposed processing facilities is expected to be limited in comparison to noise from existing processing facilities.

Noise has the potential to affect public health and amenity, however, the facility is remote from communities and other sensitive receptors. The risk to health and amenity is therefore considered low.

Native fauna are also potentially sensitive receptors to noise. Noise from operation of the proposed processing facilities may disturb Ghost Bats and cause individuals to abandon roosts. However, the nearest nocturnal roosts are located more approximately 1.5 km from the proposed processing facilities. Ghost Bats are known to roost in caves in close proximity (as close as 50 m) to mining operations elsewhere in the Pilbara. Given that Pilbara Leaf-nosed Bats and Ghost Bats forage at night, noise from operation of the proposed processing facilities may also disturb nocturnal foraging behaviour. However, noise is expected to be limited at night (when nocturnal native fauna are expected to be foraging) in comparison to noise during the day from blasting activities. It is also known that Pilbara Leaf-nosed Bats and Ghost Bats forage in close proximity to mining operations elsewhere in the Pilbara. The risk to native fauna is therefore considered low.

Screening of Material

Mobile crushing and screening plants will be operated in accordance with the Iron Ore (WA) Mobile Crushing and Screening Management Plan (RTIO-HSE-0235877).

Noise emissions from operation of the mobile crushing and screening plants is expected to be limited in comparison to noise from surrounding processing facilities.

Noise has the potential to affect public health and amenity, however, the facility is remote from communities and other sensitive receptors. The risk to health and amenity is therefore considered low.

7.2.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of noise at its Pilbara operations. Noise emissions will continue to be managed via relevant legislation (including *Environmental Protection (Noise) Regulations 1997*) and standard operating procedures. Specific controls are not proposed.

7.2.3 Residual Risk to the Environment

The Licence Holder considers that the risk to the environment from potential noise emissions from the proposed facilities is ‘low’ given the distance from noise emitting sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.3 Light emissions

7.3.1 Description of Risk Event

Construction

Light emissions causing adverse impact to sensitive receptors are not expected from the construction of the proposed facilities. However, night lighting will be required. Construction of the proposed processing facilities may be undertaken at night. However, local light emissions generated during construction are expected to be limited at night (when nocturnal native fauna are expected to be foraging) and are also expected to be limited to the duration of the construction activities.

Operation

Night lighting will be required for the construction and operation of the proposed processing facilities. Light emissions are expected to result in limited light spill.

Processing facilities

Processing facilities will operate on a continuous 24-hour basis. Permanent night lighting will be required at the proposed processing facilities for safe work.

Light spill from operation of the proposed processing facilities has the potential to affect public health and amenity however, the facility is remote from communities and other sensitive receptors. The risk to health and amenity is therefore considered low.

Native nocturnal fauna are also potential sensitive receptors to light. Light sources are orientated away from critical MNES species habitats. As Pilbara Leaf-nosed bats and Ghost bats forage at night, light from operation of the proposed processing facilities may alter nocturnal foraging behaviour, attracting invertebrates which are a food source for these species. Light spill from the operation of the proposed processing facilities is expected to be limited and will affect only a small proportion of the foraging habitat. The risk to nocturnal native fauna is therefore considered low.

Sewage Facilities

The Biomax units are situated within the NPI hub. Lighting for operation will be minimal, limited to lighting required for safe access and operation of the facility. Given the small footprint and lighting requirements the risk from operational lighting is expected to be low.

7.3.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of night lighting at its Pilbara operations to ensure light levels are within acceptable criteria to protect the health and amenity of the camp residents. As such, impacts from potential light emissions generated during operations on the camp residents are expected to be limited.

Processing facilities

Specific controls for managing light emissions from the proposed processing facilities will include:

- Lighting design will comply with Australian standards for safe work; and
- Lighting design in areas that require permanent night lighting will ensure light is directed to work areas and minimal light spill occurs (including use of directional lighting and covered lenses).

Appropriate design, management, inspection and maintenance of lighting at proposed processing facilities is expected to mitigate the risk of light spill during operations.

7.3.3 Residual Risk to the Environment

The Licence Holder considers that the residual risk to the environment from potential light emissions from the proposed facilities is ‘low’ given the distance from light emitting sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.4 Odour Emissions

7.4.1 Description of Risk Event

Construction

No odour emissions are expected from the construction of the proposed facilities.

Operation

Odour emissions during operation of the Biomax units should be negligible for a properly functioning sewage treatment plant. Odour emissions generated during operation of the proposed landfill facility are expected to be limited.

Sewage treatment facilities

Any odour emissions from the proposed Biomax units have the potential to affect public health and amenity, however, the facilities are remote from communities and other odour sensitive receptors. As such, odour is expected to have negligible impact on residents. The risk to public health and amenity is considered ‘low’.

Landfill facilities

Odour emissions from the disposal of putrescible waste to the proposed landfill facility have the potential to affect public health and amenity, however, the nearest odour sensitive receptors are the residents of the existing West Pilbara, Brockman 4 and Nammuldi villages which are located more than 1.6 km from proposed facility. As such, impacts from odour emissions are expected to be limited. The risk to public health and amenity is considered ‘low’.

7.4.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of general wastes at its Pilbara operations. Any general waste will be disposed of at landfill facilities, managed via the requirements of the Works Approval, Licence L8232/2008 and standard operating procedures.

Odour emissions should be negligible for properly functioning landfill facilities. Landfill facilities are proposed to be located and managed in accordance with the following criteria to manage potential odour emissions:

- Total landfill waste will be 6,000 tonnes per annual period;
- Landfill facilities will only accept approved waste streams;
- Landfill facilities will include a sign which clearly defines what waste is accepted; and
- Waste in putrescible landfill facilities will be covered weekly (at least 200 mm) so that no waste is left exposed, including at final landform design.

Appropriate design, management, inspection and maintenance of landfill facilities is expected to mitigate the risk of odour emissions.

Odour emissions should be negligible for properly functioning sewage treatment facilities. The following design, management, monitoring, inspection and maintenance activities are proposed to be undertaken to manage potential odour emissions from the proposed sewage treatment facilities:

- Biomax units will have a combined design capacity of 31.1 m³/day;
- The cumulative volume of all effluent discharges will be recorded monthly;
- Representative effluent discharge samples will be collected and analysed quarterly; and
- Samples will be assessed and compared against the NWQMS *Australian Guidelines for Sewerage Systems – Effluent Management* (1997) and all recorded monitoring data.

7.4.3 Residual Risk to the Environment

The Licence Holder considers that the risk to the environment from potential odour emissions from the proposed landfill facility and sewage treatment facilities is 'low' given the distance from odour emitting sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.5 Discharges to the Environment

7.5.1 Description of Risk Event

Construction

No contaminated discharges to the environment are expected during construction of the proposed facilities.

Sedimentation controls have been considered for the construction of the OLC through Boolgeeda creek. Pilling of conveyor foundations requires the construction of a pad. The pilling pad is a temporary structure and will be removed once construction is complete. The pilling pad will be designed to include culverts and spillways to allow for a 50% AEP event. Excavations through Boolgeeda creek to support the construction of the OLC may require additional water management controls which will be detailed and assessed in the supporting Bed and Banks Permit.

Operation

No contaminated discharges to the environment are expected during operations, however, unplanned discharges from the proposed processing, refuelling, sewage and landfill facilities could cause soil contamination, seepage to groundwater or migration to surface waters.

Processing facilities

The proposed facilities could potentially result in sediment laden or hydrocarbon contaminated surface water run-off to the environment.

The operation of the proposed processing facilities could potentially result in an unplanned release of iron rich process water, seeping to groundwater or migrating to surface water, causing elevated nutrient levels (eutrophication). The operation of the proposed processing facilities could also potentially result in a hydrocarbon spill. A hydrocarbon spill could cause soil contamination, seepage to groundwater or migration to surface waters.

The proposed processing facilities will be located where the vertical distance to groundwater is more than 10 m and where the distance to the nearest surface water, Boolgeeda Creek, is more than 4 km. Given the depth to groundwater and distance to the nearest surface water feature, spills are not expected to seep to groundwater or migrate to surface water. The risk to groundwater quality, surface water quality and any associated terrestrial ecosystems is therefore considered medium.

Refuelling facilities

Fuel storage and refuelling during operation of the proposed fuel facilitates could potentially result in a hydrocarbon spill. A hydrocarbon spill could cause soil contamination, seepage to groundwater or migration to surface waters. However, the proposed fuel storage and refuelling facilities will be located where the vertical distance to groundwater is more than 20 mbgl and where the distance to the nearest surface water, Boolgeeda Creek, is approximately 950 m. Given the depth to groundwater and distance to the nearest surface water, hydrocarbon spills are not expected to seep to groundwater or migrate to surface water. The risk to groundwater quality, surface water quality and any associated terrestrial ecosystems is therefore considered medium.

Sewage treatment facilities

The operation of the proposed Biomax facilities could potentially result in spills or leaks of untreated raw sewage to soil or groundwater. Sewage is not likely to contaminate surface water with the appropriately designed facilities and identified controls in place. The vertical distance to groundwater (19 mbgl) lessens the risk of untreated sewage reaching and contaminating groundwater

7.5.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of contaminated discharges at its Pilbara operations. Potential discharges will be managed via the requirements of the Ministerial Statement and Environmental Management Plan, the Works Approval, Licence L8232/2008/2 and standard operating procedures, including:

Construction

- Diversion of surface water around work areas.
- Potentially contaminated surface water will be retained on site.
- Provision of bunding / secondary containment at all hydrocarbon storage facilities to ensure any spills are contained.
- Provision of spill response.

Operation

- Surface water management structures (such as diversion bunds and drains) will be installed to direct surface water around the proposed facilities.
- Potentially sediment laden surface water will be retained on site to allow for sedimentation before being discharged.
- Potentially contaminated surface water will be retained on site and treated to remove hydrocarbons.
- Provision of spill response.

Processing facilities

Specific controls for managing potential discharges from the proposed processing facilities include:

- Concrete hardstand (with associated sumps and oily water collection and treatment system) will be installed under the proposed processing facilities where there is potential for sediment or hydrocarbon contaminated surface water.
- Potentially sediment laden surface water will be directed to sedimentation ponds / silt traps (designed to treat a peak 1:10 year rainfall event).
- Provision of hydrocarbon sensors to prevent hydrocarbons being pumped to sedimentation ponds or drains;
- Fuel storage tanks will be self bunded; and
- Provision of management structures (bunding / secondary containment) at all hydrocarbon storage facilities to ensure any spills are contained;

Appropriate design, management, inspection and maintenance at proposed processing facilities is expected to mitigate the risk of contaminated discharges during operations.

Refuelling facilities

Specific controls for managing potentially contaminated discharges from the proposed fuel storage and refuelling facilities include:

- Fuel storage tanks will be above ground;
- Fuel storage tanks will be self-bunded;
- Concrete hardstand (with associated sumps and oily water collection and treatment system) will be installed under the permanent proposed fuel storage and refuelling facilities where there is potential for hydrocarbon spills; and
- Potentially contaminated surface water will be directed to the oily water collection and treatment system.

Appropriate design, management (including provision of management structures to ensure any spills are contained and provision of spill response), inspection and maintenance are expected to effectively mitigate the risk of hydrocarbon spills during operation of the fuel storage and refuelling facilities.

Sewage facilities

The proposed Biomax units at the NPI hub will be contained within a bunded earthen pad. An alarm is fitted to the pump out chamber indicating high water levels. Regular ongoing monitoring of the Biomax system will be conducted in accordance with manufacturer specifications. The treated effluent will be disposed of to an appropriately sized sprayfield where the vertical depth to groundwater in the sprayfield locality reduces the risk of groundwater contamination (approximately 19 mbgl).

7.5.3 Residual Risk to the Environment

The Licence Holder considers that the residual risk to the environment from potentially contaminated discharges (soil contamination, seepage to groundwater or migration to surface waters) from the proposed facilities is 'low' given the distance from sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.6 Hydrocarbons

7.6.1 Description of Risk Event

Construction

During construction of the proposed facilities and the BS1 development temporary fuel storage is required. Hydrocarbons used during construction will be stored in the contractor laydown work areas. Hydrocarbon spills from fuel storage and refuelling during construction of the proposed facilities have the potential to cause soil contamination and seepage to groundwater however, spills are expected to be limited owing to the small volumes and limited duration of hydrocarbons stored and used during construction. The risk to soil and groundwater is therefore considered low.

Field refuelling of plant required for the construction of the proposed facilities is required, including the OLC which intersects Boolgeeda Creek. Field refuelling will not occur within 30 m of the AHGF centreline for Boolgeeda Creek. Drip trays will be used where field refuelling is required.

Operation

No hydrocarbon emissions are expected from the operation of the proposed facilities.

There will be permanent fuelling facilities and lubrication facilities to support the mining fleet during operations. Fuel storage and refuelling during operations could potentially result in a hydrocarbon spill. A hydrocarbon spill could cause soil contamination, seepage to groundwater or migration to surface waters. However, the proposed fuel storage and refuelling facilities will be located where the vertical distance to groundwater is more than 20 mbgl and where the distance to the nearest surface water, Boolgeeda Creek, is more than 950 m. Given the depth to groundwater and distance to the nearest surface water, hydrocarbon spills are not expected to seep to groundwater or migrate to surface water. The risk to groundwater quality, surface water quality and any associated terrestrial ecosystems is therefore considered medium.

7.6.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of hydrocarbons at its Pilbara operations. Any hydrocarbons used during construction and operation will be managed via relevant legislation (including AS 1940-2004: *Storage and handling of flammable and*

combustible liquids), the requirements of the Works Approval, Licence L8232/2008 and standard operating procedures, including:

- Vehicle refuelling will occur over a concrete hardstand or compacted, lined earthen pad (with the exception of field based refuelling where a drip tray will be used);
- Fuel storage tanks will be designed and constructed to AS 1940-2004: *The storage and handling of flammable and combustible liquids*;
- Concrete hardstand or compacted, lined earthen pads will be installed under all hydrocarbon storage and refuelling facilities where there is potential for hydrocarbon spills;
- Management structures (bunding / secondary containment) will be installed at all hydrocarbon storage and refuelling facilities to ensure any spills are contained; and
- Spill response will be provided.

Refuelling facilities

Specific controls for managing fuel storage and refuelling will include:

- Fuel storage tanks will be above ground;
- Fuel storage tanks will be self-bunded;
- Concrete hardstand (with associated sumps and oily water collection and treatment system) will be installed under the proposed fuel storage and refuelling facilities where there is potential for hydrocarbon spills; and
- Potentially contaminated surface water will be directed to the oily water collection and treatment system

Appropriate design, management, inspection and maintenance of hydrocarbon storage and refuelling at the proposed Refuelling Hub is expected to mitigate the risk of hydrocarbon contamination.

7.6.3 Residual Risk to the Environment

The Licence Holder considers that the residual risk to the environment from potential hydrocarbon spills is ‘low’ given the distance from hydrocarbon storage and refuelling sources to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.7 Solid / Liquid Wastes

7.7.1 Description of Risk Event

Construction

Wastes generated from the construction of the proposed facilities are expected to be limited.

Operation

Wastes are expected to be generated from the operation of the proposed facilities. Controlled waste will be removed from site via an appropriately licensed controlled waste contractor (and relevant records including tracking notes maintained on site for audit and inspection purposes). Recyclable materials will be separated from other waste and recycled wherever possible. Non-recyclable materials are proposed to be disposed of at the approved BS4 landfill until capacity is reached and the replacement landfill facility (the subject of this WAA) has been constructed.

The proposed landfill facility will accept:

- Clean Fill;
- Uncontaminated Fill;
- Inert Waste Type 1;
- Special Waste Type 1; and
- Putrescible Waste.

Windblown wastes from the operation of the proposed facilities have the potential to affect public health and amenity, however, the nearest sensitive receptors are the residents of the existing nearest receptors are the existing West Pilbara Village, Brockman 4 Village and the Nammuldi Village. which are located more than 1.5 km from the proposed landfill facility. The risk to public health and amenity is therefore considered medium.

Scavenging fauna are also potentially attracted to putrescible wastes. A local increase in feral fauna could result in predation and replacement of native fauna species. The risk to native fauna is considered medium.

The operation of the proposed landfill facility could potentially result in seepage of landfill leachate to soil or groundwater. Migration of landfill leachate could also result in contamination or elevated nutrient levels (eutrophication) in surface water. However, the proposed landfill facility will be located where the vertical distance to groundwater is approximately 30 m and where the distance to the nearest (ephemeral) surface water, Boolgeeda Creek, is over 1 km. Landfill leachate is not expected to seep to groundwater or migrate to surface water. The risk to groundwater quality, surface water quality and any associated terrestrial ecosystems is therefore considered medium.

7.7.2 Proposed Environmental Controls

Rio Tinto has well established strategies for the management of general wastes at its Pilbara operations. Any general wastes generated during the construction, commissioning or operation of the proposed facilities will be managed via standard operating procedures including:

- Sufficient recycling and general waste collection areas will be established and labelled with the relevant waste type to facilitate the management of waste.
- Recyclable materials will be separated from other waste and recycled wherever possible.

- Non-recyclable materials will be disposed of at an approved landfill facility.

Landfill

The landfill facility will be managed in accordance with the following criteria to minimise the risk of wastes:

- Total landfill waste will not exceed 6,000 tonnes per annual period.
- Landfill facility will only accept approved types of waste.
- Landfill facility will be fenced to an appropriate height, gated and locked.
- Fencing surrounding the perimeter of putrescible landfill facility will be regularly inspected for damage and cleared of waste.
- Landfill facility will include a sign which clearly defines what waste is accepted.
- Surface water management structures (i.e. bunding) will divert surface water flows away from landfill facility.
- A sump or bunding will collect any surface water that has come into contact with waste.
- Waste in putrescible landfill facility will be covered weekly to at least 200 mm so that no waste is left exposed, including at final landform design.

The appropriate design, management, inspection and maintenance of the proposed landfill facility is expected to mitigate the risk of wastes during operations.

7.7.3 Residual Risk to the Environment

The Licence Holder considers that the residual risk to the environment from potential wastes is ‘low’ given the distance to potentially sensitive receptors and the proposed environmental controls to be implemented.

7.8 Flora and Fauna

The prescribed activities will be located within pre-disturbed areas wherever possible, however new clearing will be required. The clearing of up to 19,805 ha within a 63,343 ha Development Envelope for the Brockman Syncline Proposal is currently under assessment. Clearing associated with this WAA (with the exception of the replacement landfill facility) will be covered by the revised Ministerial Statement. The surveys have identified:

- No TECs or PECs are present within the Premises;
- No threatened flora have been recorded;
- Six priority flora specie including *Hibiscus* sp. Mt Brockman ET 1354 (P1), *Pentalepis trichodesmoides* subsp. *hispida* (P2), *Ipomoea racemigera* (P3), *Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708), *Indigofera rivularis* (P3), *Eremophila magnifica* subsp. *velutina* (P3), *Rhynchosia bungarensis* (P4) and *Goodenia nuda* (P4) have been identified;

- Threatened fauna species including the Ghost Bat, Pilbara Leaf-nosed Bats, Northern Quoll and Pilbara Olive Python, and two priority species the Western Pebble-mound Mouse (*Pseudomys chapmani*) (P4) and the Lined soil-crevice skink (*Notoscincus butleri*) (P4);
- Three high value significant terrestrial fauna habitats - Gorge/Gully, Breakaway and Riverine, particularly to MNES species Ghost Bat, Pilbara Leaf-nosed Bat, Northern Quoll and Pilbara Olive Python; and
- One major drainage line, Boolgeeda Creek intersects proposed infrastructure (the OLC). Boolgeeda Creek holds high environmental and cultural heritage value as well as hosting riparian vegetation communities and groundwater dependent ecosystems.

The OLC crosses Boolgeeda creek, intersecting areas of riparian vegetation that hosts *Indigofera rivularis* (P3). The duplicate discharge outlet intersects Boolgeeda creek.

7.8.1 Proposed Environmental Controls

The environmental controls outlined in Sections 7.1 – 7.7 are applicable to managing potential impacts to flora and fauna. During both construction and operation, the Licence Holder will implement the following mitigation and management measures:

- Brockman Syncline Proposal Environmental Management Plan (in review)
- Restrictions Zones around MNES habitat caves to avoid direct disturbance, minimise the impact of blasting and associated vibration on the structure and quality of roosts and protect the integrity of the habitat values of these caves; and
- Groundwater monitoring across the Premises will continue in accordance with the Brockman 4 GWOS and proposed Brockman Syncline 1 GWOS to ensure that the changes in groundwater levels are as predicted. Data will be reported annually within the Annual Aquifer Review.

Construction

Dust, noise, light and vibration during construction have the potential to impact terrestrial ecosystems including vegetation health and disruption of nocturnal native fauna behaviour. The Licence Holder will implement the following management measures to minimise potential impacts:

- Adherence to the Construction Environmental Management Plan
- Progressive rehabilitation of areas to be disturbed to allow fauna to migrate away from clearing activities or machinery movements and to minimise dust;
- Speed limits to reduce risk of fauna strikes;
- Dust suppression will be implemented (including use of water trucks, control of vehicle movements / restricted speeds);
- Lighting design in areas that require night lighting will ensure light is directed to work areas and minimal light spill occurs (including use of directional lighting and covered lenses); and

- Dust, light and noise will be managed as per this Works Approval and L8232/2008/2 conditions.

Operation

Dust, noise, light, vibration and discharges to the environment (e.g. landfill waste, sediment laden surface water run-off, hydrocarbons or process water) have the potential to impact terrestrial ecosystems including vegetation health and native fauna behaviour during operations. The Licensee will implement the following management and mitigation measures to minimise potential impacts during operations:

- feral animal management measures within the Prescribed Premises boundary, including fencing of landfill areas and minimization of artificial water sources;
- avoid the use of barbed wire fencing within the Prescribed Premises as far as practicable and use bat deflectors where it is required;
- speed limits to reduce risk of fauna strikes;
- weeds will be managed during operations in accordance with a dedicated weed control program including key actions such as periodic spraying and equipment hygiene;
- dust suppression to minimise disturbance to fauna habitats;
- locate and construct water sources, domestic waste facilities, administration facilities and camps to minimise fauna (and feral animal) access;
- permanent lighting in mining areas will be directed inwards towards mining activities to minimise light overspill;
- awareness training to identify conservation significant fauna and habitat, relevant management measures, personnel/contractor responsibilities, and incident reporting requirements (i.e. reporting of fauna observations and/or incidents); and
- adherence to conditions of this Works Approval, L8232/2008/2, and standard operating procedures.

7.8.2 Proposed Environmental Controls

The majority of the prescribed activities subject to this WAA avoid high value fauna habitat areas, conservation significant habitat features (caves, pools etc.) and threatened and priority flora species. The maintenance of ecological linkages throughout the Premises is expected to ensure conservation significant species populations remain connected and therefore it is not expected there will be an impact to fauna and flora species and their habitat at a local or regional scale.

Operations will be managed via the Works Approval, L8232/2008/2 conditions, standard RTIO operating procedures and the pending Ministerial Statement and supporting Brockman Syncline EMP. The Licence Holder considers that the residual risk to flora and fauna from construction and operations of the proposed prescribed activities/facilities is ‘low’.

8 Rehabilitation and Closure

The Brockman 4 Mine Closure Plan (v4) (2023) addresses closure of the existing BS4 Operations. The Brockman Operation Mine Closure Plan (v2) (2023) is currently under review as part of the Brockman Syncline Proposal and includes all activities associated with this WAA. On completion of the required operations, the proposed facilities that are the subject of this WAA will be decommissioned and removed from the site and the areas will be rehabilitated, in accordance with the methodologies and closure criteria detailed in the Mine Closure Plan. The Closure Plan will continue to be updated to address closure of existing and future operations (subject to approvals).

References

Australian Bureau of Statistics (2021), 2021 Census QuickStats, East Pilbara (S), 2021 East Pilbara, Census All persons QuickStats | Australian Bureau of Statistics (abs.gov.au), accessed 01 August 2024.

Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ) 1994. *Policies and Principles — A Reference Document. National Water Quality Management Strategy Paper no. 2*.

Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ) 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Australian and New Zealand Government (ANZG) 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

Beard, J.S. 1975. Vegetation Survey of Western Australia, Pilbara: 1,000,000 Vegetation Series: Explanatory Notes to Sheet 5. University of Western Australia Press, Western Australia.

Biologic Environmental Survey (Biologic) 2020a. *Brockman Syncline Riparian Vegetation Survey Interim Report*. Prepared for Rio Tinto Iron Ore, March 2020.

Biologic Environmental Survey (Biologic) 2020b. Riparian Vegetation and associated Groundwater Dependent Ecosystems: Targeted Survey of Caves Creek and Palm Springs. Prepared for Rio Tinto, June 2020.

Biologic Environmental Survey (Biologic) 2020c. Brockman Syncline: Riparian Vegetation Survey - Boolgeeda Creek.

Biologic Environmental Survey (Biologic) 2020d. *Brockman Syncline Targeted Vertebrate Fauna Survey*. Prepared for Rio Tinto Iron Ore, March 2020.

Biologic Environmental Survey (Biologic) 2020e. Western Range: Pilbara Leaf-nosed Bat VHF Study. Prepared for Rio Tinto, Perth, Western Australia.

Biologic Environmental Survey (Biologic) 2021a. Brockman Syncline Proposal (Revised Operations) Baseline Groundwater Dependent Ecosystem Exposure Assessment for the Greater Brockman Operations. Prepared for Rio Tinto.

Biologic Environmental Survey (Biologic) 2021b. *Brockman Syncline: Riparian Vegetation Survey – Duck Creek*. Prepared for Rio Tinto.

Biologic Environmental Survey (Biologic) 2021c. *Brockman Syncline Fauna Habitat Extrapolation Mapping*. Prepared for Rio Tinto, Perth, Western Australia.

Biologic Environmental Survey (Biologic) 2021d. *Targeted Conservation Significant Fauna Survey Memo*. Perth Western Australia.

Biologic Environmental Survey (Biologic) 2021e. Brockman Syncline Matters of National Environmental Significance and VHF Fauna Study. Unpublished report by Biologic Environmental Sciences to Rio Tinto Rev 1.

Biologic Environmental Survey (Biologic) 2022a. *Matters of National Environmental Significance Consolidated Report Brockman*. Prepared for Rio Tinto, June 2022, Perth, Western Australia.

Biologic Environmental Survey (Biologic) 2022b. *Greater Brockman Habitat Assessment and Modelling*. Unpublished Report for Rio Tinto.

Biologic Environmental Survey (Biologic) 2022c. *Brockman Syncline 2020-2021 Fauna Matters of National Environmental Significance Study*. Prepared for Rio Tinto, February 2022, Perth, Western Australia.

Biologic Environmental Survey (Biologic) 2022d. *Greater Brockman Subterranean Fauna Survey*. Unpublished Report for Rio Tinto.

Biota Environmental Sciences (Biota) 2005. Brockman Syncline 4 Project – Baseline Stygofauna Assessment.

Biota Environmental Sciences (Biota) 2007. Brockman Syncline 4 Boolgeeda Creek Stygofauna Survey.

Kendrick, P. 2003, Pilbara 3 (PIL3 – Hamersley Subregion) in J. E. May and N. L. McKenzie, (editors), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management, Western Australia.

Rio Tinto 2019b. Surplus Water Discharge Extent Assessment: Boolgeeda Creek.

Rio Tinto 2019c. Iron Ore (WA) Fibrous Minerals Management Plan.

Rio Tinto 2020a. Greater Brockman Syncline Mine Closure Plan.

Stantec, 2019. Brockman Syncline Proposal Detailed Fauna Survey 2019. Unpublished report prepared for Rio Tinto Iron Ore.

Stantec. 2021a. Greater Brockman and Nammuldi Silvergrass Hub Consolidated Fauna Habitat Mapping. Unpublished report prepared for Rio Tinto Iron Ore.

Stantec. 2021b. Greater Brockman Syncline Consolidated Vegetation Type and Condition.

van Dyck, S., and R. Strahan (Eds.) (2008). The Mammals of Australia, 3rd edition. Reed New Holland, Sydney.

Appendices

Appendix 1. Indicative coordinates of the proposed Works Approval Prescribed Premise boundary

Appendix 2. Supplementary Design Figures

Appendix 3. Discharge Criteria Calculations