

**SUPPORTING INFORMATION  
NATIVE VEGETATION CLEARING PERMIT  
APPLICATION**

PREPARED FOR:

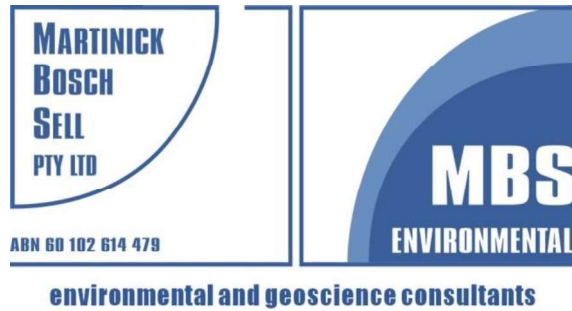
**WRS BIOPRODUCTS PTY LTD**

AUGUST 2023

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**MBS**  
ENVIRONMENTAL



## NATIVE VEGETATION CLEARING PERMIT APPLICATION SUPPORTING INFORMATION

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# 1. INTRODUCTION

## 1.1 BACKGROUND

WRS Bioproducts Pty Ltd (WRS) are planning to develop an algae farm within the Pilbara Region of Western Australia, east of the Karratha airport in Gap Ridge. Previous planning and environmental approvals have been obtained over Lot 267 on Deposited Plan 93179, Gap Ridge and Lot 301 (previously Lot 300) on Deposited Plan 49873 Gap Ridge (Figure 1) for construction of the various project components including algae ponds, the settling pond, and sea water pond, along with various ancillary facilities. Clearing Permit CPS 8414/1 was issued by the Department of Water and Environmental Regulation (DWER) on 11 May 2020 permitting the clearing of no more than 115.39 ha of native vegetation to support the development of the Project. A second clearing permit application was submitted and has received an in Agreement in Principle for the clearing of an additional 54.92 ha within portions of Lot 267 and what was Lot 300 to accommodate changes to the cultivation ponds and borrow pits (CPS 9926/1), subject to planning approvals from the City of Karratha.

The GHD (2019) report *WRS Clearing Permit Application Clearing Permit Supporting Report* was submitted to DWER in support of the original clearing permit application and provided:

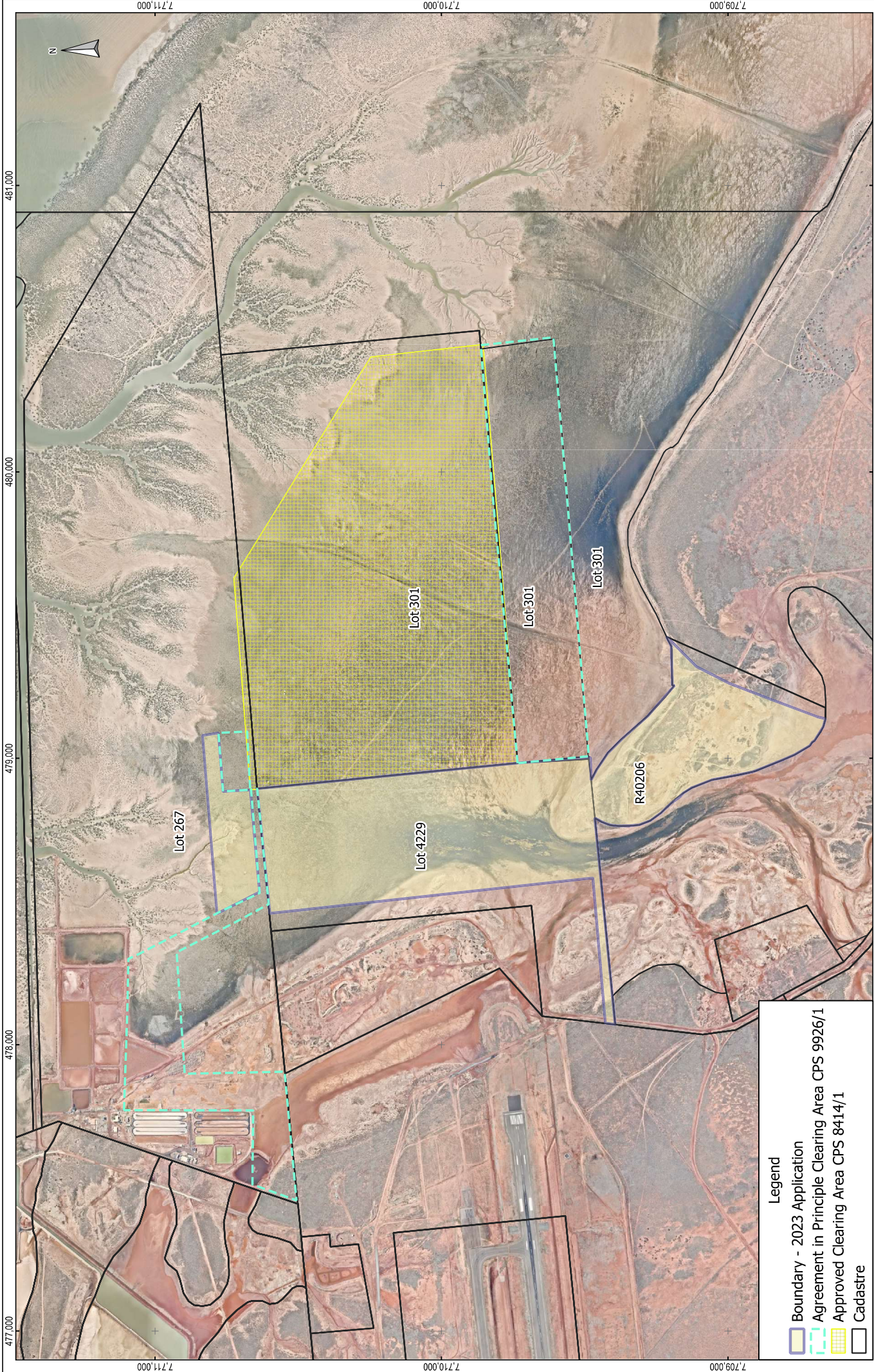
- Background information.
- An overview of legislative requirements.
- A description of the project and associated clearing.
- Assessment of the desktop environmental aspects and impacts, including the physical environment, land use, hydrology, flora and vegetation, and fauna.
- Assessment of the proposed clearing against the clearing principles.

Since the initial Project design was prepared, issue of CPS 8414/1 and the lodging of CPS 9926/1, additional land to support the operational requirements has been identified in a portion of Lot 4229 to the west, an additional area in Lot 267 to the north, and a portion of R40206 to the south has been identified. These proposed changes have led to preparation of a new Clearing Permit application, with this updated supporting document prepared to inform that process. The nature of the environment in which the additional clearing area is located is consistent with that described in GHD (2019), indicating that impacts associated with clearing are unlikely to have a significant environmental impact.





## 1.2 SCOPE OF WORKS

Martinick Bosch Sell Pty Ltd (MBS Environmental) was commissioned by WRS to prepare a new clearing permit application and associated supporting document for submission to DWER to support the approval of an additional Clearing Permit allowing clearing of 84 ha within a purpose permit area of 87 ha . Works have included:

- Reviewing and updating information relating to potential impacts associated with the additional areas to be cleared and how they can be managed.
- Documenting outcomes in this updated supporting document.



**Legend**

-  Boundary - 2023 Application
-  Agreement in Principle Clearing Area CPS 9926/1
-  Approved Clearing Area CPS 8414/1
-  Cadastre

Scale: 1 : 12,000  
 Original Size: A3  
 NearMap May 2022  
 Grid: GDA94 / MGA zone 50 (EPSG:28350) 1,000 m

Part Lots 267 and 4229, and Reserve 40206  
 2023 Clearing Permit Application  
 WRS Bioproducts Pty Ltd

Figure 1  
 Location and Proposed Clearing Areas

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477,000 478,000 479,000 480,000 481,000  
 7,709,000 7,710,000 7,711,000

## 2. PROJECT DESCRIPTION

### 2.1 PROCESS DESCRIPTION

WRS are in the process of developing a commercial scale algae farm along with associated processing facilities within Part Lots 301, 267 (CPS8414/1 (approved) and 9926/1 (Agreement in Principle issued), and 4229 (current application) east of the Karratha Airport in Gap Ridge, R40206, and an additional portion of Lot 267 in the Pilbara Region of Western Australia (current application) (Figure 2). The project involves four key phases:

- Cultivation of the unicellular green microalgae *Dunaliella salina* in open ponds filled with hypersaline water, sunlight, nutrients, and trace elements.
- The pond water containing the algae is pumped to the harvesting facility where the algae is separated from the water.
- Harvesting of algae.
- The algal concentrate will be formulated into products including omega-3 oils suitable for human consumption, food colourant, or protein rich biomass suitable for animal and fish feed.

### 2.2 ADJUSTED PROJECT ELEMENTS

The following changes to the Project have necessitated the new Clearing Permit application to gain approval for the additional clearing area (Figure 2):

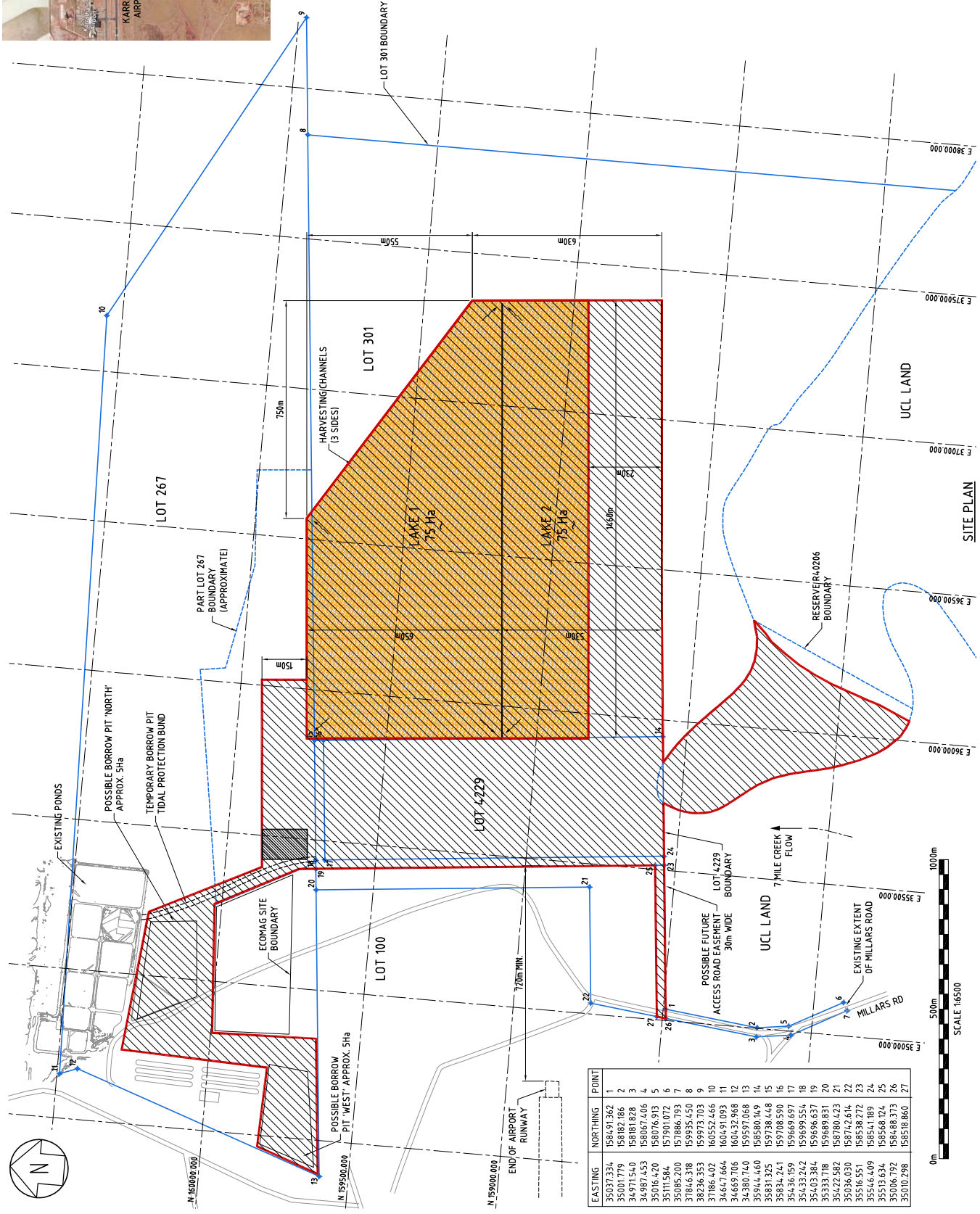
- A portion of Lot 4229 (53 ha) will be utilised for operational activities with the remainder of the Lot to be utilised by the Karratha Airport. Changes to the boundaries of these Lots are currently being progressed, as is the lease arrangements authorising their use by WRS Bioproducts.
- A portion of Reserve R40206 (27 ha) to enable the flow of 7 Mile Creek so that it can flow towards the east through Lot 301.
- An additional portion of Lot 267 (8 ha) will be utilised for operational infrastructure and activities.

The proposed plant layout and construction is consistent with that described in the original Clearing Permit application supporting document prepared by GHD (2019), including:

- Cultivation ponds constructed to a height of approximately 2 m from compacted impervious clay that will be armoured on the exterior faces.
- Pond height based on predicted 1:100-year flood event.
- The maintaining of high salinity levels necessary for algae cultivation.
- Construction of the primary processing plant adjacent to the northern cultivation pond on Lot 267.



**LOCATION PLAN**  
SCALE 1:40000



EASTING	NORTHING	POINT
35037.334	158491362	1
35001.779	158182786	2
34971.540	158181828	3
34987.453	158067406	4
35016.420	158076913	5
35111.584	157901072	6
35085.200	157886793	7
37846.318	15935450	8
37826.353	159373703	9
34647.664	160491093	11
34669.706	160432968	12
34380.740	159597068	13
35944.460	159380149	14
35931.325	159738448	15
35934.241	159708390	16
35436.159	159669697	17
35433.242	159693354	18
35435.384	159696637	19
35432.376	159689833	20
35232.592	159712413	21
35236.020	159712414	22
35516.650	158538272	23
35514.109	158511189	24
35513.634	158568374	25
35016.792	158488373	26
35010.298	158518860	27

NOT FOR CONSTRUCTION  
PRELIMINARY ONLY

**NOTE:**  
1. ALL DIMENSIONS & AREAS ARE APPROXIMATE ONLY

- LEGEND**
- LEASE & GOVERNMENT BOUNDARIES
  - EXISTING CLEARING PERMIT AREA
  - ADDITIONAL CLEARING PERMIT AREA

**WRS Bioproducts**

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**APP-SK-080**

**DRAWING NUMBER**

REV. NO.		DATE		BY		CHK		APP		DESCRIPTION	

SCALE:	1:6500	NAME:	DATE:
DESIGNED:	H. ROSEN	11.6.23	
CHECKED:	T. STALIN	16.6.23	
APPROVED:			

**DRAWING TITLE**

WRS BIOPRODUCTS PTY LTD  
CONCEPTUAL SITE UTILISATION - RAINSTORM LEASE  
ALGAL PONDS & PROCESSING PLANT  
PROPOSED CLEARING PERMIT AREA

ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED	
PRELIMINARY	DO NOT SCALE
PRELIMINARY	DO NOT SCALE

Scale: 1:6500



CPS 8414/1 issued to WRS Bioproducts Pty Ltd on 11 May 2020 allows for clearing of no more than 115.39 ha within the approved purpose permit area that includes portions of Lot 267 on Deposited Plan 93179 and Lot 300 (now Lot 301) on Deposited Plan 49873, Gap Ridge (Figure 1, Figure 2, Figure 3).

## 2.3 CLEARING PERMIT APPLICATION — CPS 9926/1

CPS 9926/1 was submitted to the Native Vegetation Clearing Branch of DWER on 24 October 2022, with an Agreement in Principle issued on 30 June 2023 subject to planning approval from the City of Karratha. This permit provides for the clearing of no more than 60.87 ha of vegetation within portions of Lots 267 and 301 (Figure 1, Figure 2, Figure 4).

## 2.4 INDICATIVE ADDITIONAL CLEARING AREAS

The indicative additional clearing that will be the subject of this clearing include portions of two Lots (267 and 4229) and Reserve 40206 noting that the maximum extent of each location may be subject to clearing according to vegetation present at the time clearing occurs. The proposed clearing areas are summarised in Table 1 and shown in Figure 1.

**Table 1: Proposed Additional Clearing Areas**

Lot	Address	Lot Area (ha)	Proposed Purpose Permit Area (ha)	Indicative Clearing Footprint (ha)
Part Lot 267	Lot 267	247	10	10
Part Lot 4229 on Plan 188048	Lot 4229 Bayley Ave, Gap Ridge	68	53	53
Reserve R40206	Gap Ridge	27	27	25
<b>Total</b>		<b>342.00</b>	<b>90.00</b>	<b>88.00</b>

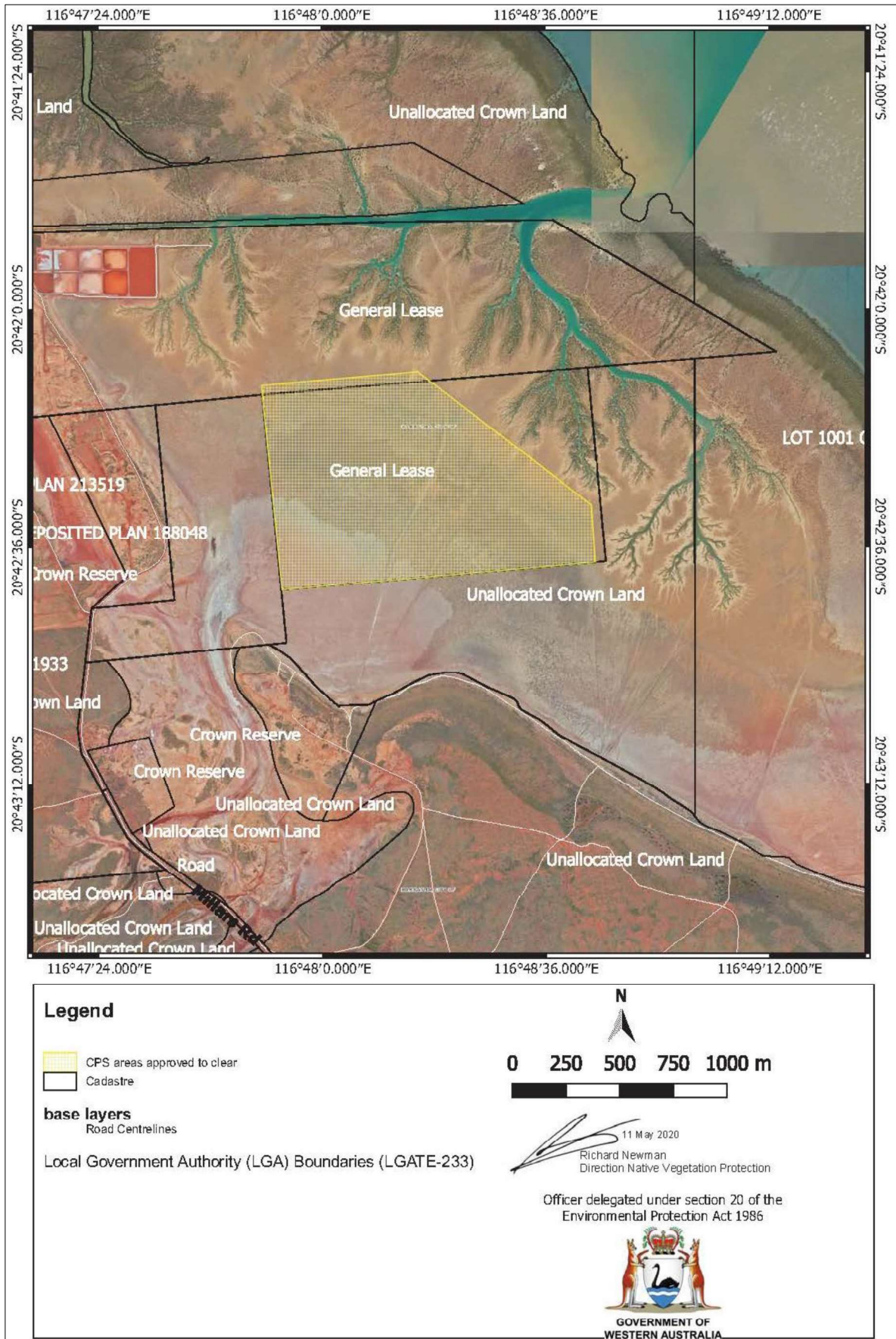


Figure 3: CPS 8414/1 Approved Clearing Area

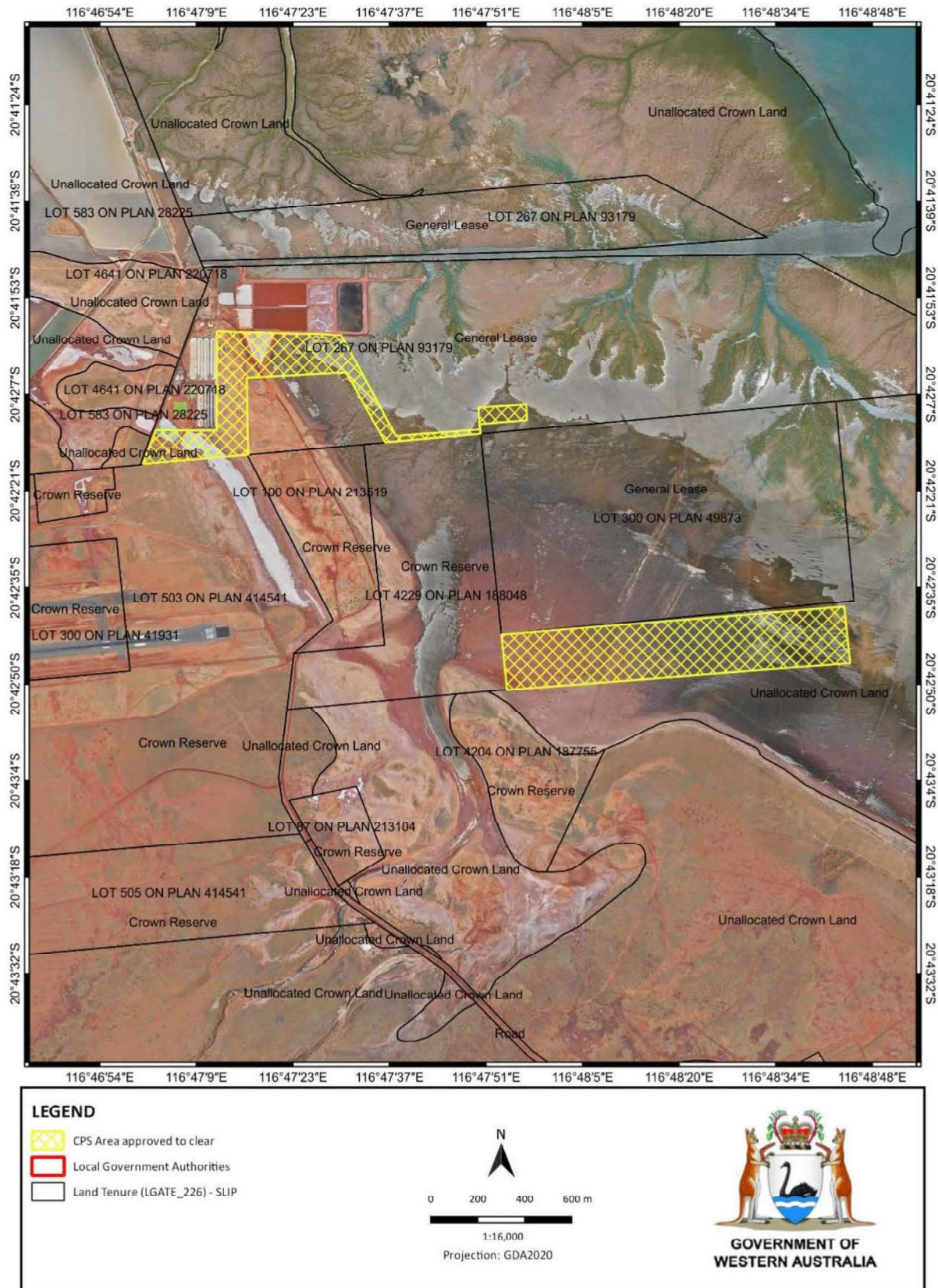


Figure 4: CPS 9926/1 Agreement in Principle Clearing Area

### 3. METHODOLOGY

The assessment process applied to the additional Clearing Permit area was similar to that carried out by GHD (2019), and included:

- Review of the GHD 2019 WRS Bioproducts initial Clearing Permit supporting document; this document is included as an attachment to support the assessment process.
- Review of the currency of information included in the GHD (2019) document through accessing various publicly available databases and providing updated information where appropriate.
- Calculation of the indicative clearing areas within the expanded project area; note that the clearing area approved in CPS 8414/1 is not considered in these calculations.
- Assessment of the additional clearing areas against the ten clearing principles.
- Documentation of outcomes of the review process along with their implications in this native vegetation clearing permit supporting document.

## 4. BIOPHYSICAL ENVIRONMENT

### 4.1 CLIMATE

Karratha is in the Pilbara region of Western Australia, thus experiences an arid, semi-desert climate characterised by a distinct 'wet' and 'dry' period each year. According to the Bureau of Meteorology (BoM), the Karratha Airport weather station (ID 004083, 2022), approximately 2 km to the west of the site, experiences:

- An average maximum temperature that ranges from 26.5 °C to 36.2 °C, with the highest recorded temperature being 48.4 °C.
- An average minimum temperature that ranges from 13.9 °C to 26.9 °C, with the lowest recorded temperature being 20.5 °C.
- An average annual rainfall of 297.5 mm, with the majority falling between December and March, in the 'wet' season; cyclones are more likely between November and April, and which can be associated with higher rainfall occurring.
- Winds are typically easterlies or westerlies.

### 4.2 BIOREGIONALISATION

According to the Interim Biogeographic Regionalisation of Australia (IBRA), the site is in the Pilbara 4 Roebourne Subregion (PIL 4) and is characterised by (Kendrick and Stanley, 2001):

- Quaternary alluvial and older colluvial coastal and subcoastal plains.
- Grass savannah of mixed bunch and hummock grasses, with a dwarf steppe of *Acacia* sp.
- Upland areas dominated by *Triodia* hummock grasslands.
- Samphire, *Sporobolus* and mangroves are present on alluvial flats and river deltas.

### 4.3 LAND SYSTEM AND SOILS

According to the *Soil and Landscape Mapping — Best Available* (DPIRD\_027) dataset (Department of Primary Industries and Regional Development (DPIRD), 2022), the site is located within the Littoral System which is characterised by bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes, and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.

The Dampier (2256) 1:100 000 Geological Series Map (Department of Mines, Industry, and Regulation Safety, 2018) indicates the presence of three soil types within the project site boundary:

- Qhmu, which is described as silt and mud in supratidal to intertidal flats and lagoons; this soil type is present in most of the project site, including Lots 267, 301, 4229, and R40206.
- Qhms: which is described as shelly sand in coastal dunes and old beach deposits; this soil type occurs in western portions of Lots 267, 4229, R40206, and Lot 301.
- Qs: which is described as aeolian red-yellow windblown sand on local sand ridges; this soil type is present in the westerly portions of Lots 267 and 4229.

GHD (2019) reported that the project site and its surrounds is in an area that has a high to moderate risk of acid sulfate soils occurring within 3 m of the natural soil surface that could be disturbed during land development.

## 4.4 VEGETATION ASSOCIATION

A review of the Pre-European Vegetation (DPIRD-006) dataset (Department of Primary Industries and Regional Development (DPIRD), 2019), the project site is almost entirely located within the Abydos Plain — Roebourne vegetation association (127) (117.7 ha) that is described as tidal mud flats (Figure 5).

The most westerly portion (0.3 ha) of the possible access road easement located within Lot 4229 is located within Abydos Plain — Roebourne vegetation association (589) that is described as short bunch grass savannah/grass steppe (Figure 5).

As the Pilbara IBRA region contains more than 99% of its pre-European clearing extent, with Vegetation Association 127 retaining approximately 95% of its pre-European clearing extent and Vegetation Association 589 retaining 99.4% (Government of Western Australia, 2019), the proposed clearing is unlikely to adversely impact on species diversity or recruitment in these ecological communities.

## 4.5 VEGETATION TYPE AND CONDITION

GHD (2019) identified the following vegetation types in the vicinity of the project site:

- Mud flats that appear to be dominant vegetation type present within the site; these areas include vegetated areas such as *Chenopod* shrublands, blue-green algae mats, tidal samphire communities, as well as areas devoid of vegetation.
- Mangroves that are present to the north and west of the site; mangrove habitats have been avoided in the design of the Project due to their high productivity and their designation as being regionally significant.

A review of aerial imagery held by NearMap indicates that the vegetation condition ranges from Excellent (areas with no obvious signs of damage resulting from human activities) to completely degraded (areas that are almost or totally lacking native species in their vegetative structure). The location of the proposed clearing within the short bunch-grass vegetation is likely to be in Excellent condition, with some patches of vegetation within R40206 and the terrestrial portion of Lot 301 also likely to be in Very Good – Excellent condition. Other areas are likely to be in Degraded – to Completely Degraded condition due to disturbance.

## 4.6 ECOLOGICAL COMMUNITIES

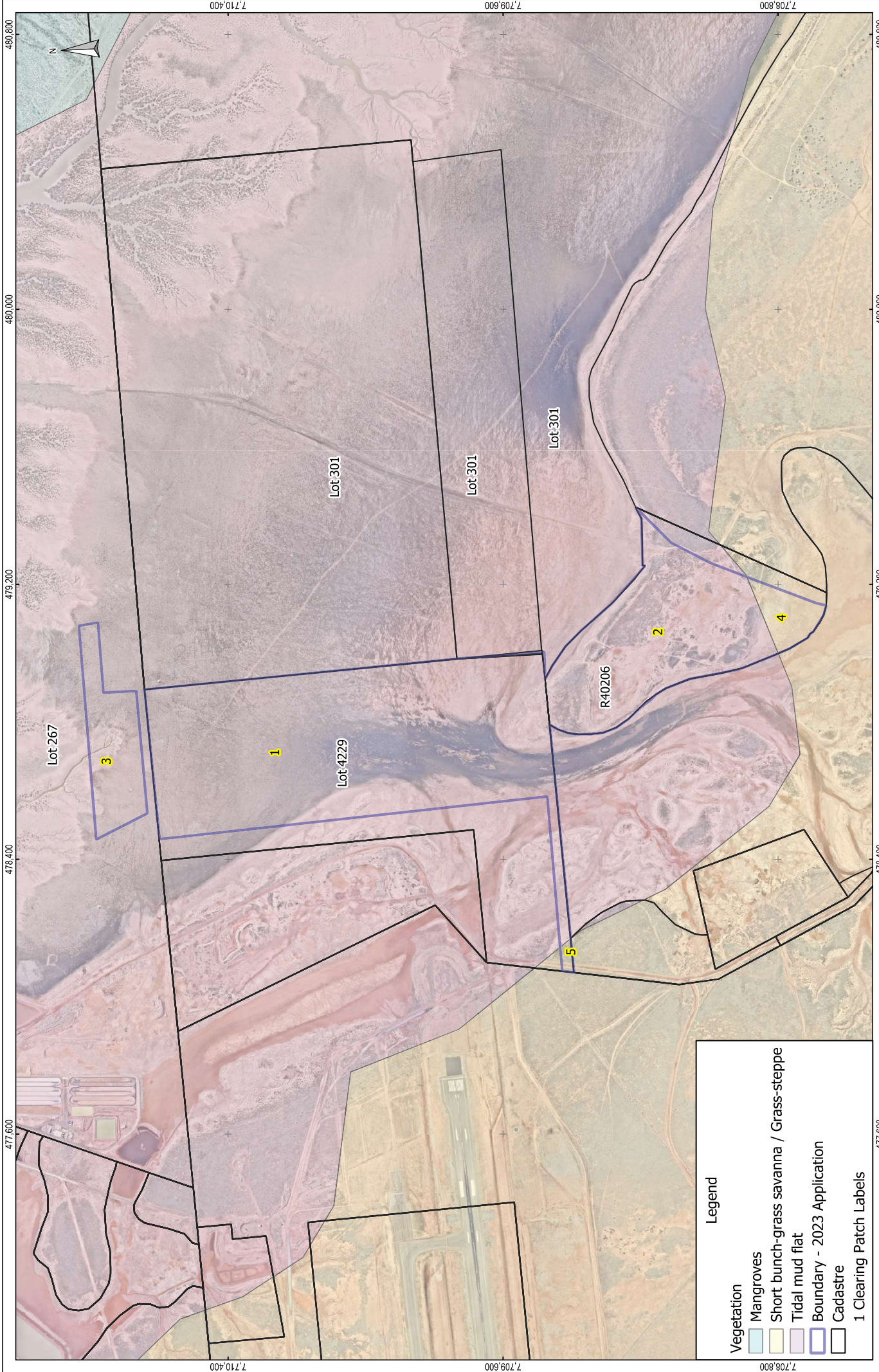
A search of the Department of Biodiversity Conservation and Attractions (DBCA) Threatened and Priority Ecological Community (TEC, PEC) database commissioned by GHD (2019) indicated there were no TECs or PECs within the site listed under the *Biodiversity Conservation Act 2016* (WA) (BC Act). However, the site is within the 2-km buffer zone of several recorded occurrences of two priority listed communities:

- The P1 Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays, with the closest record approximately 500 m west.
- The P3 Horseflat Land System of the Roebourne Plains, with the closest record approximately 1.2 km to the south.

Occurrences of two other priority listed ecological communities are present within 10 km of the site:

- The P3 Coastal dune native tussock grassland dominated by *Whiteochloa airoides*, with the closest record approximately 6.5 km to the southeast.
- The P1 Burrup Peninsula Rock Pile Communities, with the closest record approximately 8 km to the north.

A review of the protected matters search tool (PMST) report (2022) indicated there were no ecological communities listed as Threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act).



**Legend**

- Vegetation
- Mangroves
- Short bunch-grass savanna / Grass-steppe
- Tidal mud flat
- Boundary - 2023 Application
- Cadastre
- 1. Clearing Patch Labels

Scale: 1 : 10,000  
 Original Size: A3  
 NearMap May 2022  
 Grid: GDA94 / MGA zone 50 (EPSG:28350)

Part Lots 267 and 4229, and Reserve 40206  
 2023 Clearing Permit Application  
 WRS Bioproducts Pty Ltd

Figure 5  
 Vegetation Associations

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\\mbssvr\working\WRS Bioproducts\2023 Clearing Permit Application\GIS\WRS Clearing Permit 2023.qgz 04/08/2023 F4 Veg Associations

## 4.7 FLORA SPECIES

The original NatureMap report using a 20 km search radius obtained by GHD (2019) indicated the presence of 583 flora species from 86 families, of which 547 were native species and 36 were introduced. A NatureMap report provided by DBCA in 2022 using a 10 km search radius produced similar outcomes, with 504 flora species recorded.

## 4.8 CONSERVATION SIGNIFICANT FLORA

GHD (2019) carried out a search of the NatureMap report, the PMST Report, along with WA Herbarium (WA Herb) and the Threatened and Priority flora list (TPFL) database search outcomes to review the potential for conservation significant flora species being present. These search outcomes indicated the potential for nine conservation significant flora species with an assessment of the habitat requirements of each indicating their presence is unlikely within the Project area. This is likely to be the case with the expanded Project boundary, noting that a current PMST report indicated there are no conservation significant flora species likely within the Project site or the 5 km search radius (DCCEEW, 2022).

The updated DBCA (2022) NatureMap report indicated seven conservation significant flora species, with one Priority 1 (P1) species, five Priority 3 species, and one Priority 4 species. Of these, six species were the same as those indicated within the GHD (2019) report. A review of the Threatened and Priority Flora (DBCA-036) dataset indicates that the closest record of priority listed flora species is approximately 5.5 km to the northwest (DBCA, 2021).

The P1 species, *Gomphrena axillaris*, was listed in 2021 and appears to be known from three locations, one near Dampier, one west of Karratha, and the other west of Kumpupintil Lake in the East Pilbara (Western Australian Herbarium, 1998). According to Davis, Palmer, and Hammer (2021), it seems to prefer sub-saline (moderately salty) habitats or margins of salt lakes and hummock or tussock grasslands on sand. The limited habitat description and indicative locations shown on FloraBase (Western Australian Herbarium, 1998) suggest this species prefers more terrestrial locations than those present within the Project site, however, this has not been confirmed.

## 4.9 FAUNA HABITAT

The primary fauna habitats present within and in proximity to the site includes:

- Mangroves.
- Intertidal areas.
- Mud flats.

Areas with mangroves present are typically very productive due to their root systems providing safe areas for the young of many species. The intertidal and mudflat areas provide habitat for a rich and diverse fauna assemblage that includes a range of burrowing invertebrates as well as supporting a range of migratory marine birds and mammals.

## 4.10 FAUNA SPECIES

The 2018 NatureMap report using a 20-km search radius obtained by GHD (2019) indicated the potential presence of 651 fauna species, of which 639 were native species and 12 were introduced; the search outcomes included a large number of marine species. An updated NatureMap report (DBCA, 2022) using a 10-km search radius identified reduced numbers of the various vertebrate faunal groups, with 454 fauna species recorded. Despite the lower numbers presented in the 2022 search outcomes, both the 2018 and 2022 searches demonstrate a high level of faunal diversity present within the area. A summary of the two searches is provided in Table 2.



Birds are the dominant vertebrate group and are attracted to the mudflats due to the presence of various invertebrates that contribute to their food sources (Table 2). Reptiles are the species group with the next highest number of records, with lizards being the most common.

**Table 2: NatureMap Fauna Search Summaries**

Species Group	2018 NatureMap Search (20-km search radius)	2022 NatureMap Search (10-km search radius)
Amphibians	4	5
Birds	206	186
Fish	88	46
Mammals	44	32
Reptiles	102	97
Invertebrates	207	88
<b>Total</b>	<b>651</b>	<b>454</b>

## 4.11 CONSERVATION SIGNIFICANT FAUNA SPECIES

Desktop data collected by GHD (2019) via PMST and NatureMap reports indicated:

- Five fauna species listed as priority species by DBCA, of which three were mammals and two were reptiles.
- 18 species were listed as Threatened under the EPBC Act and/or the BC Act, namely 11 birds, four mammals, and three reptiles.
- 41 species were listed as migratory and/or marine species under the EPBC Act, with five being listed as migratory birds protected by an international agreement under the BC Act.
- The assessment process excluded those species that were exclusively marine species.
- A likelihood occurrence assessment was carried out for all conservation significant fauna species that considered the biology and habitat requirements of each, along with the locations of previous records. That assessment determined:
  - 34 migratory/marine birds are likely to be opportunistic visitors to the area.
  - Nine birds listed under the EPBC Act and/or the BC Act, with some in common with the marine/migratory species, are also likely to be opportunistic visitors.
  - The reptile *Ctenotus angusticeps* (Airlie Island Skink) that was listed as Priority 3 under the BC Act and Vulnerable under the EPBC Act was considered as likely to occur within the Project site; note that this species is now listed as Threatened (vulnerable) under the BC Act (WA Museum, 2022) and is no longer listed under the EPBC Act (Threatened Species Scientific Community, 2019).

The GHD (2019) information is consistent with the 2022 NatureMap (DBCA, 2022) and PMST reports (DCCEEW, 2022).

A review of the Threatened and Priority Fauna (DBCA-037) dataset (DBCA, 2020) indicates that the closest records of conservation significant species are migratory species located a minimum of 1.2 km to the north, northwest, south, southeast, and east of the site.

## 4.12 CONSERVATION ESTATE

Reserve R40206 is zoned Conservation Recreation and Natural Landscapes under the City of Karratha Local Planning Scheme (LPS) 8, gazetted on 26 July 2022. This reserve is located to the south of Lots 4229 and 301, with a portion suggested for lowering to accommodate the proposed diversion of 7 Mile Creek (Figure 1, Figure 2).

## 4.13 HYDROLOGY, WETLANDS, AND WATERWAYS

The Project area:

- Is in the Pilbara Groundwater Area, which is a proclaimed groundwater area under the *Rights in Water Irrigation Act 1914 (WA) (RIWI Act)*.
- Is located within an identified irrigation district in the Pilbara Surface Water Area that is proclaimed under the RIWI Act.
- Supports no rivers within or near to the site.
- Supports no permanent, seasonal, or ephemeral lakes.
- Is not located within a proclaimed public drinking water source area (PDWSA) gazetted under the *Country Area Water Supply Act 1947 (WA) (CAWS Act)*.
- Is not located within a Clearing Control Catchment as defined in the CAWS Act.
- Contains no RAMSAR wetlands.

The initial project design considered the City of Karratha Storm Surge Risk Policy (Local Planning Policy DP 19) that included mapping of the 100-year annual recurrence interval (ARI) flood depth of >2 m, and the Storm Surge Vulnerability Maps that indicated the site was in a calculated 500-year Surge Inundation Depth.

One watercourse, 7 Mile Creek, is present to the south of the proposed additional clearing area (Figure 6). This is an ephemeral creek that flows after rainfall events and tidal movement. The proposed increased size and location of the algae ponds will impact on the discharge and mixing of water from the creek, with the pond walls acting as a barrier to movement (Figure 6). It is currently anticipated that the discharge location for this creek will change with construction of a diversion through Reserve R40206 to the right, directing the flow east towards the ocean rather than directly into the southern areas of Lots 4229 and 301.

A hydrological study carried out by Hydrologia assessed several options in relation to the creek, with the diversion to the east being the preferred option. Hydraulic modelling carried out by Hydrologia (2023) determined that:

- Floodwater depths at the diversion point will increase.
- Peak velocities in events up to the 1% annual exceedance probability (AEP) event are approximately 0.5 m.
- Floodwater will reach and mix with the same estuary system, however, in the east only as discharge to the north will be prevented when the algae ponds are constructed.
- Storm surge events greater than the 10% AEP could inundate the algae ponds, which would need to be drained then refilled ahead of production recommencing.
- The southern pond embankment and section of the access road from Millars Road that would act as a levee will act to divert the flow from 7 Mile Creek towards the east.
- The collection of water in a residual estuarine area to the west of the algae ponds may need to be drained, with a potential drainage pathway being towards the north past the plant site and discharging into the estuarine channel network north of the lakes.
- There is a flood risk for the two proposed borrow pits to be located within Lot 267 that can be managed through construction of temporary levees that will be removed at the conclusion of the excavation, or timing of works so they are carried out during a dryer period to minimise the potential for flooding.

The use of Lot 4229 will mean a reversion to the original plan formulated by Hydrologia (2022) to divert the discharge from 7 Mile Creek to the east through R40206 south of Lot 301 (Figure 6). Detailed design will be considered during preparation of the Stormwater Management Plan.

## 4.14 GROUNDWATER

The hydrogeology of the initially approved clearing area was assessed by GHD (2019), with a shallow alluvial aquifer and a fractured and weathered bedrock aquifer potentially being present. Groundwater is tidally influenced and flows to the east toward Nickol Bay. The coastal location and flat topography of the project area indicate that the water table is likely to be shallow and influenced by the tide.

A search of the DWER Water Information Reporting database on 13 February 2018 indicated there is one registered private bore within 3 km of the Rainstorm Leasehold. The bore is located approximately 2.5 km southwest of the Mining lease, was drilled in 1931 for the purpose of agricultural irrigation and is likely decommissioned.

## 4.15 CONTAMINATION

A basic summary of records (BSR) relating to the presence of contamination within the initial proposed clearing area (part of Lots 257 and 300) was obtained by GHD (2019). This record indicated that portions of Lot 267 is classified as 'Possibly contaminated — investigation required'. This classification suggests that continued use of the land in an industrial context is acceptable.

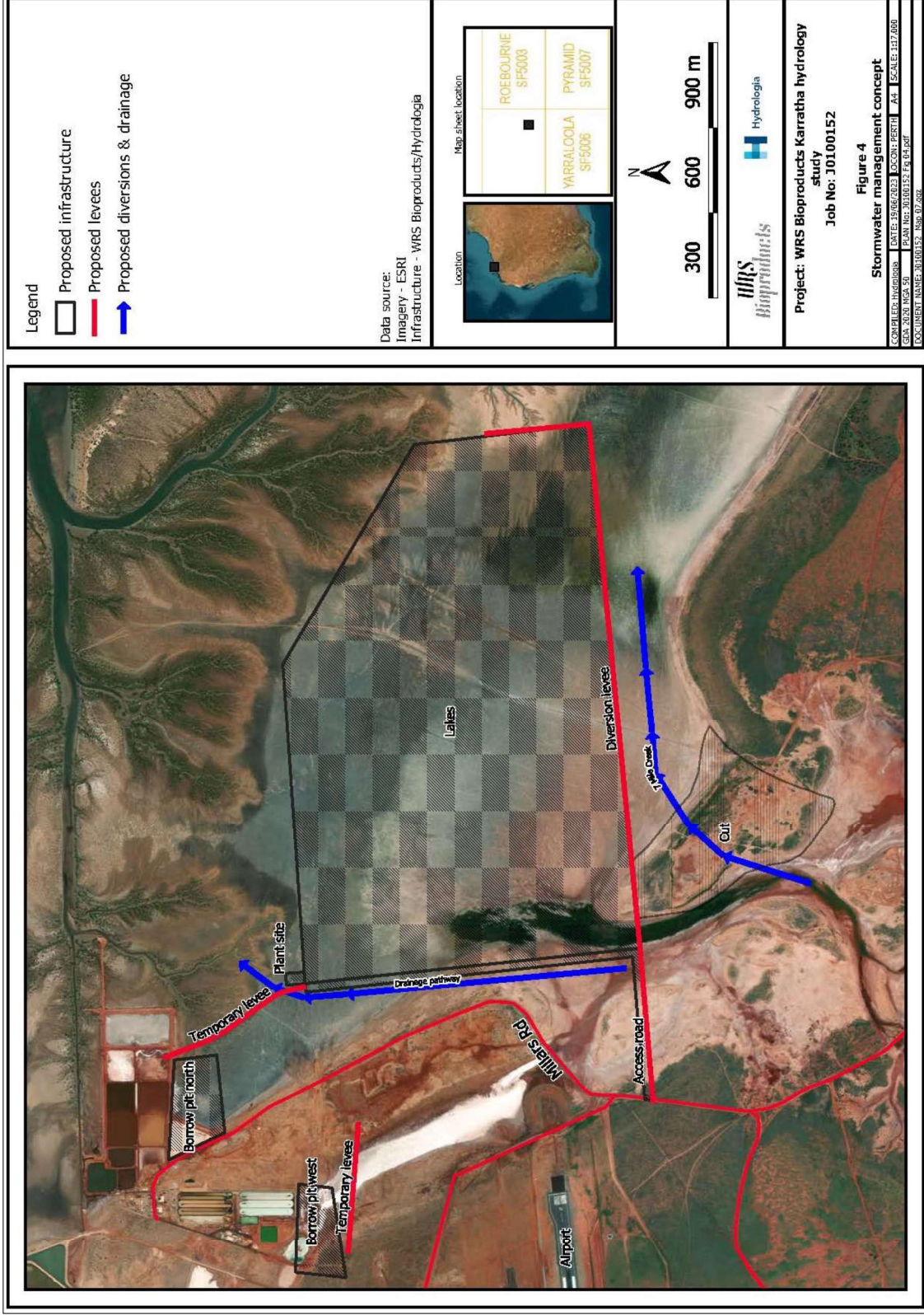


Figure 6: Option 1 — Diversion of 7 Mile Creek to the East

## 5. PROJECT ELEMENTS AND POTENTIAL IMPACTS

### 5.1 CLEARING OF NATIVE VEGETATION

#### 5.1.1 Clearing Area

The expanded Project area is largely cleared mud tidal flats and open water associated with those tidal flats. Vegetated areas within Lots 267 and 4229, and Reserve 40206 with an area of 84 ha have been identified on current aerial imagery available from Nearmap as having the potential to be impacted by the Project. Their indicative clearing area and the vegetation association in which it may occur has been identified, namely:

- Up to 24 ha of vegetation association 127 within Reserve 40206.
- Up to 52 ha of vegetation association 127 within Lot 4229.
- Up to 8 ha of vegetation association 127 within Lot 267.
- 0.3 ha of vegetation association 589 within Lot 4229 (included in the overall indicative clearing area of 84 ha).

Overall, the clearing footprint is expected to be a maximum of 84 ha within a broader clearing footprint of 87 ha (Table 3, Figure 7).

**Table 3: Clearing Areas**

Area No.	Vegetation Type	Vegetation Association	Location	Indicative Clearing Area (ha)	Purpose Clearing Permit Area
1	Tidal mud flat	127	Lot 4229	53	53
2	Tidal mud flat	127	R40206	25	27
3	Tidal mud flat	127	Lot 267	10	10
4	Short bunch grass /savannah grass*	589	R40206	2.5	4
5	Short bunch grass /savannah grass*	589	Lot 4229	0.3	0.3
<b>Total</b>				<b>88</b>	<b>90</b>

\* Note: the short bunch grass/savannah grass is included in the overall total clearing area of 90 ha, and included in this table for completeness

#### 5.1.2 Potential Impacts and their Significance

The Project will result in the clearing of a maximum 84 ha primarily comprising tidal mud flat vegetation (Vegetation Association 127), and a very small area of short bunch grass/savannah grass (Vegetation Association 589). This is unlikely to be significant as the Pilbara IBRA region retains more than 95% of its pre-European clearing extent of Vegetation Association 127 (tidal mud flats) and more than 99% of Vegetation Association 589 (Short bunch grass/savannah grass) (Government of Western Australia, 2019). On that basis, the proposed clearing is unlikely to adversely impact on flora species diversity or recruitment in each of these ecological communities.

While the clearing will result in the direct loss of individual flora species that make up the vegetation, there are no known conservation significant flora species present within the proposed clearing area, with database searches indicating that those known were located in locations with habitat requirements different to those associated with tidal mudflat and bunch grass/savannah grass communities.

The introduction of non-native (weed) species is a possibility due to the clearing and on-going project activities. The implementation of hygiene management activities consistent with those required by Condition 5 of approved Clearing Permit CPS 8414/1 will mean this risk can be adequately mitigated.

The presence of mangrove populations north of the approved clearing area associated with CPS 8414/1 is noted, along with an acknowledgement of their local/regional significance and their productivity. These populations were avoided through an adjustment to the proposed CPS 8414/1 clearing area (Figure 3), with all potential clearing areas associated with the expanded operation area also avoiding mangrove populations.

## 5.2 FAUNA

Fauna habitat present within and near to the Project site includes native vegetation, open water areas, and tidal mud flats. The tidal mud flats are known to be utilised as a feeding area by migratory birds due to the presence of burrowing invertebrates (GHD, 2019), accordingly, there is likely to be a direct impact on fauna and fauna habitat as a result of the Project. Impacts will include:

- Increased habitat loss and fragmentation as a result of the clearing of up to an additional 84 ha of native vegetation. Impacts are not expected to be significant as vegetation types 127 and 589 retain more than 90% of their pre-European extent. The nature of tidal areas means that flushing and tidal movement moves sand/soils around on a daily basis.
- Habitat loss for migratory birds that utilise the site as feeding area. Impacts to migratory birds are not expected to be significant as due to their mobility and because most species are transitory visitors with alternative feeding areas present close to the site.
- Secondary impacts associated with dust, noise and/or vibration during clearing and construction. These activities will be temporary over a short timeframe, with permanent impacts on local faunal populations considered to be unlikely.
- Weed colonisation that result in changes to habitat conditions. The presence of weeds will be managed in accordance with approval conditions within the currently approved Clearing Permit, CPS 8414/1, meaning the likelihood of significant impacts occurring is considered to be low.

## 5.3 CONTAMINATION

GHD (2019) assessed the potential for contamination associated with previous activities within Lot 267, along with proposed site and plant construction, and the likely presence of acid sulfate soils that could result in contamination if disturbed and exposed to the atmosphere. There is unlikely to be any significant increase in the risk of contamination and associated impacts due to the increased clearing and operational area.



Scale: 1 : 10,000  
 Original Size: A3  
 NearMap May 2022  
 Grid: GDA94 / MGA zone 50 (EPSG:28350)

Legend  
 Boundary - 2023 Application  
 Cadastral

Part Lots 267 and 4229, and Reserve 40206  
 2023 Clearing Permit Application  
 WRS Bioproducts Pty Ltd

Figure 7  
 Indicative Clearing Areas

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## 5.4 DIVERSION OF 7 MILE CREEK

The increased operational area for the facility will result in a direct impact to the discharge of 7 Mile Creek (Figure 2) that would normally flow into a portion of Lot 4229. The approved clearing area and construction of algae ponds associated with the issuing of CPS 8414/1 may have resulted in flows into Lot 4229 that had a reduced likelihood of flushing/mixing with surrounding areas. The planned increased operational area and construction of larger algae ponds will result in an alteration to the flow/discharge regime additional to that which would occur based on the original proposed pond area. This will result in an increased potential for water ponding and flooding in areas south of Lot 4229 and in the vicinity of Reserve R40206, along with increased sediment deposition along the algae pond walls.

Diversion of 7 Mile Creek to the east around the southern extent of the site infrastructure has been proposed as a means of managing the impacts associated with the increased operational area. When this occurs, tidal areas south of Lot 301 will change and contribute to stream flow processes, with sediment collecting in differing areas. Over time, the new flow regime will result in an adjusted equilibrium in terms of sediment and flow dynamics.

Water quality within 7 Mile Creek is unlikely to be significantly impacted by the proposed diversion as it will continue to be determined by flows within the wider catchment area that extends more than 10 km south of the site past the North West Coastal Highway. It is expected that salinity will range from fresh to brackish to saline according to rainfall, the presence of salts within the channel, and the presence of oceanic water, consistent with the current situation. The potential for contamination from the algae ponds due to leaching or flooding is low due to their proposed construction method that includes an impervious lining and pond walls that have been designed to accommodate rainfall events up to at least the seven day 1% AEP under normal operating conditions (Hydrologia, 2023).

The upgraded expanded pond design is consistent with that proposed for the original Clearing Permit (CPS 8414/1), with the height of the bunds surrounding the algae ponds along with their proposed construction mean there is a low likelihood of leakage or overflow from the site. Accordingly, there is little risk of impact to groundwater, disturbance of acid sulfate soils, and/or the off-site transport of sediment, other materials, and/or contamination.



## 6. ASSESSMENT AGAINST CLEARING PRINCIPLES

When preparing a Clearing Permit application, an assessment of the proposed clearing against the ten clearing principles is required to inform the decision-making process. The assessment as it relates to the proposed additional clearing of 84.0 ha within portions of Lot 267 and 4229, and Reserve 40206 is provided in Table 4.

The results of this assessment suggest that the proposed clearing may be at variance with Principle H: Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area. The Project may have an impact on the City of Karratha Reserve R40206 as diversion of 7 Mile Creek will occur in the vicinity of this reserve. Despite likely loss of native vegetation as a direct result of the drainage works and changed creek flow dynamics, the potential use of the Reserve is not considered likely to be affected and the overall natural landscape and its values will remain.

**Table 4: Assessment of Clearing Against the Clearing Principles**

No.	Principle	Assessment	Outcome
a	Native vegetation should not be cleared if it comprises a high level of biological diversity.	<ul style="list-style-type: none"> <li>• Previous NatureMap, DBCA, and PMST database searches indicate the wider Project location is diverse and supports a range of flora and fauna species.</li> <li>• A review of the extent of vegetation associations indicates that those present (127 and 589) retain more than 90% of their pre-European extent, indicating that impacts on these communities is not likely to result in a significant impact to diversity.</li> <li>• The Project area is located within an area previously used for various commercial/industrial purposes and is subject to previous disturbance.</li> <li>• The proposed additional clearing areas are considered unlikely to comprise greater biological diversity than surrounding areas.</li> </ul>	Not at variance with this principle
b	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	<ul style="list-style-type: none"> <li>• The Project area is located within an area previously used for various commercial/industrial purposes and is subject to previous disturbance.</li> <li>• The Project area does not support habitat that is important or necessary for the conservation significant fauna or the maintenance of indigenous fauna that is not present in other nearby areas.</li> <li>• On this basis, the proposed clearing is not likely to be at variance with this principle.</li> </ul>	Not at variance with this principle
c	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare (Threatened) flora.	<ul style="list-style-type: none"> <li>• Previous NatureMap, TPFL, WAHerb, PMST database searches, along with a 2022 PMST database search indicate that there are no flora species listed as Threatened under the BC Act and/or the EPBC Act.</li> <li>• On this basis, the proposed additional clearing of native vegetation will not result in the clearing of any vegetation that is considered necessary for the continued existence of rare (Threatened) flora species.</li> </ul>	Not at variance with this principle

No.	Principle	Assessment	Outcome
d	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a Threatened Ecological Community.	<ul style="list-style-type: none"> <li>• Previous DBCA TEC/PEC and PMST database searches, along with a 2022 PMST database search report indicates there are no Threatened or Priority Ecological Communities present within or close to the Project site.</li> <li>• On this basis, the proposed clearing of native vegetation will not result in the clearing any vegetation that is considered necessary for the continued existence of a Threatened Ecological Community.</li> </ul>	Not at variance with this principle
e	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	<ul style="list-style-type: none"> <li>• Two pre-European vegetation associations have been indicated for the project site (127 and 589), with a review of the Statewide Vegetation Statistics for these associations indicating more than 90% area present within the Pilbara Region.</li> <li>• On this basis, the proposed additional clearing will not occur within a native vegetation community that has been extensively cleared.</li> </ul>	Not at variance with this principle
f	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	<ul style="list-style-type: none"> <li>• The proposed additional clearing is not planned for areas associated with wetlands or rivers.</li> <li>• Impacts to drainage associated with the approved clearing area included creek lines that drain into Nickol Bay and drainage channels associated with the presence of mangroves, with these locations being avoided. The designs to avoid and minimise impacts are considered to be acceptable.</li> <li>• 7 Mile Creek to the south drains into a portion of Lot 4229. As the creek line is associated with tidal flats that are largely devoid of vegetation, the proposed clearing is considered not to result in a significant impact to vegetation associated with a wetland or waterway.</li> </ul>	Not at variance with this principle
g	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<ul style="list-style-type: none"> <li>• The Project area is located within an area previously used for various commercial/industrial purposes and is subject to previous disturbance.</li> <li>• Vegetation within the north western portion of Reserve R40206 will be cleared and 7 Mile Creek will be diverted through this area, discharging to the east instead of the north, providing an alternative drainage path.</li> <li>• The limited clearing area is unlikely to result in significant impacts to the species diversity of the tidal flats vegetation type due to the pre-European level remaining.</li> <li>• If the proposed creek diversion does not occur, there is an increased likelihood of local water ponding and potentially flooding due to the construction of the algae ponds.</li> <li>• Impacts to acid sulfate soils will be avoided with construction of the algae ponds using methods that will not require disturbance of ASS materials.</li> </ul>	The proposed clearing is not likely to be at variance with this principle

No.	Principle	Assessment	Outcome
h	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	<ul style="list-style-type: none"> <li>Reserve R40206 is zoned Conservation Recreation and Natural Landscapes under City of Karratha Local Planning Scheme (LPS) 8, gazetted on 26 July 2022.</li> <li>Diversion of 7 Mile Creek through to the east in proximity of Reserve 40206 is likely to result in altered drainage and flow dynamics, as well as sediment transport processes.</li> <li>These changes are not anticipated to significantly affect the potential use of the Reserve with the natural landscape and environmental values remaining.</li> </ul>	May be at variance with this principle
i	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	<ul style="list-style-type: none"> <li>Sea water tidally inundates parts of the proposed clearing area. Groundwater at the project area is saline and likely modified by surrounding salt ponds.</li> <li>Disturbance of ASS is not expected due to the planned construction method.</li> <li>Sediment control measures will be employed during creek diversion works to minimise sediment movement.</li> <li>The diversion of 7 Mile Creek is not likely to result in a change in water quality due to the planned construction of the algae ponds that minimise the potential for leakage and overflow during normal operation, with salinity expected to remain consistent with that which currently occurs within the catchment area during rainfall events and tidal movements.</li> <li>Thus impacts to surface or groundwater quality are not expected.</li> </ul>	Not likely to be at variance with this principle
j	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	<ul style="list-style-type: none"> <li>The additional proposed clearing could result in 7 Mile Creek discharge area being impacted, with an increased likelihood of local ponding and/or flooding.</li> <li>The proposed diversion of 7 Mile Creek through Reserve 40206 will provide an alternative flow and drainage option that will reduce the likelihood of ponding and flooding within Lot 4229.</li> </ul>	Not likely to be at variance with this principle

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