GOVERNMENT OF
WESTERN AUSTRALIA

# CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

| | |
|---|---|
| **Purpose Permit number:** | CPS 9926/1 |
| **Permit Holder:** | WRS Bioproducts Pty Ltd |
| **Duration of Permit:** | From 22 December 2023 to 22 December 2028 |

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

## PART I – CLEARING AUTHORISED

### 1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of the expansion of an approved aquaculture operation (algae farm).

### 2. Land on which clearing is to be done

Lot 267 on Deposited Plan 93179, Gap Ridge

Unallocated Crown Land (PIN 11954859), Gap Ridge

### 3. Clearing authorised

The permit holder must not clear more than 60.87 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

## PART II – MANAGEMENT CONDITIONS

### 4. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

## 5. Weed management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds*:

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *weed*-affected soil, *mulch, fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

## 6. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner in a single direction to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

## 7. Wind and water erosion management

The permit holder must commence construction activities no later than three (3) months after undertaking the authorised clearing activities to reduce the potential for wind and water erosion.

# PART III - RECORD KEEPING AND REPORTING

## 8. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

| No. | Relevant matter | Specifications |
|---|---|---|
| 1. | In relation to the authorised clearing activities generally | (a) the species composition, structure, and density of the cleared area;<br>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;<br>(c) the date that the area was cleared;<br>(d) the size of the area cleared (in hectares);<br>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 4;<br>(f) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 5;<br>(g) actions taken to conduct directional clearing in accordance with condition 6; and |

| No. | Relevant matter | Specifications |
|---|---|---|
| | | (h) actions taken to conduct wind erosion measures in accordance with condition 7. |

**9. Reporting**

The permit holder must provide to the *CEO* the records required under condition 8 of this permit when requested by the *CEO*.

## DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

**Table 2: Definitions**

| Term | Definition |
|---|---|
| CEO | Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*. |
| clearing | has the meaning given under section 3(1) of the EP Act. |
| condition | a condition to which this clearing permit is subject under section 51H of the EP Act. |
| department | means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 2. |
| EP Act | *Environmental Protection Act 1986* (WA) |
| fill | means material used to increase the ground level, or to fill a depression. |
| mulch | means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation. |
| native vegetation | has the meaning given under section 3(1) and section 51A of the EP Act. |
| weeds | means any plant –<br>(a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or<br>(b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or<br>(c) not indigenous to the area concerned. |

**END OF CONDITIONS**

Jessica Burton
A/MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20*
*of the Environmental Protection Act 1986*

29 November 2023

# Schedule 1

The boundary of the area authorised to be cleared (cross hatched yellow) is shown in the map below (Figure 1).

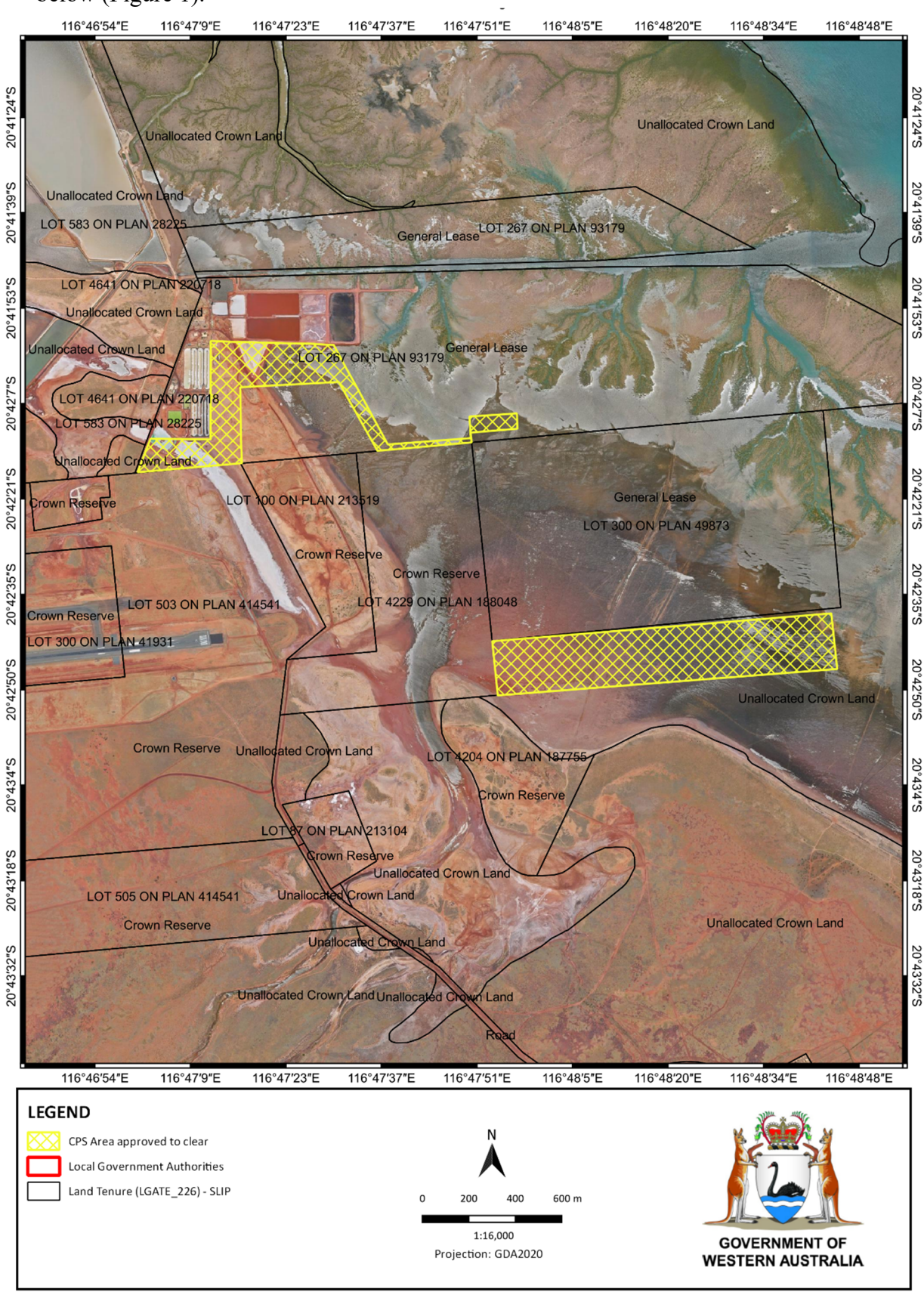



**Figure 1:** Map of the boundaries of the areas which clearing may occur

Government of Western Australia
Department of Water and Environmental Regulation

# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

| | |
|---|---|
| **Permit number:** | CPS 9926/1 |
| **Permit type:** | Purpose permit |
| **Applicant name:** | WRS Bioproducts Pty Ltd |
| **Application received:** | 24 October 2022 |
| **Application area:** | 60.87 hectares of native vegetation |
| **Purpose of clearing:** | Expansion of approved aquaculture operation (algae farm) |
| **Method of clearing:** | Mechanical clearing |
| **Property:** | Lot 267 on Deposited Plan 93179<br>Unallocated Crown Land (PIN 11954859) |
| **Location (LGA area):** | City of Karratha |
| **Localities (suburb):** | Gap Ridge |

### 1.2. Description of clearing activities

This application is for the clearing of 60.87 hectares of native vegetation over two sites within Lot 267 on Deposited Plan 93179 and Unallocated Crown Land (PIN 11954859), Gap Ridge, for the purpose of the expansion of a commercial-scale algae farming operation and associated infrastructure. Infrastructure includes algae lakes with bund walls, processing and harvesting buildings and maintenance sheds.

The vegetation proposed to be cleared is distributed across two separate areas (see Figure 1, Section 1.5). The application area largely consists of cleared mud tidal flats and open water associated with those tidal flats (WRS Bioproducts Pty Ltd, 2022).

### 1.3. Decision on application

| | |
|---|---|
| **Decision:** | Granted |
| **Decision date:** | 29 November 2023 |
| **Decision area:** | 60.87 hectares of native vegetation, as depicted in Section 1.5, below. |

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The applicant originally applied to clear 61.64 hectares of native vegetation. The final area was reduced to 60.87 hectares for the clearing of native vegetation. The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and one submission was received. Consideration of matters raised in the public submission is summarised in Appendix A.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, any other matters considered relevant to the assessment (see Section 3.3) and current databases (Appendix F).

The assessment identified that the proposed clearing would result in:

- the potential spread of weeds into the surrounding vegetation
- partial loss of foraging grounds for migratory bird species; and
- potential land degradation in the form of wind and water erosion.

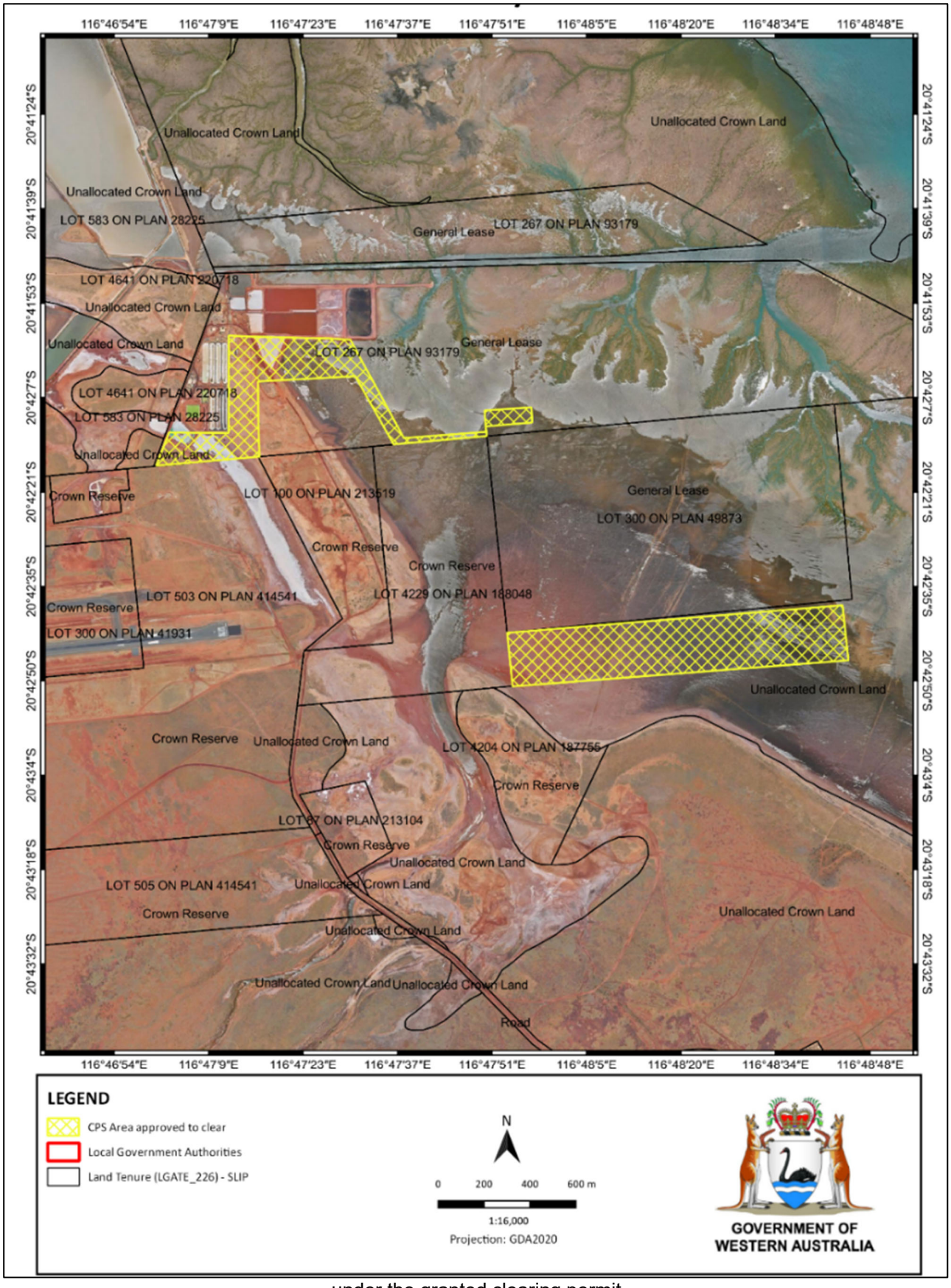
After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the proposed clearing is unlikely to lead to appreciable land degradation or have adverse impacts on conservation significant fauna or the foraging behaviour of migratory birds. The applicant has suitably demonstrated avoidance and minimisation measures. These measures, along with the clearing conditions imposed on the permit will minimise and manage impacts to the environment to ensure there is no unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- commence construction no later than three months after undertaking the authorised clearing to minimise risk of soil erosion; and
- undertake slow, progressive directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.

## 1.5. Site map

**Figure 1:** Map of the application area. The areas cross-hatched yellow indicate the areas authorised to be cleared




under the granted clearing permit.

## 2 Legislative context

The clearing of native vegetation in Western Australia is (WA) regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Aboriginal Heritage Act 1972*
- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005*
- *Rights in Water and Irrigation Act 1914* (RIWI Act)
- *Contaminated Sites Act 2003* (CS Act); and
- *Soil and Land Conservation Act 1945* (WA).

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013); and
- *Procedure: Native vegetation clearing permits* (DWER, October 2019).

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

Supporting information was submitted by the applicant, demonstrating that the following avoidance and mitigation measures will be implemented during the clearing, in order to mitigate and avoid any negative impacts to the local area (WRS Bioproducts Pty Ltd, 2022):

- to avoid disturbance to the local mangrove community, the design and location of the ponds and infrastructure will avoid the known mangrove populations in the area; and
- to achieve the least disturbance to local native vegetation, the proposed clearing has also considered how much vegetation needs to be removed to enable the construction and operation of the facility. The proposed location of the facility is in an area where native vegetation is limited.

Under the approved development approval for the proposal, the applicant is required to develop and implement a stormwater management plan and construction and operational environmental management plans to manage, avoid and mitigate environmental impacts of the proposal (City of Karratha, 2023).

The construction environmental management plan must include:

- Mitigation measures in the event acid sulphate soils are encountered;
- Impacts of artificial light on both the broader environment and Karratha Airport;
- Details regarding the construction period, operating hours and contacts for essential site personnel;
- Community information, consultation and complaints management;
- Traffic and parking management, including construction and waste vehicle access points;
- Details of cranes, large trucks or similar equipment which may block public thoroughfares during construction;
- Management of dust, erosion and sedimentation;
- Storage locations of construction waste on site;
- Containment of earthworks, excavation, land retention/piling methods and associated matters within the approved development site;
- Protection of infrastructure on site during cyclone events;
- Details of temporary fencing or hoarding;
- Identification of underground services in the proximity of the site and implementation of measures to protect those services prior to excavation;
- Operation of construction activities in accordance with the *Environmental Protection (Noise) Regulations 1997*;
- Any other matter that may impact community safety, security and amenity or the surrounding environment (City of Karratha, 2023).

The operation environmental management plan must include:

- The management of any potential adverse impacts that the approved use may have on the surrounding environment either during normal operations or during a
- flooding event where the lakes may overtop and spill into the surrounding environment;
- The use of Vertimec or other such insecticides for the control of invertebrate within the approved algae lakes;
- The management of light emissions during operation of the approved use both on the broader environment and the airport; and
- Any other relevant matters as determined by the City of Karratha or DBCA (City of Karratha, 2023).

The Delegated Officer was satisfied that the applicant has undertaken reasonable measures to avoid and minimise potential impacts of the proposed clearing on environmental values.

## 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix C) identified the impacts of the proposed clearing are limited and able to be managed to be environmentally acceptable with standard avoid and minimise conditions, as well as staged clearing conditions. Biological values (fauna) and land resources are further considered below.

### *3.2.1. Biological values (Fauna) - Clearing Principles (b)*

**Assessment:**

Abydos Plain with Roebourne vegetation associations (tidal mud flats) are characteristic of the application area and its surrounding environment. The site is dominated by Chenopod shrublands, blue-green algae mats, and tidal samphire communities. Samphire, and mangroves are additionally present on the alluvial flats and the river deltas adjacent to the application area. The mangrove areas will not be impacted by the proposed clearing and are located 870 metres to the northeast.

The desktop assessment identified 56 conservation significant fauna species within the local area (50-kilometre buffer of the application area, excluding the area which extends into the ocean).

Martinick Bosch Sell Pty Ltd (MBS Environmental) was commissioned by the applicant to carry out a likelihood analysis for the conservation significant fauna species, that are likely to occur within the application area (WRS Bioproducts Pty Ltd, 2022). From the likelihood analysis, as well as consideration of preferred habitat, it is considered that suitable habitat for six conservation significant fauna species are likely to occur within the application area. These species are further considered below.

**Fauna habitats**

One main fauna habitat has been recorded in the application areas, that being tidal mud flats, which include largely cleared mud tidal flat areas and open water associated with those tidal flats (WRS Bioproducts Pty Ltd, 2022). MBS Environmental advised that the immediate adjacent areas to the application area contain mangrove habitats which provide significantly productive environments due to their root systems providing shelter for the young of many fauna 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 (WRS Bioproducts Pty Ltd, 2022).

**BIRDS**

*Calidris ferruginea* (common name: Curlew sandpiper) is a critically endangered migratory species under the EPBC Act and BC Act associated with habitats in an around intertidal mudflats in sheltered coastal areas. *C. ferruginea* breeds on bare dry shingle, shell or sand beaches, as well as in and around coastal wetlands. Australia is not known to host any of this migratory species' breeding grounds. *C. ferruginea* forages on mudflats and in shallow water (Department of Climate Change, Energy, Environment and Water (DCCEEW), 2023). A number of *C. ferruginea* have been recorded less than one kilometre away from the proposed clearing area. Based on the likelihood analysis, *C. ferrugineai* is likely to use the application areas for dispersal, however, is not solely restricted to the application area, as the habitat type within the application area is common throughout the local area.

Various migratory birds, such as *Limosa lapponica* (Bar-tailed godwit), *Numenius madagascariensis* (Eastern curlew) and *Calidris canutus* (Red knot), have no known breeding sites in Australia, however, have been observed to have foraging grounds within the local area of the area under application. The application area and its surroundings are

likely to constitute foraging habitat for these migratory species. These migratory waterbird species may occasionally visit the application area, however these species are not solely restricted to the application area, as the habitat type is locally common extending extensively to the northwest and southeast of the application area. The proposed clearing of 60 hectares of this habitat is not considered to significantly impact habitat for these migratory species.

**REPTILES**

*Ctenotus augusticeps,* (common name: Northwestern coastal Ctenotus) is listed as a Priority 3 species by the Department of Biodiversity, Conservation and Attractions (DBCA). *C. augusticeps* inhabits tussock grassland, Acacia shrubland as well as samphire shrubland along mangrove margins around Karratha. *C. augusiceps* has been observed to exhibit a preference to open shrubland subject to tidal influences and dense vegetation in sandy soils (DCCEEW, 2023). A review of available databases determined this species occurs along the coastline of northern WA within the boundaries of the Shire of Ashburton to the Shire of Broome, as well as occurring on offshore islands (DBCA, 2007). On the mainland, this species generally inhabits the landward fringe of salt marsh communities in samphire shrubland or marine couch grassland in the intertidal zone along mangroves and mangrove margins, however, subtle differences in vegetation and topography exist among sites where the species has been recorded (Department of the Environment and Energy (DEE), 2019). On the Airlie Island *C. augusticeps* is strongly associated with samphire species *Tectornia halocnemoides subsp. tenuis* and *Suaeda arbusculoides*, which occur on clayey soils, and mixed herb and grass cover of *Muellerolimon salicorniaceum* and *Sporobolus virginicus*, which occur on sandy soils (DEE, 2019). The closest recorded occurrence of this species to the application area is situated roughly 10 kilometres away. The application area and its surroundings are likely to constitute suitable habitat for this species. *C. augusticeps* may occasionally visit the application area, however this species is not solely restricted to the application area, as the habitat types are common within the local area. A slow directional clearing is likely to mitigate negative effects the clearing may have on individuals of this species, if present at the time of clearing.

*Lerista nevinae* (common name: Nevin's slider) is an endangered species (EPBC Act) associated with the Acacia shrubland over spinifex on the Pilbara coast (DCCEEW, 2023). *L. nevinae* have also been observed near mangrove inlets (Gaikhorst, 2015). The area of proposed clearing and its surroundings exhibits environmental characterises suitable to this species. However, habitat for this species is not solely restricted to the application area, as the habitat types are common within the local area. A slow directional clearing is likely to mitigate negative effects the clearing may have on individuals that may occur at the time of clearing.

**Conclusion:**
Tidal mud flats and their associated habitats are well-represented in the vicinity of the application area. Given the extent of suitable habitats in the local area, extending well beyond the boundaries of the application area, the proposed clearing of 60.87 hectares of tidal mud flats is unlikely to represent a significant habitat for the aforementioned conservation significant fauna species which have a scattered distribution across northern Australia.

Due to the presence of suitable habitats within, and adjacent to, the application area, these species may be present at the time of the clearing activities. Fauna management measures such as undertaking clearing in a slow, directional and progressive manner towards adjacent vegetation will mitigate potential impacts to fauna.

**Outcome:**
Based on the above assessment, and the avoidance and mitigation measures provided by the applicant (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to fauna values. For the reasons set out above, it is considered that direct impacts to fauna can be managed through the application of slow, directional clearing techniques.

**Conditions:**
To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- slow, directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity.

### *3.2.2. Land and water resources (Land degradation and surface water) - Clearing Principles (g) (i)*

**Assessment:**

Based on the mapped soil units within the application areas (the Littoral System soil landscape -286Li.), the proposed clearing may cause land degradation from resulting wind and water erosion and short term sedimentation of surface water.

In relation to water erosion risks, the surface water is largely reliant on weather and waterways that generally only flow for parts of the year in response to larger cyclonic or rainfall events. Water erosion may occur as sheet flow in broad inter-drainage areas on alluvial plains, near the baselines of hills and ridges with the risk of soil erosion during rainfall events (Department of Primary Industries and Regional Development (DPIRD), 2019).

Advice from the Office of the Commissioner of Soil and Land Conservation (CSLC) with regard to the granted adjacent Clearing Permit CPS 8414/1 indicated that subject to the applicant restricting clearing to a minimum in areas with little native vegetation, any soil and land degradation impacts are not likely to be significant. The period between clearing and development should be kept to a minimum in order to avoid any soil and land degradation impacts.

**Conclusion:**

Taking into consideration the degraded condition and limited amount of native vegetation cover of the majority of the application area as well as the activities associated with the clearing purpose, the proposed clearing may pose a small risk of appreciable land degradation in the form of water and wind erosion. To ensure land degradation impacts do not result from the proposed clearing activities, the construction of the algae farm infrastructure should commence shortly after the completion of the clearing to minimise potential erosion and sedimentation of surface water impacts.

**Conditions:**

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- the permit holder must commence construction activities no later than three (3) months after undertaking the authorised clearing activities to reduce the potential for water and wind erosion.

## 3.3. Relevant planning instruments and other matters

The applicant is in the process of developing a commercial scale algae farm along with associated processing facilities. The project involves cultivation of unicellular green microalgae in open ponds filled with hypersaline water sunlight, nutrients and trace elements. The pond water is pumped to the harvesting facility where algae is separated and harvested. The algal concentrate is then sent to offsite processing facilities where it will be formulated into products including food colourant or protein rich biomass suitable for animal and fish feed.

Development Approval (DA) under the *Planning and Development Act 2005* (issued by the City of Karratha) is a relevant authorisations required for the proposed clearing. WRS Bioproducts Ltd was issued with the DA on the 28 November 2023 for an Algae farm, subject to number of conditions. The conditions of the DA requires that the WRS Bioproducts provide the following management plans to City of Karratha prior to the commencement of works.

- Stormwater management plan
- Construction environmental management plan
- Operational environmental management plan

**Contaminated sites**

The application area intersects a contaminated site, and therefore was reported as *a possible contaminated site – investigation required under the CS Act* on the 16 January 2023. Advice was sought from DWER's Contaminated Sites Branch (CSB) who advised that the land had been used as a purpose-built evaporation facility for solar salt manufacturing, for approximately 53 years since 1968. The quality of soil, groundwater, surface water and sediment in the ponds and channels used for solar salt manufacturing is unknown. Additionally, a disposal channel for bitterns is present on Lot 267, discharging into Nickol Creek. Surface water investigations carried out in 2010 found that metal (lead) was present at concentrations exceeding assessment levels for fresh water and marine water ecosystems relevant at that time. However, quality assurance and quality control sampling indicated that the result may have been due to sampling equipment contamination. No further surface water sampling and sediment quality sampling has been carried out in the area. CSB advised that, with regard to the above, this information should not have any implications for clearing native vegetation within the application area.

**Groundwater and Surface water Area**

The application area is located within the Pilbara Groundwater Area and the Pilbara Surface Water Area proclaimed under the RIWI Act. Advice received from the DWER's North-West Water licensing team advised that abstraction of groundwater or surface water will not be undertaken and no additional permitting by the department under the RIWI Act required (DWER, 2023). A bed and banks permit is also not required under the RiWI Act as the proposed work is within a tidal zone and the creek identified within the application area is a tidal watercourse (DWER, 2023).

**Acid Sulphate Soils**

With regard to the high-moderate risk of ASS occurring within three metres of the surface, the nature of the clearing as well as the construction activities, including the establishment of bunds surrounding the algae ponds, it is not considered likely for the proposed clearing to disturb the soil depth where the acid sulphate soils are deposited.

**Aboriginal sites**

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Details of public submissions

| Summary of comments | Consideration of comment |
|---|---|
| An objection to the clearing permit was received. A submission was received by a stakeholder stating that they were not consulted by WRS Bioproducts Pty Ltd for the use of their drainage bitterns and therefore, have not had the opportunity to assess how the proposed infrastructure may change drainage characteristics, and impact conditions of the bitterns channel (Submission, 2023). | The clearing provisions contained in part V, Division 2 of the EP Act are considered to the extent that they relate to the impact of clearing native vegetation. The department considered that this matter raised through the submission is outside of the scope of the clearing assessment. It is the responsibility of WRS Biproducts Pty Ltd to ensure that stakeholders are consulted for matters regarding the end land use of the proposal.<br><br>The department has communicated this matter to WRS Biproducts to ensure WRS Biproducts are aware of this concern. |

## Appendix B. Site characteristics

### B.1. Site characteristics

The information provided below describes the key characterises of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix C.

| Characteristic | Details |
|---|---|
| Local context | The area proposed to be cleared is part of a 60.87-hectare expansive track of native vegetation within a tidal mudflat, located in the extensive land use zone of WA. The application area is situated to the immediate west of Nickol Bay, in the Pilbara region of WA.<br><br>Spatial data indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared, excluding areas intercepting the ocean) retains approximately 96 per cent of the original native vegetation cover. |
| Ecological linkage | No formal ecological linkages are mapped within the local area or the application area. |
| Conservation areas | Murujuga National Park can be found 3.8 kilometres north of the application area. An Unallocated Crown Land can be found 26 kilometres from the application area. No other conservation areas are mapped within the local area. |
| Vegetation description | Abydos plain – Roebourne vegetation association (tidal mud flats) comprises the location of the proposed clearing. The site is dominated by Chenopod shrublands, blue-green algae mats, and tidal samphire communities. Site surveys provided by MBS Environmental on behalf of the applicant, indicate the area is characterised by tidal mudflats; with samphire, hemed asp and mangroves present on the alluvial flats and the river deltas. Mangroves are present adjacent to the proposed clearing site. Full survey descriptions and maps are available in Appendix E.<br><br>This is consistent with the mapped vegetation type:<br>• Beard Vegetation Association 127, which is described as a Tidal Mud Flat (Shepherd et al, 2001)<br><br>The mapped vegetation type retains approximately 90 per cent of the original extent (Government of WA, 2019). |
| Vegetation condition | Site consultation provided by MBS Environmental on behalf of the applicant, suggest that the vegetation condition ranges from Excellent (Trudgen, 1991) to Completely degraded (Trudgen, 1991) in the surrounding area. |

| Characteristic | Details |
|---|---|
| | The full Trudgen (1991) condition rating scale is provided in Appendix D. The full survey descriptions are available in Appendix E. |
| Climate and landform | An arid, semi-desert climate characterises Karratha with distinct wet- and dry seasons on an annual cycle. The proposed clearing area experiences average maximum temperatures ranging from 26.5°C to 36.2°C, while average minimum temperatures range between 13.9°C to 26.9°C. The area experiences an annual average rainfall of 297.5 mm, most of which occurs during the wet season between December and March. Cyclones occur in the area between November and April. The dominant winds are typically easterlies or westerlies.<br>The proposed clearing area is characterised by quaternary alluvial as well as older colluvial coastal and subcoastal planes. |
| Soil description | The soil is mapped as 286Li. The application areas are located within the Littoral System, characterised by bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests. |
| Land degradation risk | The application area is highly susceptible to phosphorus export risks, risk of flooding and waterlogging, as well as wind and water erosion hazards. None of the application area is mapped to be susceptible to subsurface acidification. |
| Waterbodies | The proposed clearing area is mapped within the Port Hedland Coast hydrographic catchment area. The desktop assessment and aerial imagery indicated that the application is mapped within a Saline Coastal Flat, however no watercourses or waterbodies transect the area proposed for clearing. |
| Hydrogeography | The application area is mapped within the Pilbara surface water area and ground water area, proclaimed under the RIWI Act. Groundwater salinity level (Total Dissolved Solids) is mapped as 1,000-3,000 milligrams per litre (fresh to brackish) (DWER-026). |
| Flora | According to the desktop assessment, 20 priority flora species were identified within the local area with the most abundant being *Terminalia supranitifolia* (41 recordings in the local area). The closest recorded species from the proposed clearing area is *hemed asp. Hamersley Station* (M.E. Trudgen 11431). |
| Ecological communities | Priority Ecological Communities (PECs) – Horseflat Land System, and Roebourne Plains gilgai grasslands are mapped within the local area. Neither of these PECs are mapped within the application area. The Roebourne Plains gilgai grasslands is the closest PEC mapped from the application area, approximately 1.2 km away. |
| Fauna | Primary fauna habitats in proximity to the proposed clearing area consist of mangroves, intertidal areas and mudflats. According to the desktop assessment, 56 conservation significant fauna species were recorded within the local area, which comprise of 44 bird species, 7 mammal species and 5 reptiles. The Northern quoll (*Dasyurus hallucatus*) has the highest number of fauna records within the local area. |

## B.2. Vegetation extent

| | Pre-European extent (ha) | Current extent (ha) | Extent remaining (%) | Current extent in all DBCA managed land (ha) | Current proportion (%) of pre-European extent in all DBCA managed land |
|---|---|---|---|---|---|
| IBRA bioregion* | | | | | |
| Pilbara | 17,808,657.04 | 17,731,764.88 | 99.57 | 1,801,714.98 | 10.16 |
| Vegetation association | | | | | |
| Abydos Plain – Roebourne 127 * | 177,749.75 | 159,595.04 | 89.79 | 3,703.79 | 2.32 |

| | Pre-European extent (ha) | Current extent (ha) | Extent remaining (%) | Current extent in all DBCA managed land (ha) | Current proportion (%) of pre-European extent in all DBCA managed land |
|---|---|---|---|---|---|
| Local area | | | | | |
| 50km radius | 425026.15 | 411,373.78 | 96.8 | - | - |

*Government of WA (2019a)

## B.3. Flora analysis table

With consideration to the site characteristics set out above and relevant datasets (see Appendix FF.1), impacts to the following conservation significant flora required further consideration.

| Species name | Conservation status | Suitable habitat features ? [Y/N] | Suitable vegetation type? [Y/N] | Suitable soil type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|---|
| *Eragrostis lanicaulis* | 3 | N | N | Y | 40.33 | 2 | N/A |
| *Stackhousia clementii* | 3 | N | N | Y | 3.64 | 4 | N/A |
| *Tephrosia rosea var. Port Hedland (A.S. George 1114)* | 1 | N | N | Y | 30.30 | 10 | N/A |
| *Terminalia supranitifolia* | 3 | N | N | Y | 4.17 | 41 | N/A |

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

## B.4. Fauna analysis table

| Species name | Conservation status | Suitable habitat features? [Y/N] | Suitable vegetation type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|
| *Ctenotus angusticeps* | P3 | Y | Y | 10.93 | 6 | N/A |
| *Lerista nevinae* | EN | Y | Y | 24.37 | 90 | N/A |
| *Calidris ferruginea* | CR | Y | Y | 0.57 | 23 | N/A |
| *Limosa lapponica* | VU | Y | Y | 1.76 | 48 | N/A |
| *Numenius madagascariensis* | CR | Y | Y | 1.76 | 39 | N/A |
| *Calidris canutus* | EN | Y | Y | 4.29 | 10 | N/A |

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

## Appendix C. Assessment against the clearing principles

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| **Environmental value: biological values** | | |
| Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."*<br><br>Assessment: The areas proposed to be cleared is unlikely to contain regionally significant flora, fauna, habitats, assemblages of plants. The application area does not comprise suitable habitat for the flora species of conservation significance or priority or threatened ecological communities. | Not likely to be at variance | No |
| 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."*<br><br>Assessment: The areas proposed to be cleared contain suitable foraging habitat for conservation significant fauna, however, the habitat is not considered significant given the abundance of suitable habitat outside the application area. | Not likely to be at variance | Yes<br><br>*Refer to Section 3.2.1 above.* |
| Principle I: *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."*<br><br>Assessment: The area proposed to be cleared is unlikely to contain threatened flora species listed under the BC Act due to the lack of preferred suitable habitat within he application area. | Not likely to be at variance | No |
| Principle (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."*<br><br>Assessment: The areas proposed to be cleared does not contain species that can indicate a threatened ecological community (TEC) and does not contain suitable habitat for TECs that have been mapped within the local area. | Not likely to be at variance | No |
| **Environmental value: significant remnant vegetation and conservation areas** | | |
| Principl(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."*<br><br>Assessment: The extent of the mapped vegetation type is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. | Not likely to be at variance | No |
| 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."*<br><br>Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas. | Not likely to be at variance | No |
| **Environmental value: land and water resources** | | |
| 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."*<br><br>Assessment: The application area occurs within a tidal mudflat which is considered a wetland as defined under Schedule 5 of the EP Act. The | At variance | No |

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| proposed clearing will be impacted limited native vegetation growing within this mudflat area. | | |
| Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."*<br>Assessment: The mapped and surveyed soils are highly susceptible to wind and water erosion. Given the location of the application area and amount of clearing proposed, there is potential for appreciable land degradation. These impacts can be mitigated through management conditions imposed on the permit. | May be at variance | Yes<br>*Refer to Section 3.2.2, above.* |
| 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."*<br>Assessment: Given that the proposed clearing and construction activities are unlikely to intercept groundwater, as well as the implementation of mitigation measures with regard to land degradation, the proposed clearing is unlikely to significantly impact surface or ground water quality. However, there may be a minor short-term impact to surface water quality through sedimentation during clearing. These impacts can be mitigated through management conditions imposed on the permit. | May be at variance | Yes<br>Refer to Section 3.2.2, above. |
| 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."*<br>Assessment: The application area occurs within a tidal mudflat and therefore is susceptible to natural intermittent inundation. The proposed clearing is not considered to exacerbate the existing potential for flooding or water logging given the limited amount of native vegetation occurring within the application area. | Not likely to be at variance | No |

## Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

**Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)**

| Condition | Description |
|---|---|
| Excellent | Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement. |
| Very good | Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks. |
| Good | More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds. |

| Condition | Description |
|---|---|
| Poor | Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds. |
| Very poor | Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species. |
| Completely degraded | Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs. |

# 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. Four vegetated areas with an indicative area of 54.62 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 as it relates to the changed project design, namely:

- 17.35 ha of vegetation association 127 within Areas 1, 2 and 3 (Lot 267).
- 37.27 ha of vegetation association 127 within Area 4 (Lot 300)

Overall, the maximum clearing area is expected to be 54.62 ha within a broader purpose permit area of 65.47 ha (Table 3, Figure 6). Note that information relating to Lot 127 and Lot 300 has been confined to those portions of each Lot that relate to the WRS Bioproducts lease holding that are the subject of this clearing permit application only.

**Table 3: Clearing Areas**

| Area | Vegetation Type | Vegetation Association | Location | Indicative Clearing Area (ha) | Purpose Clearing Permit Footprint | Lot Area (ha) | Clearing Footprint as a (%) of Lot Area |
|---|---|---|---|---|---|---|---|
| 1 | Tidal mud flat | 127 | Lot 267 | 3.95 | 3.95 | 24.37 | 16.21 |
| 2 | Tidal mud flat | 127 | Lot 267 | 11.70 | 11.70 | | 48.00 |
| 3 | Tidal mud flat | 127 | Lot 267 | 2.00 | 2.00 | | 8.21 |
| 4 | Tidal mud flat | 127 | Lot 300* | 37.27 | 37.27 | 37.27 | 100 |
| | | | **Total** | **54.92** | **54.92** | **65.47** | |

** Note: Planned addition to Lot 300 only*

### 5.1.2 Potential Impacts and their Significance

The Project will result in the clearing of up to 54.62 ha of native vegetation in an overall Purpose Permit Area of 65.47 ha, with all that area located in tidal mud flat vegetation (Vegetation Association 127). This is unlikely to be significant as the Pilbara IBRA region retains more than 90% of its pre-European clearing extent of this Vegetation Association (Government of Western Australia, 2019). On that basis, the proposed clearing is unlikely to adversely impact on 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 type, there are no known conservation significant flora species present within the proposed clearing area. Database searches carried out by GHD indicate that those known are located in locations with habitat requirements different to those associated with tidal mudflat 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 Weed Control 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 all mangrove populations.

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

## 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 54.62 ha of native vegetation. Impacts are not expected to be significant as Vegetation Association 127 retains more than 90% of its 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 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 documented on 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 sulphate soils that could result in contamination if disturbed and exposed to the atmosphere. The nature of the Project and its associated construction meant that there was unlikely to be any significant increase in the risk of contamination and impacts associated with the Project, and this is likely to remain the case with the implementation of an increased clearing and operational area.

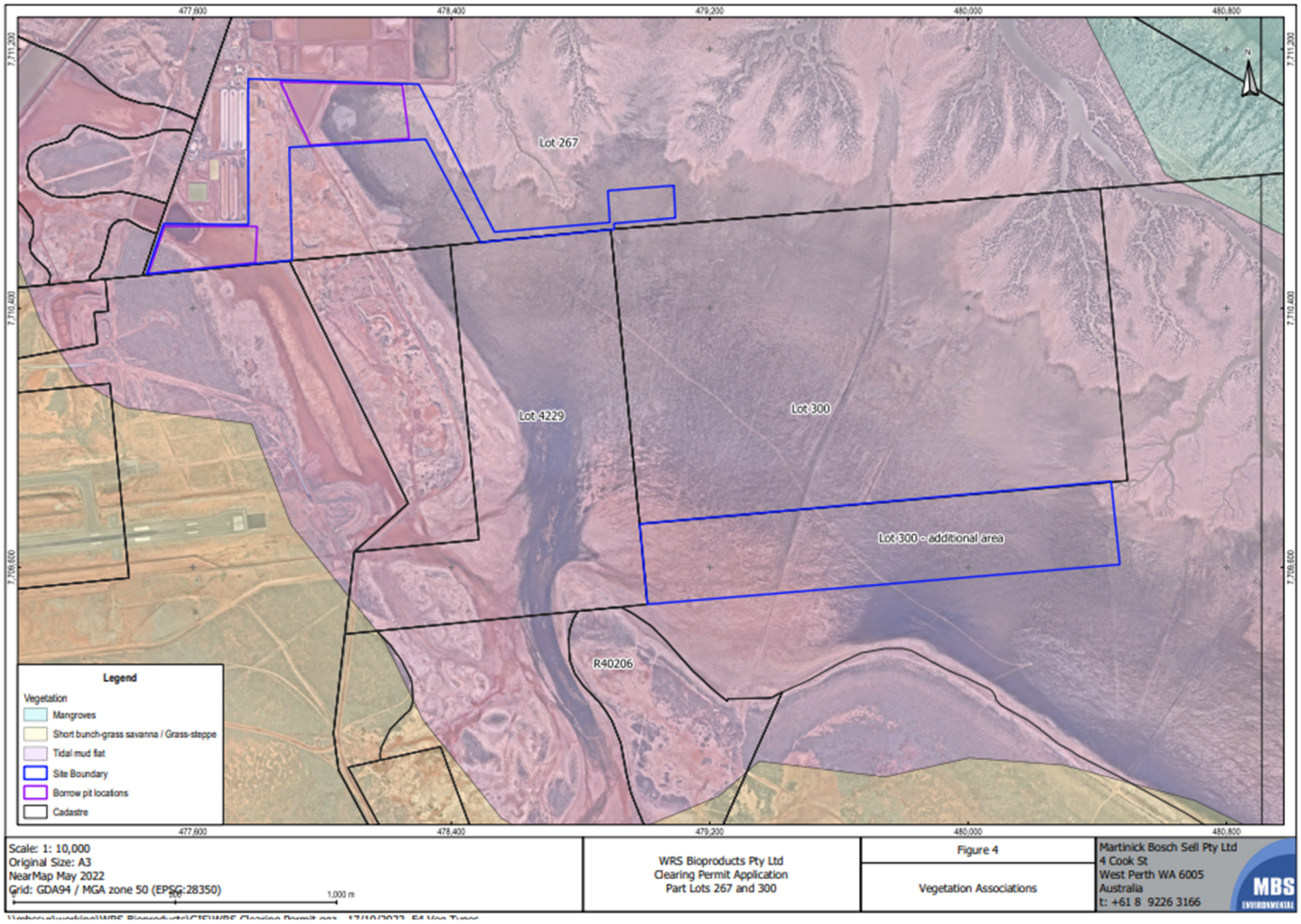



**Figure 2.** Vegetation Types surrounding the application area (MBS Environmental, 2023).

A full copy of the above report is available at this link:

# Appendix F. Sources of information

## F.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

## F.2. References

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