GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8909/1
Permit Holder:	Department of Transport
Duration of Permit:	2 November 2020 to 2 November 2025

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. **Purpose for which clearing may be done**
   Clearing for the purpose of construction of a Spoilbank Marina facility, including marina basin, breakwaters, revetment walls, public open space, carpark and access roads.

2. **Land on which clearing is to be done**
   Lot 5751 on Deposited Plan 91579, Port Hedland
   Lot 5550 on Deposited Plan 240246, Port Hedland
   Lot 5178 on deposited Plan 214191, Port Hedland
   Lot 370 on Deposited Plan 35619 , Port Hedland
   Lot 372 on Deposited Plan 35620, Port Hedland
   Sutherland Street Road reserve (PIN 11426108), Port Hedland

3. **Area of Clearing**
   The Permit Holder shall not clear more than 25 hectares of native vegetation within the area cross-hatched yellow on attached Plan 8909/1.

4. **Application**
   This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

5. **Type of clearing authorised**
   This Permit authorises the Permit Holder to clear native vegetation for the activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out work involving clearing for those activities under any relevant Act or any other written law.

PART II – MANAGEMENT CONDITIONS

6. **Avoid, minimise and reduce the impacts and extent of clearing**
   In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in 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.

7. Weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the 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.

PART III – RECORD KEEPING AND REPORTING

8. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit, in relation to the clearing of native vegetation authorised under this Permit:

(a) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
(b) the date that the area was cleared;
(c) the size of the area cleared (in hectares);
(d) actions taken in accordance with Condition 1;
(e) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 6 of this Permit; and
(f) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 7 of this Permit.

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

The following meanings are given to terms used in this Permit:

CEO: means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*;

fill means material used to increase the ground level, or fill a hollow;

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;

weed/s means any plant -

(a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
(b) published in a Department of Biodiversity, Conservation and Attractions Regional Weed Rankings Summary, regardless of ranking; or
(c) not indigenous to the area concerned.

Meenu Vitarana
A/MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

7 October 2020

Plan 8909/1

Map Layers

- CPS areas approved to clear
- Land TenureLGATE - 226
- Local Government Authorities

N

0 100 200 300 400 m

1:8912

MGA Zone 50
Geocentric Datum of Australia 1994

Officer delegated under section 20 of the Environmental Protection Act 1986

GOVERNMENT OF WESTERN AUSTRALIA

Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 8909/1
Permit type:	Purpose permit
Applicant name:	Department of Transport
Application received:	19 May 2020
Application area:	25 hectares of native vegetation
Purpose of clearing:	Marina construction
Method of clearing:	Mechanical, dredging
Property:	Lot 5751 on Deposited Plan 91579 Lot 5550 on Deposited Plan 240246 Lot 5178 on deposited Plan 214191 Lot 370 on Deposited Plan 35619 Lot 372 on Deposited Plan 35620 Sutherland Street Road reserve (PIN 11426108)
Location (LGA area/s):	Town of Port Hedland
Localities (suburb/s):	Port Hedland

1.2. Description of clearing activities

The applicant proposed to clear up to 25 hectares of native vegetation within a larger footprint contained within a single contiguous area, comprising approximately 37.7 hectares within an area known as the “spoil bank”, a land mass composed of dredged sand from the harbour channel, and 60.1 hectares of the adjacent marine area (see Figure 1, Section 1.5), for the purpose of facilitating the construction of a Spoilbank Marina facility, including marina basin, breakwaters and revetment walls, public open space, carpark and access roads.

Mechanical methods of clearing will be employed within the terrestrial area portion of the application area, and dredging will occur to facilitate the construction of the marina entrance channel within approximately 7.3 hectares of the marine portion of the application area (refer to map in Figure E-6, Appendix E) which will be expected to result in direct removal of marine vegetation (seagrass and macroalgae). An additional 58.8 hectare area outside of the dredging area has also been included within the marine portion of the application area, which reflects an area of “irreversible habitat loss” in which indirect impacts of the dredging (e.g. turbidity) may result in loss of seagrass vegetation (O2 Marine, 2019b).

The initial application area footprint only encompassed the terrestrial portion of the application area (Department of , Transport, 2020a) however the application area footprint was revised twice during the assessment process to add the dredging area and area of irreversible benthic habitat loss (see Appendix A for further details).

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	7 October 2020
Decision area:	25 hectares (ha) of native vegetation as depicted in Section 1.5 below.

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Water and Environmental Regulation (DWER) on 19 May 2020. DWER advertised the application for public comment on 19 June 2020 for a 21 day submission period and revised areas were re-advertised on 17 July 2020 and 4 September 2020 for a seven day submission period each. No public submissions were received.

In undertaking their assessment, and in accordance with section 51O of the EP Act, the Delegated Officer has given consideration to the Clearing Principles in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, and any other pertinent matters they deemed relevant to the assessment (see Sections 3 and 4).

In particular, the Delegated Officer has determined that:

- the clearing is not likely to have a significant impact on conservation significant terrestrial and marine fauna that may utilise vegetation within the application area as habitat; and
- the applicant has suitably demonstrated avoidance and minimisation measures (see Section 3.1).

In determining to grant a clearing permit subject to conditions, the Delegated Officer found that the proposed clearing is not likely to lead to an unacceptable risk to the environment.

1.5. Site map

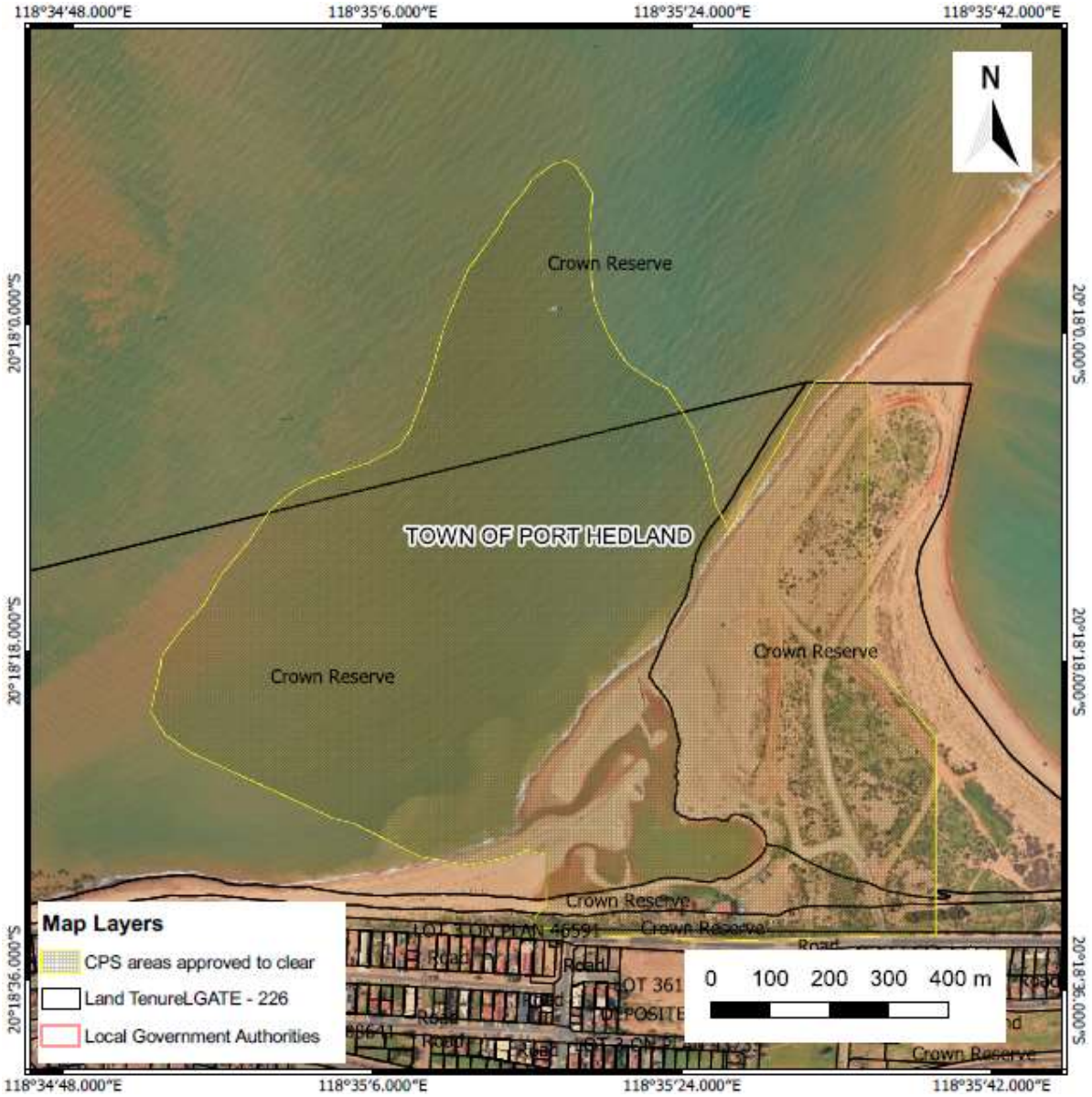

Figure 1. Map of the application area. The area cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2. Legislative context

The clearing of native vegetation in Western Australia is 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 1.3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

1. the precautionary principle;
2. the principle of intergenerational equity; and
3. the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant provided the following evidence that avoidance and mitigation measures had been considered:

- Several alternative locations for the marina were considered, including Cooke Point, Six Mile Creek and another unnamed creek, and the currently proposed site was selected as it resulted in the least environmental impacts, noting its sparse, degraded vegetation;
- A Dredging Environmental Management Plan (O2 Marine, 2020a) has been prepared to mitigate the impacts of the proposed dredging activities on benthic communities, describing the following avoidance and mitigation measures:
    - A cutter suction dredge with appropriate dredge control software will be utilised to ensure close control of the dredging operations;
    - Dredge material will be disposed onshore within the clearing permit footprint area (i.e. not on top of other benthic habitat);
    - Management of dredging operations will occur such that there is no irreversible loss of benthic community habitats outside of a designated best case zone of high impact;
    - Pre-and post-dredging benthic community surveys will be undertaken within a designated zone of moderate impact to confirm presence/absence of benthic habitat;
- A Dust Management Plan (Strategen JSB&G (Strategen), 2020a) prepared for the project states that cleared areas will be stabilised as required using a dust suppression crusting agent or other similar material.

3.2. Assessment of environmental impacts

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix B) and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix C.

This assessment identified that the clearing may pose a risk to biological values, land and water resources, and that this required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

3.2.1. Environmental value: biological values (flora) – Clearing Principles (a) and (c)

Assessment: Three priority flora species present within the local area are associated with similar soil and vegetation types as those which occur within the application area. However, noting that a large proportion of soils within the terrestrial portion of the application area are comprised of dredge spoil and the vegetation associated with natural soils were in Degraded condition, and that no priority flora species were found by Strategen (2020b), it is considered unlikely that any priority species are present within the application area. No threatened flora species are recorded within the local area.

Benthic community habitat types within the application area are not considered to be of local or regional significance within the Port Hedland area, and are well represented within the Port Hedland area (O2 Marine, 2019b).

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered **acceptable** in relation to this environmental value.

Conditions: No flora management conditions required.

3.2.2. Environmental value: biological values (fauna) – Clearing Principle (b)

Assessment: Nine threatened fauna species and one other specially protected fauna species may utilise the terrestrial portion of the application area for habitat:

- Shore birds:
    - *Calidris canutus* (red knot) (T)
    - *Calidris ferruginea* (curlew sandpiper) (T)
    - *Calidris tenuirostris* (great knot) (T)
    - *Charadrius leschenaultia* (greater sand plover, large sand plover) (T)
    - *Limosa lapponica menzbieri* (bar-tailed godwit (northern Siberian)) (T)
    - *Numenius madagascariensis* (eastern curlew) (T)
    - *Sternula nereis nereis* (fairy tern) (T)
- Other
    - *Falco hypoleucos* (grey falcon) (T)
    - *Falco peregrinus* (peregrine falcon) (OS)

The seven shorebirds listed above have previously been recorded either within the Port Hedland area and/or within or close to the application area (i.e. at Spoilbank or nearby Cemetery Beach) (Bamford and Bamford, 2019). In Australia, the primary habitats for these shorebirds are mudflats and/or sandflats of beaches, estuaries and sometimes wetlands (Threatened Species Scientific Committee (TSSC), 2015a, 2015b, 2016a, 2016b, 2016c, 2016d and Department of Environment (DoE), 2011) and as such the shoreline and inland lagoon area within the application area may provide habitat for these species, however given that these areas of the application area are unvegetated (Strategen, 2020b) the proposed clearing is unlikely to impact upon this habitat type. These species do not generally use the vegetation types mapped by Strategen (2020b) for foraging or roosting, although the great knot and curlew sandpiper may occasionally nest in dune vegetation (Higgins and Davies, 1996 and TSSC, 2015a). The only one of these species to breed in Australia, the fairy tern, generally prefers nest sites clear of vegetation (Jenniges and Plettner, 2008 and Barre et al., 2012), although may line nests with vegetation (DoE, 2011). Overall, the proposed clearing of vegetation within the application area is considered unlikely to have a significant impact on these migratory species.

Although vegetation within the application area may be utilised by the grey falcon and peregrine falcon, given the large ranges and varied habitats utilised by these species (BirdLife International, 2020), the proposed clearing is unlikely to have a significant impact upon these species.

Vegetation mapped within the marine portion of the application area may provide foraging habitat for following threatened, priority and other specially protected marine fauna species:

- *Chelonia mydas* (green turtle) (T)
- *Eretmochelys imbricate* (hawksbill turtle) (T)
- *Natator depressus* (flatback turtle) (T)
- *Pristis zijsron* (green sawfish) (T)
- Australian humpback dolphin (*Sousa sahulensis*) (P4)
- *Dugong dugon* (dugong) (OS)

The three turtle species listed above may eat and/or forage within areas of seagrasses (Commonwealth of Australia, 2017). Although flatback turtles are considered likely to occur within both the marine portions of the application area, the Port Hedland flatback turtle population utilises foraging grounds known to be outside of the application area (Pendoley Environmental, 2019) and as such the proposed clearing of marine vegetation is considered unlikely to impact this species. A significant flatback turtle rookery is known to be present at Cemetery Beach, to the east of the Spoil Bank peninsula (Pendoley Environmental, 2019) and flatback turtle nesting may also occur within the terrestrial portion of the application area, however nests are generally placed within bare sand and as such the proposed clearing of native vegetation is unlikely to impact upon nesting. Hawksbill turtles are omnivorous but have a preference for sponge habitats (Pendoley Environmental, 2009) and as such, given the presence of significant other mixed assemblage benthic habitats in the local area that contain sponges, the proposed clearing of seagrasses and macroalgae is not expected to have a significant impact on foraging habitat for this species. Green turtles are largely herbivorous, preferring to eat seagrasses and algae (Pendoley Environmental, 2009). Given that the seagrasses and algae within the application area are sparse (O2 Marine, 2019b) it is considered unlikely that they represent significant foraging habitat for the green turtle.

Green sawfish may utilise seagrass beds as habitat (Jabado et. al., 2014) and have been recorded within the Port Hedland area (Teal Solutions and O2 Marine, 2020). However, it is noted that the seagrass containing benthic habitats within the application area do not comprise seagrass beds as they only contain very sparse seagrass, and these habitats also have a reef or rubble substrate (O2 Marine, 2019b) whereas the green sawfish tends to prefer a sandy substrate (Teal Solutions and O2 Marine, 2020). Loss of habitat resulting from direct and indirect effects of the proposed dredging operations has been assessed to be low due to relatively small extent of dredging (Teal Solutions

and O2 Marine, 2020). The proposed clearing is therefore considered unlikely to have a significant impact on the green sawfish.

Given the relatively small extent of this seagrass vegetation and the large ranges of the Australian humpback dolphin and dugong, the proposed clearing of seagrass is not likely to have a significant impact on these species.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

Conditions: No fauna management conditions required.

3.2.3. Environmental value: land and water degradation – Clearing Principles (f), (g) and (h)

Assessment: Given the sandy soils and exposed nature of the Spoilbank peninsula, and that the Spoilbank has been previously identified as a source of dust (Strategen, 2020a) it is considered likely that the proposed clearing may result in an increased risk of wind erosion. However, a Dust Management Plan has been prepared for the application area, which specifies that cleared areas will be stabilised as required using a dust suppression crusting agent or other similar material (Strategen, 2020a). As part of the proposed marina development, much of the cleared areas will be covered by hardstand or landscaping in the future, reducing the risk of future wind erosion. These measures are considered adequate to mitigate the effects of any land degradation. It is also noted that the Spoilbank peninsula is already an artificial environment consisting of dredge spoil.

Given the significant modifications required to facilitate the marina development proposed for the marine areas, shoreline and inland waterbody, including the proposed dredging, the ecological values of these waterbodies are likely to be significantly altered from their natural state such that any erosion or sedimentation resulting from the proposed clearing of terrestrial vegetation would not be likely to have significant impacts. Noting the relatively small extent of the seagrass vegetation in the application area in the context of the local area, the removal of the seagrass vegetation is considered unlikely to have impacts on water quality.

As noted in Section 3.3 below, while dredging is likely to have impacts on water quality, however the dredging is not specifically being undertaken to clear seagrasses, which only cover a small portion of the area to be dredged.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

Conditions: No management conditions required.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the Regional Joint Development Assessment Panel (JDAP) rather than the Town of Port Hedland due to the cost of the development);
- Approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Town of Port Hedland advised DWER that a development application approval by the Regional JDAP is required for the proposed marina development and that the clearing is consistent with the Town Local Planning Scheme 5 (LPS 5). The terrestrial component of the application area is reserved 'Parks and Recreation' under LPS 5, and the marine component is predominately located within Other Categories:Waterbodies, is neither zoned nor reserved land, and located outside of the Scheme Area. The Town did not have any objections to the proposed clearing.

A determination was made on 21 September 2020 to approve the JDAP application for the Spoil Bank Marina, subject to conditions (Department of Transport, 2020e).

The application area is on reclaimed land within tidal extent and is therefore outside what is considered the proclaimed Pilbara Surface Water Area, and accordingly a permit to disturb bed and banks is not required (DWER, 2020a).

The Spoilbank Marina proposal was referred to the Environmental Protection Authority (EPA) under Part IV of the EP Act on 5 March 2020. On 14 April 2020 the EPA considered that the proposal is unlikely to have a significant impact on the environment and did not warrant formal assessment, although noted that the proposal raises a number

of environmental issues pertaining to marine fauna, marine environmental quality and benthic communities and habitats and air quality (EPA, 2020).

The Spoilbank Marina proposal was referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the EPBC Act. On 11 June 2020 DAWE decided that the proposal would be assessed by preliminary documentation (DAWE, 2020). The proposal is currently undergoing assessment at the time of granting this permit.

It is noted that dredging works associated with the proposed marina development may have impacts on water quality, soil quality (from disposal of dredged spoil) and aquatic fauna (e.g. the flatback turtle (Pendoley Environmental, 2019)), however it is considered that these impacts are primarily related to the dredging process itself and not specifically due to the removal of the relatively small extents of vegetation. It is noted that conditions have been required on the approval issued by the Regional JDAP based on relevant agency submissions (including from DWER) to conduct the works in accordance with a Construction Environmental Management Plan (CEMP), Dredge Environmental Management Plan and Dust Management Plan and to prepare and implement a Marine Fauna Monitoring Program.

A portion of the application area, located within a portion of Lot 370 on Deposited Plan 35619, falls within a site awaiting classification under the *Contaminated Sites Act 2003* due to potential contamination issues including a diesel spill, raw sewage spill and disposal of dredging sediments (DWER, 2020b). Limited information is available regarding the nature and extent of contamination, however investigations undertaken within the site to date have not identified the presence of contaminants above guideline values in the investigation area. As such, there are no known implications from contamination to the proposed clearing, however DWER has noted that development works will be undertaken in accordance with a CEMP.

The application area falls within a site registered under the *Aboriginal Heritage Act 1972* (WA) (Place ID 11943). 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.

The application area falls within an Environmentally Sensitive Area associated with an area included on the Register of the National Estate relating to coastal islands in the Port Hedland area. This Register was closed in 2007 and is no longer a statutory list. No state or federal currently listed heritage areas fall within the application area. It is noted that Spoil Bank peninsula is an artificial peninsula created from dredge spoil and is not an island.

Appendix A – Additional information provided by applicant

Summary of comments	Consideration of comment
The applicant advised that vegetation was unlikely to be present within the waterbody located within the terrestrial zone of the project (Department of Transport, 2020b), providing a copy of the Port Hedland Spoilbank Marina Sediment Sampling and Analysis Plan Implementation Report (O2 Marine 2020a) which stated that sediment samples collected from the waterbody showed that no biota were present.	Clearing/dredging activities in this waterbody are unlikely to impact upon native vegetation.
Applicant increased the application area to add the marine area, as dredging is proposed to be conducted within this area which may disturb seagrass and macroalgae vegetation (Department of Transport, 2020c). The changes included: • Increase of application area footprint from 36.76 hectares to 45.08 ha to include marine area; and • Increase of proposed clearing area from 20 to 25 ha.	The application area and application area footprint were amended and the application re-advertised for 7 days.
Applicant increased the application footprint from 45.08 hectares to 97.82 hectares to include the entirety of the areas mapped as irreversible areas of habitat loss by O2 Marine (2019b) to ensure that both areas of direct and indirect seagrass loss were included within the application area (Department of Transport, 2020d).	The application area footprint was amended and the application re-advertised for 7 days.

Appendix B – Characteristics of site and surrounding area

The information provided below describes the key characteristics 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.

1. Site characteristics

Site characteristic	Details
Local context	The terrestrial portion of the application area contains part of an approximately 35 hectares patch of terrestrial vegetation within the Spoil Bank peninsula and fringing the surrounding coastline. This patch of vegetation is relatively sparse and highly fragmented by multiple roads and paths. This portion of the application area comprises a large portion of the Spoil Bank peninsula, which is surrounded by ocean to the west, north and east, and residential properties to the south. Spatial data indicates terrestrial portions of the local area (50 kilometres radius of the proposed clearing area) retain approximately 95% of the original native vegetation cover. The marine portion of the application area lies within the Timor Sea near Port Hedland harbour. The benthos of the Port Hedland marine environment largely consists of bare ground, with isolated patches of mixed assemblage communities of coral and macroalgae (O2 Marine, 2020b). Seagrasses have also been mapped within a small proportion of these mixed assemblage benthic communities, however it should also be noted that seagrasses within the Port Hedland region has been described as ephemeral in nature, having high temporal variability (O2 Marine, 2020b).

Site characteristic	Details
Vegetation description	A flora and vegetation reconnaissance survey conducted of the terrestrial portion of the application area in February 2020 (Strategen, 2020b) found that vegetation within the application area consisted of: • Acacia shrubland: Open shrubland, primarily of Acacia species, over grasses and Fabaceae species, which gradually decreased in species richness closer to the western coast of the application area; • Foredune: Areas of *Spinifex longifolium* and *Ipomoea pes-caprae* closest to the western coast. Aerial photography at different scales demonstrates that dune and coastline locations of the Spoilbank peninsula fluctuate over time due to tidal levels coastal erosion, and as such the position of foredune vegetation is likely to fluctuate accordingly; • Athel Pine: A small area of athel pine (*Tamarix aphylla*, a declared pest) was present in the south-east of the application area near Sutherland Street; • Unvegetated: A large portion of the south-west application area consisted of unvegetated bare ground; and • Cleared: Areas of roads and buildings cleared of vegetation (refer to Figure E-1, Appendix E). 39 flora species were identified within the terrestrial portion of the application area, of which 11 were introduced and five were pending identification confirmation (refer to Figure E-2, Appendix E). No threatened or priority flora were identified, and the five unidentified species were not considered to be of conservation significance based on their attributes. Vegetation present in the application area did not meet criteria for any threatened or priority ecological community listed as occurring in the Pilbara. Vegetation in the waterbody within the terrestrial portion of the application area has not been surveyed (Strategen, 2020b and O2 Marine, 2020b), however sediment samples collected within this waterbody did not contain any biota (O2 Marine, 2019a). Mapping of Pre-European vegetation (Shepherd et al, 2001) is only present for a small portion of the south-western application area, likely because the majority of the application area is an artificially created landform (see Soil description below for more details), and is mapped as Abydos Plain 117: Hummock grassland, *Triodia* spp. Both shrubland and foredune areas mapped by Strategen (2020b) are largely inconsistent with this vegetation mapping. When surveyed by O2 Marne (2019b), the marine portion of the application area contained 12.6 hectares of mixed assemblage (coral, macroalgae, sponges and hydrozoan) benthic communities without seagrass and 2.3 hectares of mixed assemblage communities with “very sparse” (typically <1% cover (O2 Marine, 2020b)) seagrass (*Halodule* species) (O2 Marine, 2019b) (refer to Figure E-6, Appendix E). The remainder of the marine portion of the application area is described as bare substrate, with no benthic community habitat or occasional isolated sparse macroalgae (O2 Marine, 2019b). Macroalgal species present within the application area were not specified by O2 Marine (2019b), except for *Halimeda* sp. noted to be present at one location. Of the areas of mapped benthic communities described above, approximately 3 hectares of mixed assemblage communities and 1.1 hectares of mixed assemblage communities with seagrasses are present within the dredging area, with the remainder of these areas within a zone of modelled “irreversible loss”. This area of “irreversible loss” was modelled upon predicted coral mortality sedimentation tolerance limits for corals in clear water (and are considered conservative for corals in naturally turbid areas and also for seagrasses) and a dredge plume impact assessment (O2 Marine 2019b).
Vegetation condition	Strategen (2020b) indicated that vegetation within the terrestrial portion of the application area was in (refer to Figure E-3, Appendix E): • Very Poor (Trudgen, 1991) (described by Strategen as Degraded) condition in the majority of the application area: ○ Vegetation was dominated by *Cenchrus ciliaris* (buffel grass, an aggressive weed widespread throughout the Pilbara region). The area

Site characteristic	Details
	was fragmented by many four-wheel-drive tracks and showed signs of extensive human use for dog walking and off-road and four-wheel motorbikes. Earthworks had been undertaken in many places throughout the application area, with earth pushed up into piles which contained rubble (Figure E-4, Appendix E). It was considered that site some portions of the site which had low species diversity may be subject to periodic storm surges (Strategen, 2020b). There was also a patch of vegetation in the south-east of the reserve which was dead, with no apparent cause, although speculated to be due to herbicide or a storm surge (Figure E-5, Appendix E). • Poor (Trudgen, 1991) (described by Strategen as Good) condition in areas of vegetation closest to the coast: ○ Although largely consisting of only two species, vegetation within these areas had a lack of weeds. • Completely Degraded (Trudgen, 1991) condition in area cleared for buildings and roads. The full Trudgen condition rating scale is provided in Appendix E, below.
Soil description	The Spoil Bank peninsula, and therefore the majority of the terrestrial portion of the application area, is an artificial landform created from the disposal of dredge material during capital dredging of the Port Hedland and the Goldsworthy shipping channel in the late-1960s and early 1970s (Department of Transport 2020a). Over the past 50 years, this artificially constructed area of land has migrated south and evolved from an offshore island to a shore-connected sandspit peninsula. Soil sampling conducted during acid sulphate soil and ground contamination investigations carried out in 2014 (RPS 2014b, RPS 2014c) within the terrestrial portion of the application area determined soil types within to be pale brown, off white sands of fine to coarse grain size with lenses of sandstone/limestone (pale brown, off white) and sandy clays (dark brown) encountered through the profile. The soil within the terrestrial portion of the application area is mapped as Littoral System (Mapping unit 286Li), described as bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests (DPIRD, 2017).
Land degradation risk	Land degradation risks for the mapped soil type within the terrestrial portion of the application area include: • Subsurface acidification - <3% of map unit has a high susceptibility • Salinity at surface - >70% of the map unit has a high susceptibility (Schoknecht et al., 2004). The Spoil Bank peninsula has been previously identified as a dust source due to wind erosion (Strategen, 2020a).
Waterbodies	The terrestrial portion of the application area includes a pond connecting to the ocean via a channel. No mapped waterbodies traverse the terrestrial portion of the application area. The Leslie (Port Hedland) Saltfields System, mapped in the Directory of Important Wetlands in Australia, is located approximately 13.7 kilometres east of the application area. The marine portion of the application area lies within the Indian Ocean.
Conservation areas	No conservation areas are located within the local area.
Climate and landform	**Rainfall:** 400 **Evapotranspiration:** 400

Site characteristic	Details
	Topography: Elevation in the southern portion of the application area is 10 metres AHD and likely to be variable, with some low lying areas, to the north of this. **Acid Sulfate Soil Risk: High to moderae risk (south western portion),** Moderate to low risk (southern portion, unmapped (northern and north-eastern portion). **Groundwater Salinity (Total Dissolved Soilds):** 1000-3000 mg/L **Hydrogeology:** Surficial Sediments - Shallow Aquifers - Surficial sediments lithology (southern portion), unmapped (northen portion)

2. Flora, fauna and ecosystem analysis

13 priority flora species, 19 threatened fauna species, six priority fauna species and two other specially listed fauna species are mapped within the local area (i.e. within a 50 kilometre radius of the clearing area). Of these species and communities, with consideration for the site characteristics set out above, relevant datasets (see Appendix F) and photos provided of the clearing areas, the following conservation significant flora and fauna species may be impacted by the clearing.

Flora Species	**Distance of closest record to application area (kilometres)**	**Suitable soil type?**	**Suitable vegetation type?**	**Are surveys adequate to identify? (Y, N, N/A)**
Gomphrena pusilla (P2)	1.0	Y	Y	Y
Gymnanthera cunninghamii (P3)	1.0	Y	Y	Y
Tephrosia rosea var. Port Hedland (A.S. George 1114) (P1)	3.2	Y	Y	Y
Fauna Species	**Distance of closest record to application area (kilometres)**	**Most recent record**	**Suitable habitat features**	**Are surveys adequate to identify? (Y, N, N/A)**
Calidris canutus (Red knot) (T)	0.8	2017	Y	Y
Calidris ferruginea (curlew sandpiper) (T)	0.8	2017	Y	Y
Calidris tenuirostris (Great knot) (T)	0.1	2017	Y	Y
Charadrius leschenaultia (Greater sand plover, large sand plover) (T)	0.6	2017	Y	Y
Chelonia mydas (Green turtle) (T)	0.8	1997	Y	N
Dugong dugon (Dugong) (OS)	0.8	2010	Y	N
Eretmochelys imbricate (Hawksbill turtle) (T)	0.8	unknown	Y	N
Falco hypoleucos (Grey falcon) (T)	13.1	2018	Y	N
Falco peregrinus (Peregrine falcon) (OS)	11.7	2012	Y	N
Limosa lapponica menzbieri (Bar-tailed godwit (northern Siberian)) *(T)*	7.7	2011	Y	Y
Natator depressus (Flatback turtle) (T)	0.2	2016	Y	Y

Numenius madagascariensis (Eastern curlew) (T)	0.8	2017	Y	Y
Pristis zijsron (Green sawfish) (T)	17.8	2002	Y	Y
Sousa sahulensis (Australian humpback dolphin) (P4)	0.8	unknown	Y	N
Sternula nereis nereis (Fairy tern) (T)	3.7	2008	Y	Y

3. Vegetation extent

Vegetation Unit	Pre-European extent (ha)	Current extent (ha)	% remaining	Current extent in all DBCA managed land (ha)	% current extent in all DBCA managed land (proportion of pre-European extent)
IBRA bioregion					
Pilbara	17,808,657.04	17,731,764.88	99.57	1,801,714.98	10.12
Vegetation complex					
Abydos Plain 117	82,705.78	78,096.64	94.43	17,600.29	21.28

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."* Assessment: Soil and vegetation types within the application area may support priority flora species, however none were found within the application area. Vegetation within the application area is otherwise of low floristic diversity, does not contain any locally or regionally significant ecological communities and is considered unlikely to harbour a biodiverse range of fauna species.	Not likely to be at variance	Yes: Refer to Section 3.2.1 above.
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."* Assessment: The proposed clearing area may contain habitat for conservation significant fauna, however given the small extent of marine vegetation, the nature of habitat utilised by terrestrial conservation significant fauna and the Poor to Very Poor condition of terrestrial vegetation, vegetation within the proposed clearing is unlikely to provide significant habitat for these species.	Not likely to be at variance	Yes: Refer to Section 3.2.2 above.
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The proposed clearing area is unlikely to contain habitat for flora species listed under the BC Act.	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."* Assessment: The proposed clearing area does not contain species indicative a threatened ecological community.	Not likely to be at variance	No
Environmental values: significant remnant vegetation and conservation areas		
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."* Assessment: The extent of native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. Vegetation in the proposed clearing area 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."* 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

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental values: 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."* Assessment: The application area encompasses an inland waterbody and ocean area. However, given the context of the proposed development, clearing of terrestrial areas and seagrass and macroalgae vegetation is considered unlikely to result in impacts to these waterbodies.	At variance	Yes: Refer to Section 3.2.3 above.
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: Clearing of vegetation within the application area may result in an increased risk of wind erosion of soils.	May be at variance	Yes: Refer to Section 3.2.3 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."* Assessment: Given the extent of the seagrass vegetation in the context of the marine environment, the removal of the seagrass vegetation is unlikely to have impacts on water quality. Given the context of the proposed development and mitigation measures proposed, clearing of terrestrial areas is considered unlikely to result in deterioration of water quality.	Not likely to be at variance	Yes: Refer to Section 3.2.3 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."* Assessment: The mapped and surveyed soils and topographic contours and in the surrounding area and the nature of the terrestrial vegetation to be removed does not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding or waterlogging.	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.

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
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.

Appendix E – Biological survey information excerpts / photographs of the vegetation

Figure E-1 – Vegetation mapping within the terrestrial portion of the application area (Strategen, 2020b)

The reconnaissance survey found 39 species of flora at the site, including eleven introduced taxa, several of which were likely planted:

1. *Abutilon lepidum*
2. *Acacia ampliceps*
3. *Acacia ancistrocarpa*
4. *Acacia bivenosa*
5. *Acacia colei* var. *colei*
6. *Acacia sphaerostachya*
7. *Acacia stellaticeps*
8. *Acacia tumida* var. *pilbarensis*
9. **Aerva javanica*
10. **Agave* sp.
11. *Arecaceae sp. 1
12. *Arecaceae sp. 2
13. *Aristida contorta*
14. **Calotropis procera*
15. *Canavalia rosea*
16. **Cenchrus ciliaris*
17. *Corchorus laniflorus*
18. *Crotalaria cunninghamii*
19. *Cucumis variabilis*
20. *Dactyloctenium radulans*
21. *Eucalyptus camaldulensis*
22. *Evolvulus alsinoides* var. *villosicalyx*
23. *Gomphrena canescens*
24. *Indigofera ?linnaei*
25. *Ipomoea pes-caprae*
26. **?Jatropha gossypiifolia*
27. *Pluchea tetranthera*
28. Poaceae sp.
29. *Rhynchosia minima*
30. *Salsola australis*
31. *Sesbania cannabina*
32. *Sesbania formosa*
33. **Spathodea campanulata*
34. *Spinifex longifolius*
35. **Stylosanthes hamata*
36. **Tamarix aphylla*
37. **Trianthema portulacastrum*
38. *Trianthema turgidifolia*
39. *Triodia epactia*

Figure E-2 – Flora species identified within the terrestrial portion of the application area (Strategen, 2020b)

Figure E-3 – Vegetation condition mapping within the terrestrial portion of the application area (Strategen, 2020b)

Figure E-4 – Photograph of soil disturbance from earthworks within the terrestrial portion of the application area (Strategen, 2020b)

Figure E-5 – Photograph of dead vegetation within the terrestrial portion of the application area (Strategen, 2020b)

Figure E-6 – Dredge impact modelling and benthic habitat mapping within the marine portion of the application area (O2 Marine, 2020b)

Appendix F – References and databases

1. GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- 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)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available
- Soil landscape land quality - Subsurface Acidification Risk (DPIRD-011)
- Soil landscape land quality - Surface Salinity (current) (DPIRD-039)

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)

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