



Application for Licence

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L9304/2021/1
Licence Holder	Shire of Ashburton
File Number	DER2021/000287
Premises	Pilbara Regional Waste Management Facility Lot 550 and Lot 551 on Plan 414367, being Reserve 53324 Onslow Road TALANDJI WA 6710 Certificate of Title: Volume LR3169, Folio 963
Date of Report	22 December 2021
Status of Report	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
AER	Annual Environment Report
AHD	Australian Height Datum
Applicant	Shire of Ashburton
asbestos	has the meaning defined in the <i>Guidelines for Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia</i> (DOH, 2009)
Asbestos Containing Material (ACM)	has the meaning defined in the <i>Guidelines for Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia</i> (DOH, 2009)
CRCP	Cane River Conservation Park
Asbestos Guidelines	<i>Guidelines for managing asbestos at construction and demolition waste recycling facilities</i> (DEC, 2012)
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer of the Department. “submit to / notify the CEO” (or similar), means either: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 or: info@dwer.wa.gov.au
Clean Fill	has the meaning defined in the LWCWD
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DMIRS	means the Department of Mines, Industry Regulation and Safety

Term	Definition
DWER	<p>Department of Water and Environmental Regulation</p> <p>As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.</p>
emission	has the same meaning given to that term under the EP Act.
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
freeboard	The distance between the maximum surface elevation and the top of the retaining banks or structures at their lowest point
HDPE	high density polyethylene
HELP	Hydrologic Evaluation and Landfill Performance software
Inert Waste Type 1	has the meaning defined in the LWCWD
Inert Waste Type 2	has the meaning defined in the LWCWD
Landfill Definitions (LWCWD)	means the document titled <i>Landfill Waste Classification and Waste Definitions 1996</i> published by the CEO as amended from time to time
m ³	cubic metres
Pindan Sand Ridge	means the topographic feature within the Prescribed Premises boundary defined by an elevation greater than 20 mAHD as depicted in the premises map in Schedule 1 of the Licence.
Prescribed Premises	has the same meaning given to that term under the EP Act.
premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Putrescible Waste	has the meaning defined in the LWCWD
Solid	has the meaning defined in the LWCWD
Special Waste Type 1	has the meaning defined in the LWCWD
Special Waste Type 2	has the meaning defined in the LWCWD

Term	Definition
PRWMF	Pilbara Regional Waste Management Facility
Putrescible Waste	means the component of the waste stream likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily biodegrade within the environment of a landfill
Special Waste Type 1	has the meaning defined in the LWCWD
Special Waste Type 2	has the meaning defined in the LWCWD
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
TUFLOW software	A computational engine for simulating floods, tides and urban stormwater network hydraulics
Uncontaminated fill	has the meaning defined in the LWCWD
waste	has the same meaning given to that term under the EP Act.
works approval	means the works approval issued for the premises W6225/2019/1

2. Purpose and scope of assessment

On 12 May 2021 the Shire of Ashburton (the Licence Holder) submitted a licence application under Part V, Division 3 of the *Environmental Protection Act 1986* (EP Act) for the operation of the Pilbara Regional Waste Management Facility (PRWMF) located on Onslow Road in Talandji (the premises), approximately 36 km south of Onslow in the Pilbara region of Western Australia.

The PRWMF is proposed to service domestic and industrial waste generators across the Pilbara region by providing infrastructure for waste management, including waste reuse, liquid waste disposal, asbestos and tyre disposal and a Class IV secure landfill site. The Prescribed Premises categories included in the works approval application are detailed in Table 2 below.

Approval for construction of the premises was granted under works approval W6225/2019/1. On 9 April 2021 the Applicant provided a compliance report to demonstrate the works were carried out in accordance with the works approval. The Department of Environmental Regulation's (DWER) initial review of this compliance report identified 28 items where conformance with the works approval could not be determined. The applicant provided additional information on 13 September 2021 enabling the determination of compliance for the majority of these outstanding items; however, a small number of non-conformances were found to have been not addressed by the works and were assessed as non-compliances to the works approval conditions. These items are currently being assessed to determine if compliance actions are required.

Although these non-conformances indicate that certain works approval conditions were not complied with, DWER has determined that they are not material to the determination of the licence and therefore the licence application was formally accepted on 12 October 2021.

Some information required by the works approval conditions and requested during the progress of the licence assessment has not been provided by the Applicant including the groundwater monitoring, and bore survey details (vertical top of casing, casing height and ground level and geospatial position of each well) as specified in the works approval conditions.

In addition to the variations made during in construction of the facility, the licence application requests some variations to the originally assessed categories, throughputs and waste types. These changes are summarised in Table 2 and reflect the activities that have been assessed throughout this decision report.

Table 2: Classification of premises and proposed design capacity

Category number	Category description	Production or design capacity	Alteration from W6225/2019/1
13	Crushing of building material: premises on which waste building or demolition material (for example, bricks, stones or concrete) is crushed or cleaned.	50,000 tonnes per annual period (tpa)	No change
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	1,000 tpa	New category with new waste types not previously assessed. Originally assessed as Category 85 sewage facility, now to be captured under Category 61.

Category number	Category description	Production or design capacity	Alteration from W6225/2019/1
61A	Solid waste facility: premises (other than premises within category 67A) on which solid waste produced on other premises is stored, reprocessed, treated, or discharged onto land.	20,000 tpa	Originally assessed at 10,000 tpa (proposed increase of 10,000 tpa).
62	Solid waste depot: premises on which waste is stored, or sorted, pending final disposal or re-use.	100,000 tpa	Originally assessed at 20,000 tpa (proposed increase of 80,000 tpa)
63	Class I inert landfill: premises (other than clean fill premises) on which waste of a type permitted for disposal for this category of prescribed premises, in accordance with the Landfill Waste Classification and Waste Definitions 1996, is accepted for burial.	20,000 tpa	Originally assessed at 10,000 tpa (proposed increase of 10,000 tpa)
65	Class IV secure landfill site: premises (other than clean fill premises) on which waste of a type permitted for disposal for this category of prescribed premises, in accordance with the Landfill Waste Classification and Waste Definitions 1996, is accepted for burial.	50,000 tonnes per annual period	No change

This Decision Report is an assessment of the foreseeable Risk Events that have the potential to impact public health, public amenity, and the environment, arising from the Primary Activities associated with the operation of cell 1. The Delegated Officer has determined that the licence will be granted.

2.1 Exclusions

The licence application originally proposed to receive 20 liquid waste types for acceptance under Category 61 at a throughput of 130,000 tpa. The Applicant revised the application down to five waste types and a throughput of 1,000 tpa which is reflected throughout this decision report.

The Applicant has not yet constructed the tyre monocell or associated infrastructure (front apron, baling shed or stockpile area) for acceptance and bailing of tyres and have advised they will be constructed as needed. The construction of the tyre monocell was specified within the works approval and therefore acceptance and disposal of tyres under Category 57 and 63 will not be authorised under the licence until such time as the Applicant has demonstrated the infrastructure is constructed in accordance with the works approval. The Applicant has requested that the Category 63 throughput be increased. As Category 63 waste types may consist of a combination of tyres and/or asbestos up to the proposed maximum throughput, emissions related to increased asbestos and tyre acceptance and disposal has still been assessed in relation to Category 63.

The Applicant originally applied to dispose of putrescible waste within the Class IV landfill cell via the addition of Category 64 – Class II or III putrescible landfill site. On 7 October 2021 the Applicant requested that this part of the application scope be removed as they no longer sought to add category 64 to the licence at this time. It is noted that solids/sludges from the liquid waste ponds and any non-conforming green wastes are defined as putrescible wastes by the *Landfill Waste Classification and Waste Definitions 1996* (LWCWD). Putrescible waste

acceptance and burial was also originally requested, and subsequently withdrawn from the scope of the application assessed and determined for the works approval (W6225/2019/1).

DWER notes that, while this activity has been proposed for this premises on multiple occasions, the activity has not yet been risk assessed or determined as an approved category for waste disposal at the premises as the Applicant has not provided sufficient supporting information with any application or request for information response to enable the department to assess the proposed activity. The Applicant has advised DWER that they intend to submit a future licence amendment to request co-disposal of putrescible waste, including solids/sludges from liquid waste treatment and non-conforming green waste.

3. Overview of premises

3.1 Operations summary

All waste accepted at PRWMF will be from contractors and approved entities only and the premises will not be open to general public for waste drop off or disposal.

All waste accepted will be screened via the gatehouse and weighbridge and will require relevant paperwork to confirm waste classifications, including laboratory certification and/or controlled waste tracking forms. Waste screening will include closed circuit television and infra-red camera scanning to assess incoming waste loads. Non-conforming loads will not be accepted at the premises.

Operations are proposed to occur between 0600 and 1700 hours, seven days per week.

3.2 Waste acceptance

Waste types proposed to be accepted onto the premises include:

- Clean Fill and Uncontaminated Fill;
- Neutralised Acid Sulfate Soil;
- Putrescible waste (green waste);
- Inert Waste Type 1 – building and demolition and asphalt waste, casting sand, blasting sand and garnet;
- Inert Waste Type 2 –tyres (refer to Section 2.1 – exclusions);
- Scrap metals;
- Contaminated solid waste meeting up to an including Class IV acceptance criteria specified in the LWCWD;
- Special Waste Type 1 – asbestos and asbestos cement products;
- Special Waste Type 2 – clinical waste; and
- Liquid Wastes – car and truck wash waters, waste from grease traps, sewage waste, food and beverage processing wastes and septage waste.

The acceptance and handling of domestic and commercial putrescible wastes was proposed; however, they have not been assessed in this assessment (refer to Section 2.1).

The Delegated Officer notes that in addition to the proposed waste acceptance criteria for Class IV landfills that:

- Wastes classified as a 'Controlled Waste' under Schedule 1 of the *Environmental Protection (Controlled Waste) Regulations 2004* (Controlled Waste Regulations) may be subject to transport and disposal requirements under these regulations. It is the

Applicant's responsibility to ensure that all relevant waste tracking forms and approvals are provided upon receipt of controlled waste.

- Wrapping and labelling requirements for waste acceptance may also be applicable under the Controlled Waste Regulations and other Departmental legislation such as *Dangerous Goods Safety Act 2004*. Approval to accept and dispose of wastes under the EP Act does not negate or limit the Applicant's responsibilities under any other legislation.

4. Legislative context and other approvals

Table 3 summarises approvals relevant to the assessment.

Table 3: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
<i>Conservation and Land Management Act 1984</i>	Unallocated crown land – former leasehold proposed for conservation – ex Mount Minnie	Department of Biodiversity Conservation and Attractions	Pending extension of the Cane River Conservation Park (refer to Section 4.1)
<i>Land Administration Act 1997</i>	Reserve under Management Order for Lots 550 and 551 on Deposited Plan 414367	Shire of Ashburton	For the purpose designated as a 'waste disposal site' with conditions (refer to Section 4.2)
<i>Mining Act 1978</i>	Exploration licence E 08/3371	Cauldron Energy Limited	Subject to exemption (refer to Section 4.3)
<i>Planning and Development Act 2005</i>	N/A	Shire of Ashburton	Section 6 <i>Planning and Development Act 2005</i> exemption claimed for public works. The Applicant, as the subsidiary, does not foresee any issues with regard to the <i>Shire of Ashburton Town Planning Scheme No. 7</i> and the amenity of the area.
<i>Rights in Water and Irrigation Act 1914 (RIWI Act)</i>	GWL202785 CAW202784 (1)	Shire of Ashburton	Bore construction and abstraction of up to 20,000 kL/year from Carnarvon superficial aquifer. The approval provides for the taking of water for dust suppression, construction and industrial processing purposes and is valid over the period 21 May 2019 to 20 May 2029.

Legislation	Number	Subsidiary	Approval
<i>Environmental Protection Act 1986 (EP Act) – Part IV</i>	N/A	N/A	The project was referred under Part IV of the EP Act to the EPA on 1 November 2018. On 1 February 2019 the EPA determined that the proposal would not be assessed under Part IV of the EP Act. This determination was appealed however on 8 May 2019 the Minister dismissed the appeal (009 of 2019; OAC, 2019) upholding that the EPA’s decision to not formally assess the proposal.
EP Act – Part V, Division 2	CPS 8395/1	Shire of Ashburton	Clearing permit for the clearing of 70 hectares of native vegetation granted on 19 September 2019 for a period of 5 years (19/09/2024).
<i>Environmental Protection (Controlled Waste) Regulations 2004</i>	N/A	Shire of Ashburton	Prior to the acceptance of any controlled waste at the premises, the Applicant is required to request through DWER that the premises is listed as a controlled waste disposal facility, via Form 14 – Application to list a waste facility, which is available on DWER’s website.

4.1 Conservation and Land Management Act 1984

The lands surrounding the premises were previously a pastoral station that were purchased by the Government of Western Australia and are now unallocated crown land. The purchased lands are proposed to form an extension to the Cane River Conservation Park (CRCP).

Conservation parks are defined under the *Conservation and Land Management Act 1984* (CALM Act) and management of the lands are the responsibility of the Department of Biodiversity, Conservation and Attractions (DBCA). The Applicant has advised that the premises has been excised from the proposed CRCP area.

During assessment of the works approval, it was noted that conditions are likely to be included on any subsequent licence for the premises due to the proximity to the CRCP, including maintaining the integrity of the perimeter fence, maintaining sufficient cover material on site and applying cover daily to the waste to discourage scrounging from feral animals.

4.2 Land Administration Act 1997

The Shire applied to the Department of Planning, Lands and Heritage (DPLH) for Power to Lease on the Management Order of the land. As part of the application to DPLH, the land (being Lots 550 and 551 on Plan 414367), was set apart as Reserve 533241 for the purpose of “Waste Disposal Facility” with the Management Order issued to the Shire on 5 November 2018 for a period of 21 years.

The Conditions under the Management Order are:

- The Shire of Ashburton ‘... acknowledges that a sand resource exists within the Reserve boundary may be required for extraction in the future, to the extent is not required ...’ for the purpose of the ‘Waste disposal site’; and
- The Shire of Ashburton enters into an agreement with the proprietor of the Macedon gas pipeline to ensure the pipeline is adequately protected.

The Shire has since advised that they are seeking to vary the Management Order such that the extraction of the sand ridge is limited in all circumstances, not just those which are for the purpose of the waste disposal site.

It is noted that the Applicant has not provided to DWER the necessary information to demonstrate the portion of the sand resource (the Pindan Sand Ridge) that is required for the purpose of the waste disposal site. The assessment of the works approval considered that the risk outcomes related to the stability of the landfill assumes that the Pindan Sand Ridge remains undisturbed and that any interference of the Pindan Sand Ridge may alter the acceptability of the controls proposed by the Applicant for the control of leachate emissions. As a result, conditions were determined as part of the works approval to prevent the Works Approval Holder from allowing any interference with the Pindan Sand Ridge.

Key Findings:

1. For the purpose of this assessment, it has been assumed that the entirety of the Pindan Sand Ridge within the prescribed premises boundary is necessary for the purpose of the waste disposal site, in order to maintain integrity of the infrastructure.
2. In the event that another person or entity becomes the occupier of any portion of the Pindan Sand Ridge in the future, the Delegated Officer may consider amending the boundary to encompass the areas of land that are required to maintain long term stability and integrity of all landfill infrastructure.

4.3 Mining Act 1978

During the works approval assessment, DWER identified that approvals given under the *Mining Act 1978* (the Mining Act) may allow of interference of the Pindan Sand Ridge. At the time of the works approval assessment, two exploration licences (E 08/02618 and E 08/0283) were granted to North Rossa Pty Ltd (North Rossa) under the Mining Act, which included the area of the Prescribed Premises. North Rossa no longer hold these exploration licences.

Since the granting of the works approval, the Prescribed Premises boundary has been made exempt from Divisions 1 to 5 of Part IV of the Mining Act and therefore no prospecting, exploration, mining or miscellaneous use of the area within the Prescribed Premises Boundary may occur. This exemption was gazetted on 7 December 2020 under section 19 of the Mining Act and is valid for a period of two years. Department of Mines, Industry Regulation and Safety (DMIRS) has informed DWER that exemptions can be extended under certain circumstances for time periods of up to two years, and that in determining if an exemption should be granted DWER would be consulted.

The Delegated Officer notes that each two year exemption would be based on future decision-making of the Minister which cannot be pre-empted. As there are no other mechanisms for long-term exemptions for the facility it is considered that there remains an ongoing uncertainty over the protection of the Pindan Sand Ridge via the exemption given under section 19 of the Mining Act.

The application documentation indicates that Cauldron Energy Limited (Cauldron Energy) are currently seeking an exploration lease E08/3371 which is located over the prescribed premises and adjacent areas. The documentation provides commentary from DMIRS advising

that “the area of land referred to, designated S19/402 in Tenograph has been declared exempt from Divisions 1 to 5 of Part IV of the Mining Act (WA Govt Gazette 11 Dec 2021 p.4524)”. Any areas that are exempt under Section 19 of the *Mining Act 1978* cannot be included in the grant of any title. At the time of granting this licence, the exploration lease E08/3371 has not been determined, and as such the exclusion of land areas as part of that application under the Mining Act has not been confirmed.

5. Location and siting

5.1 Siting context

The premises is located in the Pilbara region of Western Australia, approximately 36 km south of the township of Onslow. The Pilbara bioregion is characterised by vast coastal plains and inland mountain ranges with cliffs and deep gorges. Vegetation is predominantly mulga low woodlands, or eucalyptus over bunch and hummock grasses (DEE, 2008).

The area immediately surrounding the premises is dominated by broad sandy plains with linear sand dunes, supporting shrubby hard and soft spinifex grasslands (Phoenix, 2017).

The Pilbara region supports the majority of major export industry in Western Australia being petroleum, natural gas and iron ore and other mining developments. Land use within the region is dominated by pastoral tenure, with residential areas clustered around town centres.

5.2 Residential and sensitive receptors

The distances to residential and sensitive receptors are detailed in Table 4.

Table 4: Human receptors and distance from premises boundary

Human receptors	Distance from activity or prescribed premises
Pastoral stations and leases	Lands used for agricultural purposes (grazing) on Minderoo and Peedamulla station extend from ~3.2 km west and ~8 km north of the premises. Minderoo Station homestead is located ~20 km south-west of the premises. Peedamulla Station homestead and campground are located ~40km east north east of the premises.
Onslow town site and industrial areas	Wheatstone oil and gas worker accommodation is located ~22 km north-west of the premises. Onslow town site is located ~30 km north-west of the premises.
Users of Conservation Park (existing and proposed)	The proposed extension to the Cane River Conservation Park (CRCP) includes all lands surrounding the premises except easements associated with the Onslow Road and associated infrastructure. The boundary of the proposed extension to the CRCP is located between 150 and 1,500 m from the PRWMF infrastructure.

5.3 Specified ecosystems and ecological receptors

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at, or emissions and discharges from, the premises. The description of specified ecosystems and distances from the premises are discussed in Table 5 and shown in Figure 1.

Table 5 and Figure 1 also describe other relevant ecosystem and environmental values considered in this assessment.

Table 5: Environmental values

Specified ecosystems and ecological receptors	Distance from the premises
Cane River Conservation Park (CRCP)	<p>Current: located approximately 32 km south-east.</p> <p>Proposed extension: surrounding the premises, between approximately 150 m and 1,500 m from the PRWMF infrastructure.</p> <p>No management plan has been published for the existing or proposed extension to the CRCP. Consistent with section 56 of the CALM Act, the purpose of conservation parks is to conserve the natural environment, protect flora and fauna and preserve features of archaeological, historic or scientific interest while providing for suitable levels of public recreation.</p>
Public Drinking Water Source Area (PDWSA) under the <i>Country Areas Water Supply Act 1947</i>	The Cane River Water Reserve Priority 1 PDWSA is located approximately 21.1 km north-east (up-gradient) of the premises.
Surface Water: River systems	<p>The premises is located along the divide of the Ashburton River and Cane River catchment which discharges into the Ashburton River catchment.</p> <p>Ashburton River: Approximately 20.5 km west of the premises (down-gradient).</p> <p>Cane River: Approximately 22 km north-east of the premises (up-gradient)</p>
Surface Water Resource Proclaimed Area	<p>Surface Water Area which is proclaimed area under the RIWI Act. The premises is specifically located within the Ashburton River surface water resource proclaimed portion.</p> <p>Surface water areas are proclaimed for the purposes of regulating the taking of water from watercourses and wetlands and where there is a need for systematic management for the use of water.</p>

Specified ecosystems and ecological receptors	Distance from the premises
Surface water bodies	<p>A series of non-perennial lakes are situated to the west (down-gradient), south-west (up-gradient) and north-east (up-gradient) of the premises. The closest of these is located approximately 2.3 km west of the premises.</p> <p>Beyond these is a series of Saline Coastal Flats which extend towards the Indian Ocean.</p>
Threatened Ecological Communities (TEC) (buffers)	<p>The closest TEC buffer, being Tanpool land system, is situated 36.8 km north-east of the premises.</p> <p>A Tanpool land system is a “highly restricted land system that occurs between Pannawonica and Onslow. It consists of stony plains and low ridges of sandstone and other sedimentary rocks supporting hard spinifex grasslands and snakewood shrublands” (DBCA, 2017), with a Priority 1 category rating.</p>
Indian Ocean	Approximately 40.3 km north-west (down-gradient) of the premises.
Groundwater: superficial and confined aquifers	<p>The premises is located with the Carnarvon confined Birdrong aquifer and Carnarvon superficial aquifer. Talis (2018a) reported that the superficial aquifer was not encountered during intrusive investigations at the premises.</p> <p>Depth to groundwater ranges across the premises from 5.4 metres below ground level (m BGL) (BH03 January 2018) to 20.9 m BGL (BH10 April 2019)</p> <p>Groundwater dependent ecosystems have not been investigated within the unallocated crown land surrounding the premises, proposed as an extension to the CRCP, for the purposes of the risk assessment they are assumed to be potentially present.</p>
Users of groundwater resources	<p>The premises is located within the RIWI Act proclaimed Pilbara Groundwater Area.</p> <p>Groundwater licences are granted ~20 km south-west (Ashburton River – bore is up-gradient), ~27 km north-east (Cane River – up-gradient) and from ~16 km north-west (down-gradient) of the premises. A series of licences are also granted along the Onslow Road from ~5 km north-west (up-gradient) and ~1 km south-east (up-gradient) that are predominately granted to Main Roads Western Australia.</p> <p>Groundwater may also be used for stock water on nearby pastoral stations.</p>

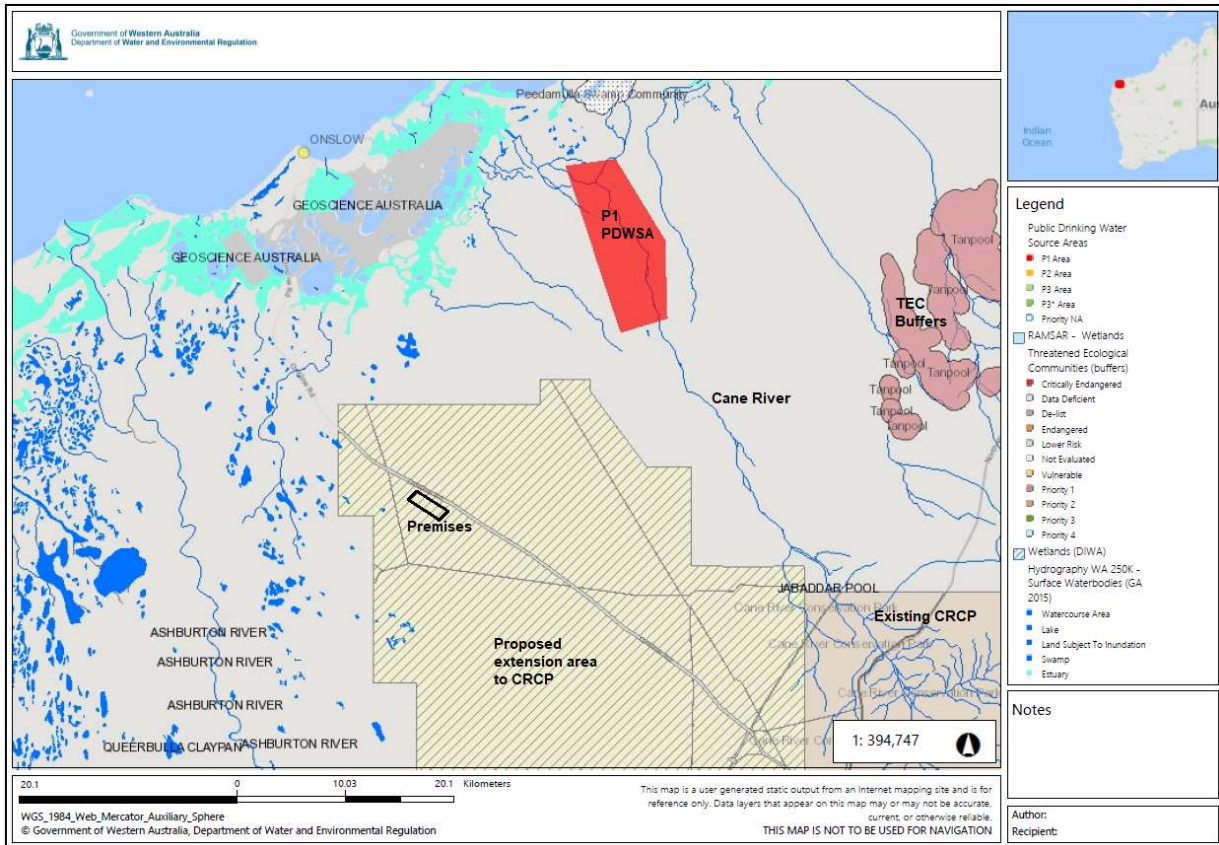


Figure 1: Proximity of premises to sensitive environmental receptors

Key Finding:

3. For the purposes of the risk assessment, the Delegated Officer considers that all land adjacent to the premises has values consistent with a Conservation Park as defined under the CALM Act. This is consistent with the *Planning and Development Act 2005* which designates adjacent lands as a specified ecosystem, an area of high conservation value as per the Department’s *Guidance statement: Environmental Siting*.

6. Environmental siting

6.1 Climate

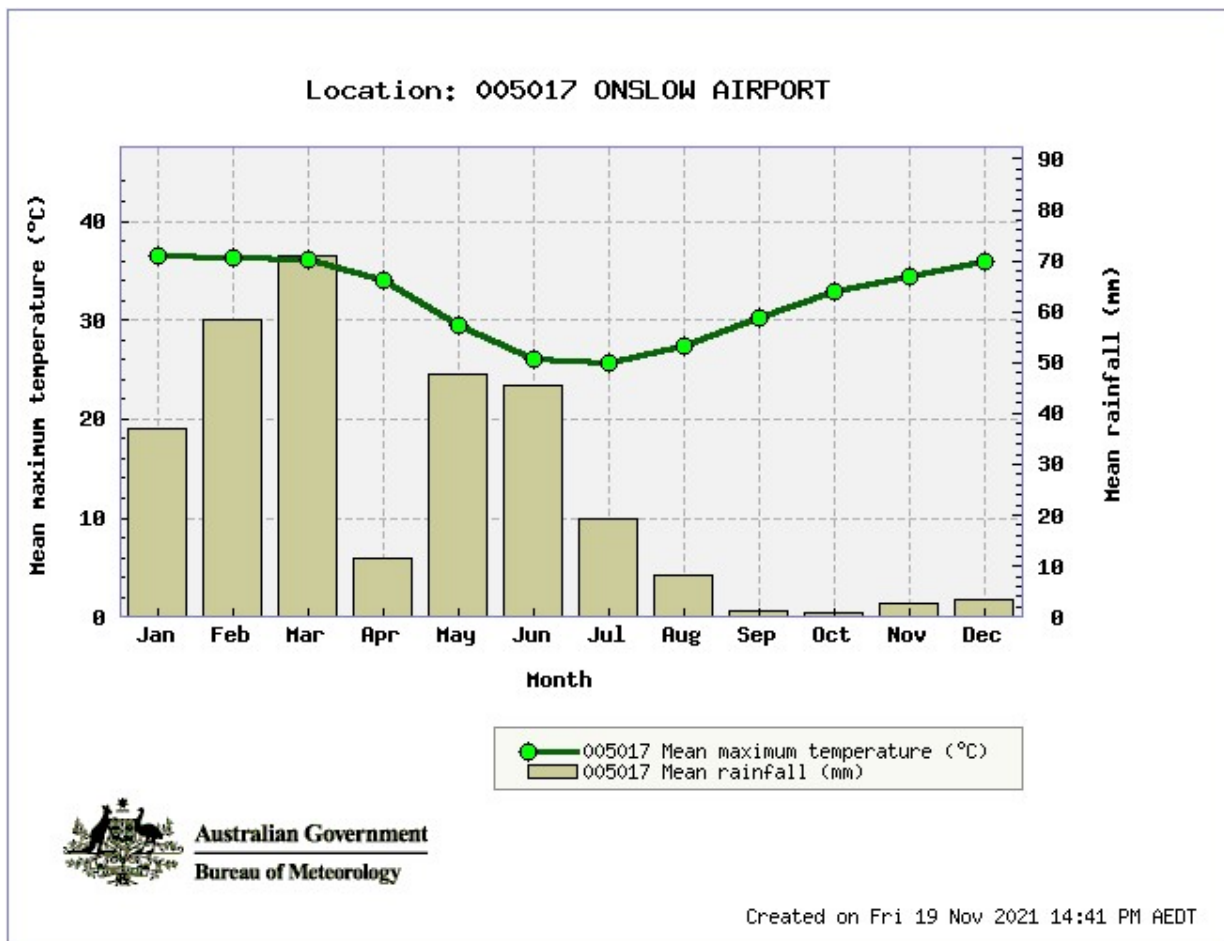
The Pilbara region is characterised by very hot summers, mild winters and low and variable rainfall. Climate systems are classified as hot desert in northern and inland areas of the region and hot grasslands in the north-west. The Pilbara has variable inter-annual rainfall and is the most cyclone-prone area along the Australian coastline.

6.1.1 Rainfall and temperature

The Bureau of Meteorology (BoM) data for the Onslow Airport weather station (Station No. 005017) shows that the area in the vicinity of the premises has an annual average of 311.6 mm (based on data between 1940 and 2019), with the majority of rainfall received between January and March. Rainfall averages are dominated by seasonal cyclones which affect the area from November through to April. Cyclones with more intense rainfall tend to occur late in the cyclone season.

The average annual temperature is 32°C, with temperatures in excess of 30°C being likely

between September and April. The monthly mean rainfall and maximum temperature is shown on Figure 2.

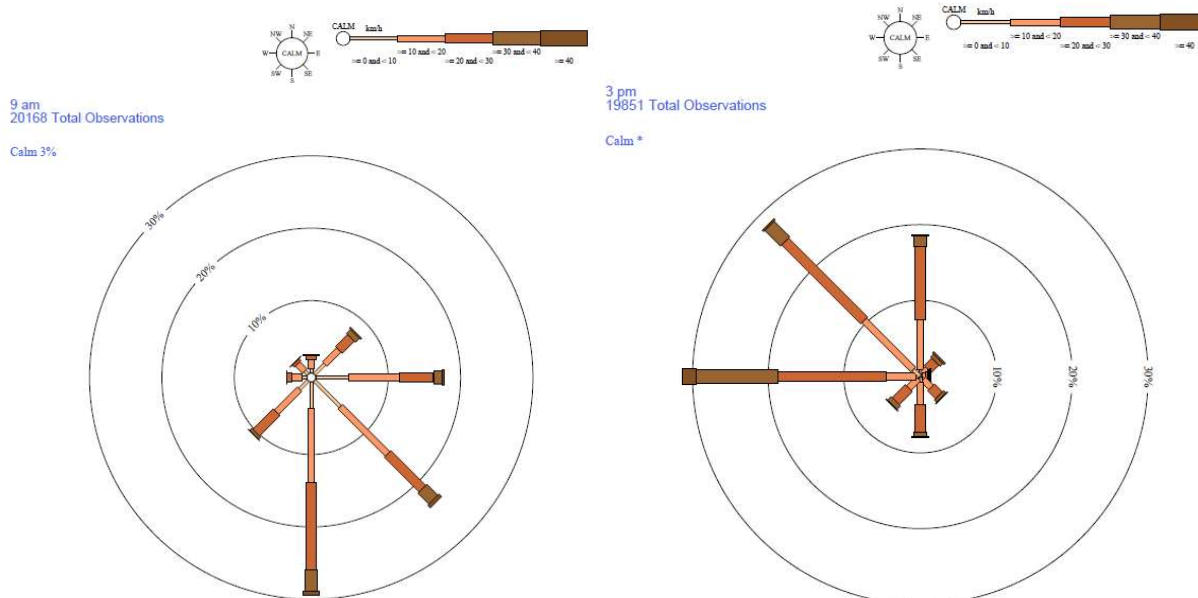


Source: BoM (Station No. 005017 - 2021)

Figure 2: Rainfall and maximum temperature Onslow Airport

6.1.2 Wind direction and strength

Based on the climate data for the Onslow Airport station (August 1940 to August 2021), the prevailing wind direction is easterly to southerly to south-easterly in the morning and westerly to north-westerly in the afternoon. This is depicted in the wind roses shown in Figure 3.



Source: BoM (Station No. 005017 – 2021)

Figure 3: Wind direction and strength Onslow Airport

It is important to note that these wind roses show historical wind speed and wind direction data for the Onslow Airport weather station and should not be used to predict future data.

6.2 Topography and soils

The topography at the premises is depicted in Figure 4. The topography is dominated by the Pindan Sand Ridge, which is surrounded by relatively flat sand plains, ranging from approximately 13 m AHD in the west to approximately 17 m AHD in the east. The Pindan Sand Ridge extends approximately 3 km from the north-west to south-east of the premises and is aligned along the northern boundary of the premises. The ridge is up to 350 m wide and is approximately 30 m AHD in height with the highest points reaching 40 m AHD. The surface is gently sloped and is hummocky with basins and swales formed by natural wind and water erosion.

The soil profile at the premises was defined during site investigations which included 112 trial pits, excavated to a depth of 5 m BGL, and drilling of 13 groundwater monitoring wells. The Pindan Sand Ridge is described as residual quartz sand, and the soil profile horizons are generally described, from the surface to depth, as:

- Sand: loose fine-medium grained Pindan soil;
- Pindan soil silty/clay/sand;
- Cemented gravel (silcrete) silty/sand matrixes; and
- Sandstone interspersed with small layers of cemented gravels.

Laboratory permeability tests (falling head permeability) were conducted on the sand and Pindan soil horizons described above. Observed permeabilities ranged from 1.634×10^{-7} to 6.107×10^{-9} m/s. The permeability of the cemented gravel horizon was assessed in laboratory triaxial permeability tests. Results ranged from 1.188×10^{-8} to 3.382×10^{-9} m/s. The hydraulic conductivity in the soil profile is likely to be highly variable and is estimated to be a maximum of 0.36 m/day.

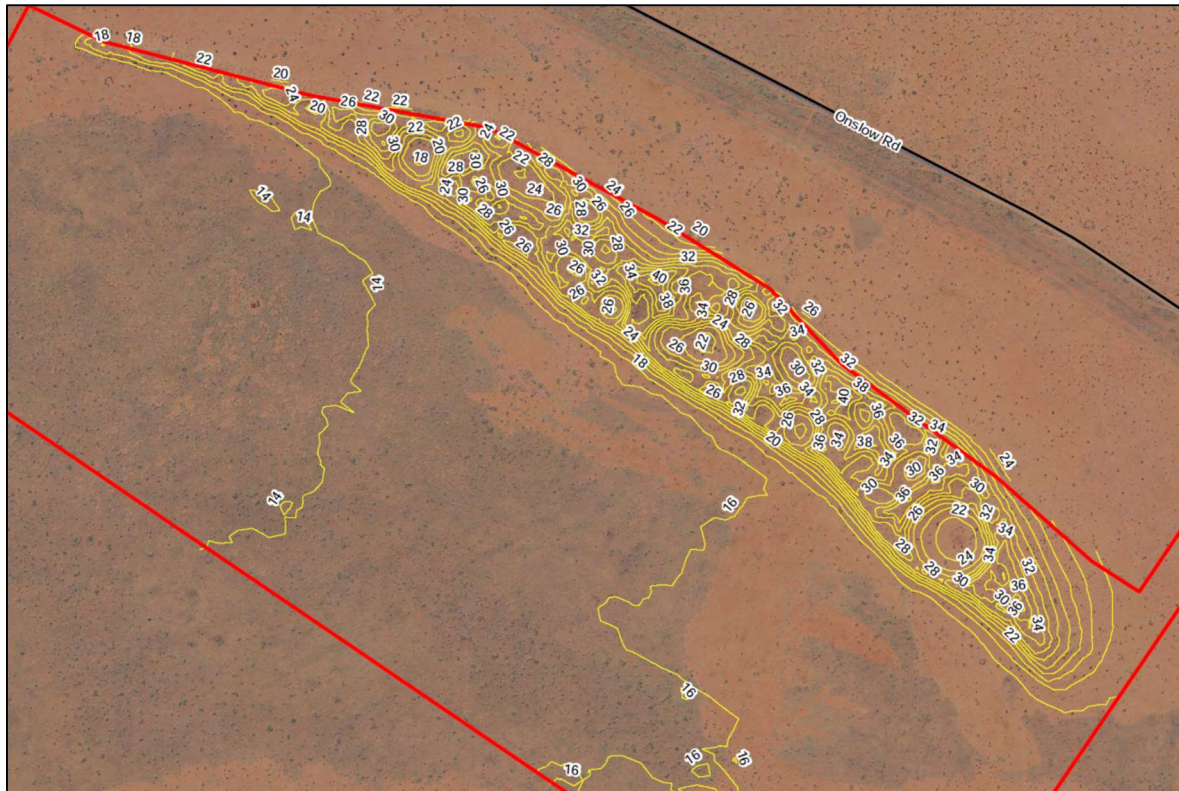


Figure 4: Topographic contours for the premises

6.3 Hydrology

Surface water runoff in the vicinity of the premises mimics topography, with no defined permanent flow paths or channels. On the sand plain area surrounding the base of the Pindan Sand Ridge, topography slopes gently from east to west towards the Ashburton River, through Minderoo Pastoral Station and the proposed extension of the Cane River Conservation Park. Based on the surface soil profiles, infiltration rates are likely to be high. There are no defined permanent surface water bodies in the vicinity of the premises. Being within the coastal sand plain, the area may be prone to flooding during high rainfall events.

6.4 Hydrogeology

Thirteen groundwater monitoring wells were installed as part of site investigations undertaken at the premises. Groundwater monitoring commenced in January 2018. Monitoring well locations are shown in Figure 5.

The aquifer encountered during intrusive investigations beneath the premises was an unconfined sedimentary aquifer comprising fine to medium grained sandstone. Talis (2018a) interpreted this aquifer to be the Windalia Radiolarite Sandstone Member, a formation that forms part of the Carnarvon-Birdrong Aquifer. The Carnarvon-Birdrong aquifer is a regionally extensive aquifer covering the western coastal areas of the Pilbara and Gascoyne regions of Western Australia. Recharge predominantly occurs in the Kennedy Range, and through surficial layers where the aquifer is unconfined.

Groundwater monitoring levels since January 2018 have recorded a consistent flow direction to the west or north-west towards the Ashburton River and Indian Ocean (Talis, 2018b). The highest groundwater elevations are generally recorded in BH01 (~12 m AHD), and the lowest groundwater elevations are generally recorded in BH05 (~6.5 m AHD). Falling head 'slug' permeability tests conducted on ten monitoring wells installed in this aquifer recorded a hydraulic conductivity range of 0.003 to 0.36 m/day (Talis, 2018a).

Conditions placed on the works approval required that additional groundwater monitoring be undertaken prior to construction and ongoing following construction, however the Applicant did not carry out this monitoring. Therefore, assumptions related to groundwater characteristics are based on the information previously provided.

Groundwater level monitoring was undertaken in six monitoring rounds at premises between January 2018 and July 2018 with an additional round undertaken in April 2019. The shallowest groundwater level recorded during this period was 5.389 m BGL in BH03 (Jan 2018) and the deepest groundwater level recorded was 20.928 m BGL in BH10 (April 2019). Based on the rainfall data the wet seasons in the Onslow region, between 2018 and 2020, have not been significantly wet, therefore the groundwater elevation data is interpreted to be representative of dry year data. Further, the timing of the monitoring rounds may not capture the groundwater level response to wet season recharge. Therefore 5.4 m BGL may not represent the highest level of groundwater that may be experienced in the vicinity of the premises.

A superficial or perched aquifer was not encountered during the Phase 1 Hydrogeological Risk Assessment (Talis, 2018a); however, it was noted that there is the potential for seasonal perched groundwater to exist within sand lenses, a gravelly sand horizon or above the cemented gravel/silcrete horizon (Talis, 2018a). It is considered that, based on the topography, material characteristics of surficial soils, and expected reduction of infiltration provided by the landfill liner, the presence of perched groundwater in the immediate vicinity of the active cells following rainfall is unlikely.

Groundwater monitoring undertaken prior to the works approval application assessment indicates that the groundwater is brackish (total dissolved solids ranging between 1,290 mg/L in bore BH03 and 2,680 mg/L in bore BH04) in the vicinity of the premises, becoming more saline as it flows towards the Indian Ocean. The groundwater quality is neutral pH with a major ion composition dominated by sodium and chloride (Talis, 2018a). The concentrations of chloride samples in groundwater wells in 2018 exceed non-potable use guidelines (DOH, 2014).

The proposed groundwater monitoring network for monitoring during construction and operation of the premises is depicted in Figure 5.

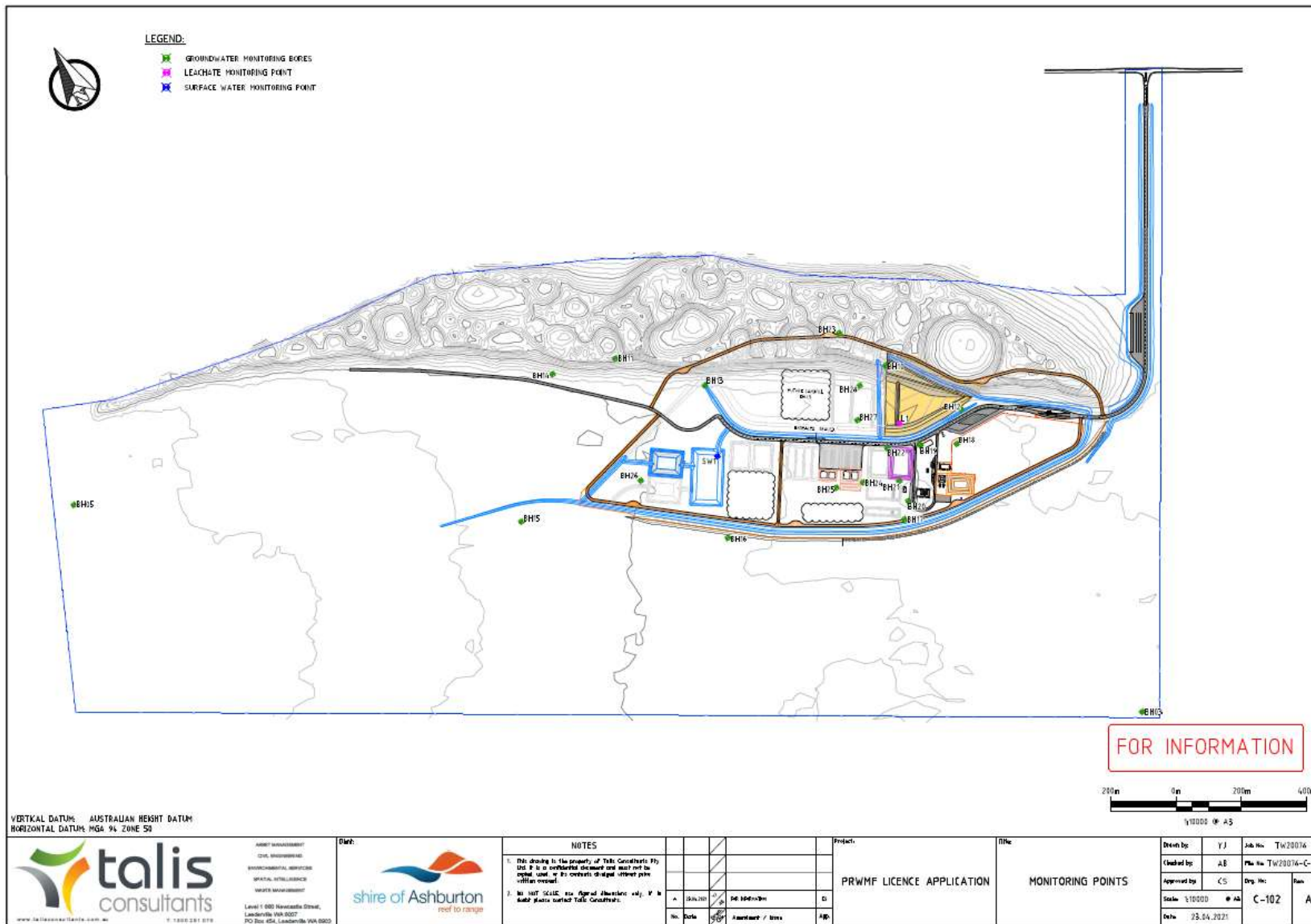


Figure 5: Groundwater monitoring location

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7. Landfill engineering and design

Table 6 provides a summary of the landfill engineering as constructed.

Table 6: Landfill Design

Landfill design aspect	Description
Footprint	Proposed fully developed landfill area - 138, 000 m ² Cell 1 - 12,138 m ²
Capacity	Total capacity - 865,000 m ³ Cell 1 – 43,426 m ³
Landfill liner design	Dual basal landfill lining system. Secondary Lining System: <ul style="list-style-type: none"> • Layer 1 – Engineered Attenuation Layer (minimum 500 mm thick) • Layer 2 – Geosynthetic Clay Liner (GCL) • Layer 3 – 2.0mm High Density Polyethylene (HDPE) • Layer 4 – Drainage Geocomposite which will act as a Leak Detection Layer. Primary Lining System <ul style="list-style-type: none"> • Layer 5 – Upper GCL • Layer 6 – 2.0 mm HDPE • Layer 7 – Cushion/Protection geotextile • Layer 8 – Leachate Collection System (300 mm thick gravel) covered with a separation geotextile.
Groundwater separation distance	2.784 m Based on the lowest point of Cell 1, being the base of the leachate sump (concrete slab) and the inferred groundwater contours from 2018 monitoring data.
Cell lifespan	Cell 1 - 2.5 years
Side slopes	1V:3H outer embankment 1V:4H cut slope (abutting Pindan Sand Ridge)
Basal gradient	>3% to primary collection pipe and 1% to leachate collection sump

7.1 Landfill liner performance

As part of the works approval application, the Applicant provided a seepage and liner performance assessment. Seepage modelling was undertaken using the Hydrologic Evaluation of Landfill Performance (HELP) software. The Applicant compared modelled landfill liner performance against EPA Victoria's *Best practice environmental management, Siting, design, operation and rehabilitation of landfills* (VIC BPEM). VIC BPEM indicates that a liner system should control seepage rates to an amount not exceeding 10 L/ha/day.

The anticipated leakage rates through the liner have been estimated between 0.00575 to 0.27973 L/ha/day for operational phases and between 0.00164 to 0.00603 L/ha/day once the

landfill cell has been capped/closed.

Further evidence of the suitability for the liner was provided as a LandSim 2.5 contaminant fate transport model which considers the likely concentration of contaminants in leachate and degradation of engineering controls over time. Based on this modelling it has been determined that:

- no leachate seepage is expected to occur through the engineered lining system while active leachate management is being undertaken (a period of approximately 60 years);
- following cessation of active landfill management leachate seepage is expected to gradually rise to a peak of ~219 L/ha/day;
- both hazardous and non-hazardous contaminants were not shown to be released above relevant guidelines for the duration of the lifecycle of the facility; and
- In some models a number of non-hazardous contaminants were shown to potentially exceed background concentrations after hundreds of years, however using the most likely 50%ile modelling scenario these exceedances were either not predicted, or marginal.

The construction of the primary and secondary leachate collection sump liners varied from the design approved under the works approval. The construction was undertaken such that the concrete slabs are now situated beneath the liner system. An additional HDPE layer was placed between the liner and concrete slab to provide a rub sheet to prevent damage to the primary and secondary liners.

The variations made to the sump construction also provide a shallower than anticipated gradient between the primary and secondary leachate sumps. Based on the base level of the primary and secondary leachate collection sumps, and the interpreted level of the riser pipes from the secondary leachate sump, it is inferred that, in the event of a liner breach in the landfill cell, a certain volume of leachate may collect within the secondary collection sump prior to it being able to be extracted and detected. Further, any damage to the primary liner within the primary leachate collection sump may result in impact to the function of the secondary liner, as the elevation of the secondary leachate collection sump relative to the base of the primary collection sump may not allow effective drainage of leachate from the leakage drainage layer within the primary collection sump.

These variations are considered to be of relevance to the assessment of leachate emission risk, in that they may impact the ability for the Applicant to detect damage to the landfill liner in a timely manner to mitigate the emission of leachate to land and groundwater.

7.2 Separation to groundwater

The lowest point of the Class IV landfill, being the base of the leachate sump in Cell 1 was designed with a separation distance to groundwater of >2.9 m. This distance was determined using the highest natural groundwater level as recorded during the pre-construction groundwater monitoring events.

Following deviations to the construction, including the construction of the concrete base plate below the HDPE and liner layers, the depth to groundwater is now considered to be 2.784 m between the base of the concrete slab in the secondary leachate collection sump and the inferred maximum recorded groundwater level. It is noted that the inferred maximum recorded groundwater level data may not be representative of the actual maximum groundwater level (refer to section 6.4).

7.3 Leachate extraction and collection

During operations the depth of leachate within the landfill (height above the basal liner surface) will range between 0.3 to 1.0 m and will be managed through regular extraction of leachate from the sump to the leachate ponds. Maintenance of leachate within the landfill will assist in prolonging the performance of the liner.

The leachate sump will be constructed with an automated pump system installed which will trigger and operate continuously when leachate levels are above the trigger levels at the inlet.

Following extraction, leachate will be stored within one leachate evaporation pond for evaporation and recirculation. The pond will have a total capacity of 5,843 m³ and an operational capacity of 4,754 m³, and was designed to be capable of accepting and evaporating accumulated leachate over a 10 year period with either recurring 90th percentile rainfall years or recurring mean rainfall years. During either rainfall scenario there will be an annual two to three month period in which the leachate pond is empty due to evaporation. An operational freeboard of 0.5 m is proposed and is proposed to be maintained via recirculation of leachate if required.

7.4 Landfill gas infrastructure

As the landfill will be used for the disposal of Class IV waste only at this time, it is considered that there will be limited landfill gas generated and no infrastructure or controls required. The original works approval application was limited to an assessment of potential fugitive landfill gas emissions which is summarised within this licence assessment. Any future proposals to accept and dispose of putrescible waste within the landfill cell will need to consider the extent of potential landfill gas generation and propose suitable landfill gas management infrastructure and/or controls as relevant.

7.5 Cell closure

The Applicant has provided a summary of the proposed rehabilitation and closure of the facility and intends to develop a more detailed plan towards the end of the lifespan of the landfill. The objectives of the rehabilitation and closure plan are to ensure all landfill cells are capped to specifications, environmental monitoring continues in accordance with licence requirements, and the facility is left in a safe and stable condition.

The final landfill profile is expected to meet a gradient of between 1:5 and 1:20. Capping of cells will be undertaken progressively using a 300 mm permeable material, a GCL or low-density polyethylene layer, 1.2 m thick layer of indigenous soils obtained from the overburden. A post closure maintenance and care programme will be developed to ensure inspection and maintenance of infrastructure is carried out.

The current closure strategy does not provide details around contingencies or mitigation measures that can be implemented in the event of unplanned closure.

8. Operational controls

The Operational Environmental Management Plan (OEMP) provided with the Application (Talis, 2021) outlines the proposed operational and environmental management procedures that will be adopted to control and mitigate potential environmental impacts associated with operation of PRWMF. The OEMP is supported by technical studies undertaken to support the design and proposed construction of the premises. Select aspects of the OEMP are summarized in the following sections.

8.1 Waste acceptance and general site operations

The PRWMF will be a manned facility operating between the hours of 0600 and 1700 hours Monday to Sunday (with occasional access to the site after hours duration any out-of-ordinary operational scenarios). All contractors and visitors to the site will enter via the weighbridge/gatehouse and will be recorded via CCTV. All loads will be inspected with an infra-red camera to identify any ignited loads. Any loads found to contain non-conforming wastes will be rejected from the premises. Liquid wastes must be transported in sealed leakproof containers or liquid waste trucks.

Signage will be displayed at the site entrance and will include at a minimum:

- Operating hours;
- Speed limits;
- Waste types accepted; and
- Emergency contact details.

The machinery and equipment that will be utilised during operations include:

- Landfill compactor;
- Backhoe excavator;
- Forklift;
- Dump truck;
- Water cart; and
- Utility vehicles.

Actions will be taken to minimise dust generally across the premises including daily visual observations of dust levels, restrictions on speed, all waste loads being covered at all times and equipment being used in a manner to minimise dust.

Surface water at the premises will be managed by diverting stormwater to drains and attenuation ponds to allow for the controlled release to the surrounding environment. Any litter or foreign matter within the surface water collection system and ponds will be regularly removed.

Vehicles entering the premises will be required to be free of soil, mud and vegetative material, and all green waste loads will be covered until they are unloaded at the designated area to minimise the spread of weeds.

Fuel on site will be stored in a self-contained double-bunded fuel cell, with a capacity of 30,000 litres, located on the concrete base of the refuelling pad. Spill response kits of a suitable size are placed in/nearby appropriate locations around the site.

8.2 Landfill management

8.2.1 Tipping face

The Applicant will implement a number of general management procedures to minimise emissions from the landfilling activities. This includes maintaining the active tipping face to no more than 30 m by 30 m and up to 2 m in height.

To ensure the stability of waste and to minimise short term settlement, wastes will be levelled and compacted as soon as possible. No bulky or sharp waste will be placed in the first layer of waste (approximately 0.5 m to 1 m) and will not be compacted.

During periods of high winds and heavy rainfall events, the placement of waste will cease until the Site Supervisor deems it safe and acceptable to recommence works.

8.2.2 Landfill cover

The proposed landfill cover requirements include daily, intermediate and final cover. The cover material is planned to be sourced from excavated surplus soils generated during construction of the premises. Proposed cover application is summarized as follows:

- Daily cover placed at the end of each day to a depth of 300 mm, with the exception of Special Waste Types 1 and 2 which will have cover applied immediately on burial.
- Intermediate cover to be applied in areas that are inactive for over a week, at a thickness of 300 mm or greater depending on the types of materials deposited.

8.3 Leachate management

8.3.1 Landfill leachates

It is proposed that leachate generated by the Class IV landfill will be managed through evaporation. It is anticipated that landfill cells will be filled and closed in a phased approach, minimising the generation of leachate while each cell is receiving waste. In addition to the leachate pond being designed to hold and evaporate leachate during operations, recirculation of leachate onto the waste mass can be undertaken to manage storage volumes if required. The Applicant proposes to undertake regular inspections of the leachate collection and storage system to ensure leachate is contained within the leachate ponds or the landfill cell footprint.

A leachate collection system consisting of permeable gravel has been installed above the primary lining system and submersible pneumatic pumps will extract leachate automatically when sufficient head is present over the pump's inlet. A leak detection layer is also present above the secondary lining system consisting of a series of pipes that direct leachate towards a collection sump and extraction point. In the event the integrity of the primary layer is compromised, the leak detection system will direct leachate towards a secondary extraction sump.

8.3.2 Green waste leachates

The leachate generated from the green waste processing area will be collected within a drainage pond which has been designed to hold a 1 in 10, 72 hour storm event, while maintaining a 0.5 m freeboard during a 90th percentile rainfall year. It is expected, based on the modelled scenarios, that the pond will be dry for two to three months of the year allowing for any maintenance and inspections of the pond if required.

Leachate monitoring will be conducted as part of the proposed Environmental Monitoring and Sampling activities detailed (Section 9).

8.4 Stormwater management

The premises infrastructure has been designed with consideration of local climate conditions. The works approval assessment considered a 1 in 100 year, 72 hour storm event for the design of infrastructure at the premises as well as assessing potential for flooding, catastrophic failure and overtopping of surface water and leachate storage ponds and structures.

Local scale flood modelling was undertaken using TUFLOW software, with the proposed infrastructure and undisturbed topography included within the boundary of the modelled area. The flood study indicated that the premises and surrounding areas could be affected by

flooding. In order to protect the premises throughout the lifecycle of the facility, surface water management infrastructure has been proposed as part of the construction works and includes:

- Levee embankment extending around the southern perimeter of the premises;
- Swale system to manage surface water volume and flow velocity;
- Rock armouring of potential scour surfaces;
- Perimeter drains and surface water retention ponds.

Ponding of water outside of the surface water perimeter drains but within the proposed prescribed premises boundary will be managed by use of a mobile pump operated by site personnel.

The surface water management infrastructure, including performance of rock armouring and any installed liners will be regularly inspected and maintained.

8.5 Special wastes management

The Applicant requires that customers inform the facility of asbestos disposal 24 hours prior to arrival. All declared asbestos loads shall be inspected to ensure the waste has been either wrapped or packaged according to the pre acceptance requirements which may include being wrapped in minimum 200 µm thickness polythene bags and appropriately labelled. Asbestos contaminated soils must be transported in a sealed container or truck and be maintained to prevent fibres from entering the atmosphere during handling and disposal.

All loads of clinical waste must be sealed in secure containers that are leak, puncture and shatter proof. Containers must be correctly labelled with the international biohazard symbol and clearly display the words 'clinical waste'. All containers must also possess a description of the contents.

8.6 Bulk waste area

8.6.1 Green waste processing

Green waste will be mulched on site with the end product being used for a range of applications including landscaping and rehabilitation. The green waste hardstand area includes a stockpiling and processing area. Green waste loads will be directed to the hardstand area for visual inspection prior to processing. The Applicant has proposed that non-conforming wastes will be directed to the landfill area. As disposal of putrescible wastes is not permitted under the licence, this provision has not been considered as a control for the purposes of risk assessment.

Green waste will only be stored within the hardstand area in stockpiles a maximum of 10 m wide, 3 m high and 50 m long. Stockpiles will be kept as neat and tidy as possible. Once stockpiles reach sufficient size or stockpile space is limited, the site supervisor will arrange for a mobile mulcher or shredder to be brought on site for processing.

Stockpiles will be regularly turned to maintain an aerobic state to minimise potential for odour generation and decomposition. Any leachate generated will be directed to the leachate evaporation ponds on site. During handling, stockpiles will be wetted down to minimise dust generation. A buffer zone of 100 m will be kept around the green waste stockpiles to minimise fire risk.

8.6.2 C&D recycling

Wastes are proposed to be accepted from commercial customers, earth works companies, construction and demolition companies and Shire works. Clean inert material is also accepted from the public via the Onslow Waste Transfer Station. All loads are designated to a high risk

or low risk area where the waste is inspected to identify any contamination including asbestos. Waste will be stockpiled to a maximum of 3 m height until there are sufficient quantities for processing.

Once there are sufficient volumes, a mobile crushing and screening plant will be brought on site and the material will be processed into products such as recycled sand, aggregates, and road base. Recycled products will be re-used on-site and potentially off-site. Sprinkler systems will be used to minimise dust generation.

For the purpose of this assessment, the acceptance, screening and storage of C&D waste is considered as an associated activity to Category 13 crushing activities. C&D throughput volumes are reflected within the volumes specified for Category 13 activities. C&D throughput volumes are not included within those assessed and defined under Category 61A, which relates to green waste acceptance, storage and processing only.

8.6.3 Scrap metal stockpiling

Scrap metals including electrical cables, exotic and specialist alloys, drill rods and general metal waste will be stockpiled until sufficient volumes are collected for a mobile baler to be brought on site. The metals will then be removed off-site for re-processing. To minimise noise emissions waste will be tipped from the lowest height possible.

For the purposes of assessment DWER has assumed that electrical cables are transmission cables, and do not refer to e-waste, and that exotic and specialist alloys are restricted to non-reactive and solid waste metals only.

For the purposes of this assessment, the acceptance, storage and baling of any scrap metal waste is considered as an associated activity to Category 62 solid waste facility activities. Scrap metal throughput volumes are reflected within the volumes specified for Category 62 activities. Scrap metal throughput volumes are not included within those assessed and defined under Category 61A, which relates to green waste acceptance, storage and processing only.

8.7 Liquid Waste

Following acceptance at the weighbridge, tankers containing liquid wastes are directed to the liquid waste area. Liquid wastes are pumped from the tanker via a pipeline to the receival ponds. The receival area comprises concrete aprons that are designed to prevent discharge of liquid waste onto unsealed ground. The receival ponds act as preliminary sedimentation basins to minimise the solid/sludge fraction entering the sillage evaporation pond.

The liquid waste treatment facility has been designed to accommodate rainfall during cyclone season assuming a 90th percentile rainfall year, on the basis that the pond is maintained below the design level (with 500 mm freeboard) leading into the cyclone season. The operational volume of the pond is 377 m³, the total volume of the pond (including freeboard) is 596m³.

The remaining liquid is gravity fed into the evaporation pond where sunlight and oxygen biodegrade the incoming organic matter and evaporation reduces the volume of liquid waste in the pond. The Applicant has proposed to remove solid content from the pond and dispose of to landfill as required. As the disposal of putrescible wastes to landfill is not permitted under the licence, this provision has not been considered as a control for the purposes of risk assessment.

The liquid waste evaporation and receival ponds and liquid waste areas have been constructed to minimise the potential for spills and leaks, including a concrete hardstand, bunding and HDPE lined perimeter drain. To minimise odour emissions there will be minimal disturbance to the ponds or surface crusts.

8.8 Tyre and asbestos and monocells

The tyre monocell will be excavated in sections on an as needed basis. Each cell is excavated to a maximum depth of 3 m. A maximum of two bales in height are to be placed in the monocell. Cover material will be applied to a depth of approximately 0.5 m. It is noted that operation of the tyre monocell is not permitted under the licence.

Asbestos will be accepted for disposal directly to the monocell, which will be excavated progressively on an as-needs basis. The asbestos monocell will be excavated to a maximum of 4 m deep. Sufficient space will be prepared on a daily basis so that any asbestos received can be buried immediately.

Final capping of both monocells will be designed to direct water away from the cells.

8.9 Feral animals and vermin

Actions taken to reduce the likelihood of feral animals and vermin entering or nesting at the site include:

- 1.8 m floppy top fence with 600 mm overhang and skirt around the entire site boundary;
- Access gate closed outside operational hours; and
- Weekly inspection for feral animals, and pest control contractor engaged where required.

8.10 Fire management/Emergency Response Plan

The Applicant developed an Emergency Response Plan (ERP) (Talis, 2021) to outline the responses to be implemented for any emergencies that may occur onsite or external situations that may impact the site. The ERP also outlines fire prevention infrastructure and equipment including fire breaks, scanning cameras, designated clear zone and extinguishers.

Water required for suppression will be available from a 100,000 L tank (or two 50,000L) tanks, groundwater or stormwater stored in the turkeys nest and 10,000 L water cart. The water cart will have an in-cab remote controlled fixed water monitor that can apply a spray and jet to 50 m distance. If additional assistance is required, additional resource may be sourced from local contractors in the Onslow area.

9. Environmental monitoring and sampling

A summary of key aspects of the proposed sampling and monitoring is provided in Table 7.

Table 7: Summary of proposed environmental monitoring and sampling

Environmental aspect	Location	Frequency	Parameters
Leachate	Leachate sample collected from the sump of each hydraulically separate cell	Monthly	Leachate level and volume removed from sump
		Quarterly	Basic parameters – physiochemical, metals, hydrocarbons, BTEX, nutrients, TSS, major ions, BOD and COD

Environmental aspect	Location	Frequency	Parameters
		Annually	Detailed parameters – basic parameters, organic acids, PCBs, MTBE, CHC, PFAS, PAH, phenols, pesticides and microbial pathogens.
Landfill gas	Gas monitoring wells	Quarterly	Bores – gas concentrations, pressure and flow, ambient conditions
		Annually	Surface emissions and accumulation – concentration of methane, ambient conditions
Surface water	Attenuation pond (variable depths)	Monthly or as required	pH, electrical conductivity, metals, nutrients, cations and anions, total soluble solids, total organic carbon and chemical oxygen demand.
Groundwater	Groundwater monitoring wells.	Monthly	Depth to groundwater
		Quarterly	Basic parameters - physiochemical, metals, Hydrocarbons, BTEX, nutrients, TDS, TSS, major ions, BOD and COD.
		Annually	Detailed parameters – basic parameters, organic acids, PCB, MTBE, CHC, PFAS, PAH, phenols, pesticides and microbial pathogens.
Treated wastewater	Oil water separator	Quarterly or as required	Parameters to be determined in licence application
Feral animals and vermin	Camera traps, bait stations, tipping face, surface water structures, ponds	Continuously, or as specified by contractor	Visual inspections
Weeds	Premises	Annually and periodically	Visual inspections

10. Risk assessment

10.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment. Risk Events during operation were previously risk assessed under the works approval application W6225/2019/1 and are summarised in Table 8 below. Where proposed operations under this licence application differ from the original works approval assessment these are noted in Table 8 and the changes are re-assessed in the relevant sections.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event.

Table 8: Identification of emissions, pathway and receptors during operation

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
<p>Category 65 Activities</p> <p>Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes</p> <p>Collection, storage, evaporation and management of leachate</p> <p>Ongoing management of premises</p>	Landfill leachates	<p><u>Pathways</u></p> <p>Overland flow due to overtopping of leachate storage ponds or failure of leachate conveyance infrastructure.</p> <p>Overland runoff (from stormwater migration).</p> <p>Infiltration and subsequent movement on contaminants through groundwater.</p> <p>Abstraction and use of groundwater – direct exposure.</p> <p><u>Impacts</u></p> <p>Deterioration and/or contamination of waters and local/regional aquatic ecosystems.</p> <p>Deterioration of conservation values of CRCP.</p>	<p><u>Human Receptors:</u></p> <p>Beneficial users of groundwater (including future users)</p> <p><u>Environmental Receptors:</u></p> <p>Non-perennial surface waters (see Table 5)</p> <p>Terrestrial habitats including the proposed extension of the CRCP (150 -1,500 m from premises) including native flora and groundwater dependent vegetation</p>	Refer to Sections 7 and 8	<p><u>Human Receptors:</u></p> <p>C = Major L = Possible</p> <p>High Risk</p> <p><u>Environmental Receptors:</u></p> <p>C = Major L = Unlikely</p> <p>Medium Risk</p> <p><i>The Applicant has not carried out additional groundwater sampling as specified in the works approval, therefore the Delegated Officer considers there is still uncertainty to the separation distance between the maximum groundwater levels and the base of the landfill (refer to section 6.4).</i></p>	N	Conditions 1, 2, 3, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 29, 30 , 31, 32, 33, 34, 35, 36, 37, 38 , 39, 40, 41, 42, 43, 44	<p>The Delegated Officer considers that due to the limited groundwater sampling done to date, and deviations in the construction design, specifically the construction of leachate sumps that may vary the likelihood of leachate emissions (refer to section 7.1), that additional monitoring is required to comply with the controls required by the works approval.</p> <p>Therefore, additional groundwater monitoring controls have been determined in the licence.</p> <p>The Delegated Officer considers that a closure plan is required within 12 months of issue of the licence to assist in the management of all potential emissions from the landfilling operations, particularly in unplanned closure circumstances.</p> <p>The Delegated Officer considers that the Applicant should provide contingencies that demonstrate that the landfill can achieve a safe, stable and non-polluting outcome in the event of liner failure, landfill instability or other requirement to close the landfill cell in advance of completion.</p> <p>Closure planning should demonstrate that the design outcomes for closure are achievable and provide information on the ability to fund any planned and unplanned closure scenarios.</p>

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
<p>Category 65 Activities</p> <p>Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes</p> <p>Collection, storage and management of leachate</p> <p>Ongoing management of premises</p>	Dust (excluding asbestos)	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of the CRCP	<p><u>Human Receptors:</u></p> <p>Users of CRCP and Onslow Road</p> <p>(Other human receptors noted in Table 4 are not considered to be receptors for dust emissions)</p> <p><u>Environmental Receptors:</u></p> <p>Terrestrial environment within the CRCP</p>	Refer to Sections 7 and 8	<p><u>Human Receptors:</u></p> <p>C = Minor</p> <p>L = Rare</p> <p>Low Risk</p> <p><u>Environmental Receptors:</u></p> <p>C = Minor</p> <p>L = Rare</p> <p>Low Risk</p>	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 18, 19, 23, 37, 38 , 39, 40, 41, 42, 43, 44	These controls generally replicate the Applicant's controls. The Delegated Officer considers that a closure plan is required to mitigate other emissions, within 12 months of issue of the licence to assist in the management of all potential emissions from the landfilling operations, particularly in unplanned closure circumstances.
<p>Category 65 Activities</p> <p>Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes</p> <p>Collection, storage and management of leachate</p> <p>Ongoing management of premises</p>	Asbestos fibres	Air / wind dispersion causing adverse health impacts including asbestosis, mesothelioma and cancer	<p>Users of CRCP and Onslow Road</p> <p>(Other human receptors noted in Table 4 are not considered to be receptors for asbestos emissions)</p> <p>Impacts to onsite human receptors are not regulated by DWER. Health and safety for onsite workers is regulated by other legislation not covered by the scope of this approval.</p>	Refer to Sections 7 and 8	<p>C = Severe</p> <p>L = Rare</p> <p>High Risk</p>	Y	Conditions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 23, 37, 38, 39, 40, 41, 42, 43, 44	These controls generally replicate the Applicant's controls as well as the recommendations specified in the Department's Guidelines for managing asbestos at construction and demolition waste recycling facilities (DEC, 2012) (Asbestos Guidelines), and are considered necessary by the Delegated Officer in managing potential impacts
<p>Category 65 Activities</p> <p>Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes</p> <p>Collection, storage and management of leachate</p> <p>Ongoing management of premises</p>	Odour	Air / wind dispersion causing impacts to health, wellbeing and amenity	<p>Users of CRCP and Onslow Road</p> <p>(Other human receptors noted in Table 4 are not considered to be receptors for odour emissions)</p>	Refer to Sections 7 and 8	<p>C = Minor</p> <p>L = Rare</p> <p>Low Risk</p>	N/A	Conditions 1, 2, 3, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 29, 39, 40, 41, 42, 43, 44	N/A
<p>Category 65 Activities</p> <p>Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes</p> <p>Collection, storage and management of leachate</p> <p>Ongoing management of premises</p>	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<p><u>Human Receptors:</u></p> <p>Users of CRCP and Onslow Road</p> <p>(Other human receptors noted in Table 4 are not considered to be receptors for noise emissions)</p> <p><u>Environmental Receptors:</u></p> <p>Terrestrial environment within the CRCP</p>	Refer to Sections 7 and 8	<p><u>Human Receptors:</u></p> <p>C = Minor</p> <p>L = Rare</p> <p>Low Risk</p> <p><u>Environmental Receptors:</u></p> <p>C = Minor</p> <p>L = Rare</p> <p>Low Risk</p>	Y	Conditions 3, 17, 18, 19, 23, 39, 40, 41, 42, 43, 44	N/A

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 65 Activities Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes Collection, storage and management of leachate Ongoing management of premises	Landfill gas generated through the decomposition of waste within the landfill	Lateral migration through soil, movement through groundwater; or passive venting to air causing adverse impacts to health including asphyxia, amenity impacts (from odour) or explosion risk	No relevant receptors			N/A		The Delegated Officer considered that the predicted volume of gas generation during operation of Cell 1 is negligible and therefore a Risk Event is not established for this emission at this time, noting that the acceptance of putrescible wastes for disposal is not permitted under this licence. Any fugitive landfill gas is likely to disperse given the distance from the premises, and the limited built environment in the area. The engineered cell, and capping profile are also considered to be sufficient at managing subsurface fugitive landfill gas emissions.
Category 65 Activities Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes Collection, storage and management of leachate Ongoing management of premises	Windblown waste/litter	Air/wind dispersion causing amenity and nuisance impacts and attraction of pests and vermin or impacts to conservation values of the CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for windblown waste emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Sections 7 and 8	<u>Human Receptors:</u> C = Minor L = Unlikely Medium Risk <u>Environmental Receptors:</u> C = Moderate L = Unlikely Medium Risk	Y	Conditions 3, 14, 15, 16, 17, 21, 37, 38 , 39, 40, 41	The Delegated Officer considers that a closure plan is required within 12 months of issue of the licence to assist in the management of all potential emissions from the landfilling operations, particularly in unplanned closure circumstances.
Category 65 Activities Unplanned event (fire in landfill cell)	Smoke, landfill leachates from damaged liner, and/or chemicals and firewater used to control fire.	Air/wind dispersion causing amenity and public health impacts (including adverse health impacts).	<u>Human Receptors:</u> Users of CRCP and Onslow Road beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Sections 7 and 8	<u>Human Receptors:</u> C = Moderate L = Unlikely Medium Risk <u>Damage to landfill liner integrity:</u> C = Major L = Rare Medium Risk <u>Environmental Receptors:</u> C = Major L = Rare Medium Risk	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 , 39, 40, 41, 42, 43, 44	The Delegated Officer considers that a closure plan is required within 12 months of issue of the licence to assist in the management of all potential emissions from the landfilling operations, particularly in unplanned circumstances.
Category 13 Acceptance and handling of waste Operation of the screening and crushing plant Stockpiling of materials (unprocessed and processed waste)	Dust (excluding asbestos)	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of the CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for dust emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	<u>Human Receptors:</u> C = Minor L = Unlikely Medium Risk <u>Environmental Receptors:</u> C = Minor L = Unlikely Medium Risk	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 18, 19, 23, 37, 38, 39, 40, 41, 42, 43, 44	These controls generally replicate the Applicant's controls as well as the recommendations specified in the Department's Guidelines for managing asbestos at construction and demolition waste recycling facilities (DEC, 2012) (Asbestos Guidelines).

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 13 Acceptance and handling of waste Operation of the screening and crushing plant Stockpiling of materials (unprocessed and processed waste)	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for noise emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	<u>Human Receptors:</u> C = Minor L = Unlikely Medium Risk <u>Environmental Receptors:</u> C = Minor L = Unlikely Medium Risk	Y	Conditions 3, 17, 18, 19, 23, 39, 40, 41, 42, 43, 44	N/A
Category 13 Acceptance and handling of waste Operation of the screening and crushing plant Stockpiling of materials (unprocessed and processed waste)	Asbestos fibres from non-conforming waste types at the premises being released into air and included in final product.	Air/wind dispersion causing adverse health impacts including asbestosis, mesothelioma and cancer	Users of CRCP and Onslow Road	Refer to Section 8	C = Severe L = Rare High Risk	Y	Conditions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 23, 37, 38, 39, 40, 41, 42, 43, 44	These controls generally replicate the Applicant's controls as well as the recommendations specified in the Department's Guidelines for managing asbestos at construction and demolition waste recycling facilities (DEC, 2012) (Asbestos Guidelines).
Category 62: Solid waste depot Waste acceptance and handling Stockpiling/ storage of material Tyre washing facility and vehicle washdown area	Dust	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of the CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for dust emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	Due to the requested increased in throughput for this activity, dust emissions have been assessed in detail in Section 9.5 below			
Category 62: Solid waste depot Waste acceptance and handling Stockpiling/ storage of material Tyre washing facility and vehicle washdown area	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for noise emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	Due to the requested increased in throughput for this activity, noise emissions have been assessed in detail in Section 9.7 below			

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 62: Solid waste depot Waste acceptance and handling Stockpiling/ storage of material Tyre washing facility and vehicle washdown area	Leachate (scrap metal storage) Wastewater from tyre wash-down facilities	<u>Pathways</u> Overland flow due to overtopping of leachate storage ponds or failure of leachate conveyance infrastructure. Overland runoff (from stormwater migration). Infiltration and subsequent movement on contaminants through groundwater. Abstraction and use of groundwater – direct exposure. <u>Impacts</u> Deterioration and/or contamination of waters and local/regional aquatic ecosystems. Deterioration of conservation values of CRCP.	<u>Human Receptors:</u> Beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Non-perennial surface waters (see Table 5) Terrestrial habitats including the proposed extension of the CRCP (150 -1,500 m from premises) including native flora and groundwater dependent vegetation	Refer to Section 8			Due to the requested increased in throughput for this activity, leachate emissions have been assessed in detail in Section 9.4 below	
Category 63: Tyre and asbestos monocells	Smoke (in the event of a fire)	Air/wind dispersion causing amenity and public health impacts (including adverse health impacts).	<u>Human Receptors:</u> Users of CRCP and Onslow Road beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	<u>Human Receptors:</u> C = Severe L = Rare High Risk <u>Environmental Receptors:</u> C = Major L = Rare Medium Risk <i>The delegated officer considers that the increased throughput for tyre disposal may increase the severity (volume of smoke) in the event of a tyre fire however it does not alter the overall risk ratings. Therefore, medium and high risk ratings above remain unchanged.</i>	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 22, 23, 37, 38 , 39, 40, 41, 42, 43, 44	Note: Acceptance and burial of tyres will not be authorised until such time as compliance with the works approval has been demonstrated.

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 63: Tyre and asbestos monocells	Leachate (firewaters) in the event of a fire	Overland runoff, movement through groundwater causing contamination of waters or degradation of local/regional surface water ecosystems, degradation to the beneficial use of groundwater, health impacts to groundwater users, and/or impacts to conservation values of the CRCP.	<u>Human Receptors:</u> Users of CRCP and Onslow Road beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	<u>Human Receptors:</u> C = Major L = Rare Medium Risk <u>Environmental Receptors:</u> C = Major L = Rare Medium Risk <i>The delegated officer considers that the increased throughput for tyre disposal may increase the likelihood of a tyre fire given the volume of additional waste material proposed, however it does not alter the overall risk ratings of rare. Therefore, medium risk ratings above remain unchanged</i>	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 , 39, 40, 41, 42, 43, 44	Note: Acceptance and burial of tyres will not be authorised until such time as compliance with the works approval has been demonstrated.
Category 63: Tyre and asbestos monocells	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for noise emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	Due to the requested increased in throughput for this activity, noise emissions have been assessed in detail in Section 9.7 below			
Category 61A Solid Waste Facility (Green waste storage and processing)	Dust	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of the CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for dust emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8	Due to the requested increased in throughput for this activity, dust emissions have been assessed in detail in Section 9.5 below			

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 61A Solid Waste Facility (Green waste storage and processing)	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for noise emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8			Due to the requested increased in throughput for this activity, noise emissions have been assessed in detail in Section 9.7 below	
Category 61A Solid Waste Facility (Green waste storage and processing)	Odour	Air / wind dispersion causing impacts to health, wellbeing and amenity	Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for odour emissions)	Refer to Section 8			Due to the requested increased in throughput for this activity, odour emissions have been assessed in detail in Section 9.6 below	
Category 61A Solid Waste Facility (Green waste storage and processing)	Leachates	<u>Pathways</u> Overland flow due to overtopping of leachate storage ponds or failure of leachate conveyance infrastructure. Overland runoff (from stormwater migration). Infiltration and subsequent movement on contaminants through groundwater. Abstraction and use of groundwater – direct exposure. <u>Impacts</u> Deterioration and/or contamination of waters and local/regional aquatic ecosystems. Deterioration of conservation values of CRCP.	<u>Human Receptors:</u> Beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Non-perennial surface waters (see Table 5) Terrestrial habitats including the proposed extension of the CRCP (150 -1,500 m from premises) including native flora and groundwater dependent vegetation	Refer to Section 8			Due to the requested increased in throughput for this activity, leachate emissions have been assessed in detail in Section 9.4 below	
Category 61 Liquid Waste Facility	Noise	Air/wind dispersion causing impacts to health, wellbeing and amenity and impacts to conservation values of CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for noise emissions) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Section 8			Due to the requested change in throughput and waste acceptance for this activity, noise emissions have been assessed in detail in Section 9.7 below	

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Category 61 Liquid Waste Facility	Odour	Air / wind dispersion causing impacts to health, wellbeing and amenity	Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for odour emissions)	Refer to Section 8				
Category 61 Liquid Waste Facility	Leachate/ raw sewage/untreated waste spills removal and disposal of consolidated sludges	<u>Pathways</u> Overland flow due to overtopping of leachate storage ponds or failure of leachate conveyance infrastructure. Overland runoff (from stormwater migration). Infiltration and subsequent movement on contaminants through groundwater. Abstraction and use of groundwater – direct exposure. <u>Impacts</u> Deterioration and/or contamination of waters and local/regional aquatic ecosystems. Deterioration of conservation values of CRCP.	<u>Human Receptors:</u> Beneficial users of groundwater (including future users) <u>Environmental Receptors:</u> Non-perennial surface waters (see Table 5) Terrestrial habitats including the proposed extension of the CRCP (150 -1,500 m from premises) including native flora and groundwater dependent vegetation	Refer to Section 8				
General site activities Acceptance, storage, sorting, burial and decomposition of up to Class IV wastes including asbestos and biomedical wastes Collection, storage and management of leachate Acceptance and storage of green wastes	Pests, flies, vermin and weeds	Vector transmission of disease, seed and waste by air and land via insects, birds and rodents causing amenity impacts, pest-associated diseases and or impacts to conservation values of the CRCP	<u>Human Receptors:</u> Users of CRCP and Onslow Road (Other human receptors noted in Table 4 are not considered to be receptors for these activities) <u>Environmental Receptors:</u> Terrestrial environment within the CRCP	Refer to Sections 7 and 8	<u>Human Receptors:</u> C = Minor L = Unlikely Medium Risk <u>Environmental Receptors:</u> C = Moderate L = Unlikely Medium Risk	Y	Conditions 1, 2, 3, 14, 15, 16, 17, 18, 19, 20 , 21, 23, 28, 37 , 38 , 39, 40, 41, 42, 43, 44	These conditions generally replicate the applicant's controls. The Delegated Officer considers quarterly inspections for weeds is required given the proximity to the CRCP The Delegated Officer considers that a closure plan is required within 12 months of issue of the licence to assist in the management of all potential emissions from the landfilling operations, particularly in unplanned closure circumstances.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Guideline: Risk Assessments (DWER 2020).

Note 2: Proposed Applicant controls are depicted by standard text. **Bold and underline** text depicts additional regulatory controls imposed by department.

10.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 9 below.

Table 9: Risk rating matrix

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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 10 below.

Table 10: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

10.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 11 below:

Table 11: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

10.4 Risk assessment – leachate impacts

10.4.1 Hazard characterisation and impact

Leachates and liquid waste seepage to groundwater may occur if there is damage to the liquid waste pond liner. Leachate and liquid wastes may also occur as a result of overtopping of the liquid waste storage infrastructure, failure of liquid waste conveyance infrastructure, or during removal and disposal of sludge from the pond base. Leachates may also arise from the acceptance and processing of solid wastes such as scrap metals and green waste, either through liquid within the waste on receipt or during rainfall events where stormwater may become contaminated by these waste types.

Liquid waste types to be accepted at the premises include sewage, septage, vehicle wash water, grease and food and beverage wastes. Therefore, leachates and sludges from the liquid waste receival area are likely to consist of high levels of nutrients, hydrocarbons, grease and oils and may contain persistent organic pollutants. No active treatment of liquid wastes is proposed, and waste characteristics may only be altered by evaporation (concentration) and passive biodegradation.

The Application also includes proposed increases to the throughput of other waste types including green wastes and tyres. This may result in an increase in the level of contaminants in any leachate generated on site that may percolate through unsealed operational areas and stormwater conveyance and collection infrastructure. Leachate generated from these operational activities may contain nutrients, salts, and heavy metals. In the event of a fire at the premises there may be an increase in the volume of fire suppressant run-off or contaminants in firewater run-off.

Receptors that may be affected by leachate emissions include beneficial users of groundwater, both on pastoral and mining land, surface water of river systems, water courses and lakes/wetlands, contamination of on-site soil and adjoining land, and impacts to native vegetation and terrestrial and groundwater dependent habitats within the proposed extension of the CRCP.

The inferred groundwater flow in the area is in a westerly to north-westerly direction predominantly towards the Ashburton River and Indian Ocean, which are located approximately 20.5 km and 40.3 km from the premises, respectively.

There are no registered down-hydraulic gradient groundwater users of the PRWMF within the Carnarvon-Birdrong confined Aquifer. The two closest registered users of the Carnarvon-Superficial Aquifer that are down-hydraulic gradient of the premises are located adjacent to the north-eastern boundary of the PRWMF, being held by Main Roads, and located approximately 4 km west from the site, being held by Forrest & Forrest Pty Ltd for the Minderoo pastoral station.

Based on information provided with the Application for hydrogeological site investigations (Talis, 2018a), the groundwater testing onsite confirmed that the quality of groundwater in the vicinity of the premises is suitable for potential beneficial use, including for irrigation, stock water and some non-potable uses.

As the surrounding land uses and potential future land uses predominantly consist of pastoral stations and mining leases, groundwater could be abstracted for the purposes of non-potable industrial use, irrigation, stock water and/or dust suppression. Water that has become contaminated with leachate generated from liquid waste activities, or other solid waste storage and processing activities on the premises is likely to pose a health and amenity (odour) risk to human users and could cause health impacts to livestock consuming the water for drinking purposes, and any irrigated crops. The health and biological diversity of species within the receiving environment of the proposed extension of the CRCP could also become degraded with plant root uptake of contaminated groundwater.

10.4.2 Criteria for assessment

The Delegated Officer considers that groundwater in the area is potentially suitable for non-potable uses (including dust-suppression), livestock watering, pastoral/agricultural use.

Impacts to groundwater have been assessed against the Non-Potable Use Guidelines (DoH, 2014) (NPUG). Given that the most sensitive potential use is non-potable purposes, it is considered that the NPUG guidelines are the most appropriate criteria for assessing impacts to groundwater based on the hazard characterisation described above.

10.4.3 Applicant controls

The Applicant's proposed controls are discussed in section 8.

10.4.4 Consequence

Liquid waste acceptance and processing (evaporation)

Human receptors

Beneficial users of groundwater may experience impacts to health from the exposure of groundwater contaminated with liquid wastes, including pathogens and amenity (odour) is also at risk of being impacted. Based on the potential contaminants within leachate/sewage, the Delegated Officer considers that direct contact with the abstracted contaminated groundwater could cause low level health impacts to human health. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Moderate**.

Environmental Receptors

Based on the nature of surface water ecosystems and terrestrial ecosystems, the Delegated Officer has determined that leachate emissions to groundwater or surface water could cause low-level off-site impacts with the specific consequence criteria at risk of being exceeded. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Moderate**.

Increase in volume of solid waste accepted, handled, and stockpiled

Human receptors

Beneficial users of groundwater may experience impacts to health from the exposure of contaminated groundwater. Based on the potential contaminants within solid wastes stored at the premises, the Delegated Officer considers that direct contact with the abstracted contaminated groundwater could cause minimal impacts to amenity. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Slight**.

Environmental Receptors

Based on the nature of surface water ecosystems and terrestrial ecosystems, the Delegated Officer has determined that leachate emissions to groundwater or surface water could cause low-level off-site impacts with the specific consequence criteria at risk of being exceeded. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Moderate**.

Increase in volume of green waste storage and processing.

Human receptors

Beneficial users of groundwater may experience impacts to amenity (odour) from the abstraction of nutrient contaminated groundwater. The Delegated Officer considers that the abstracted groundwater could cause minimal impacts to amenity. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Slight**.

Environmental Receptors

Based on the nature of surface water ecosystems and terrestrial ecosystems, the Delegated Officer has determined that leachate emissions to surface water or terrestrial ecosystems could cause low-level off-site local impacts with the specific consequence criteria at risk of being exceeded. Therefore, the Delegated Officer considers the consequence of leachate emission impacts to be **Moderate**.

10.4.5 Likelihood of Risk Event

Liquid waste acceptance and processing (evaporation)

Human receptors

The Delegated Officer has determined that the likelihood of moderate impact to human health from leachate emissions/sewage spills, when considering the Applicant's controls, would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

Environmental Receptors

In considering the Applicant's controls, the Delegated Officer has determined that the likelihood of moderate impact to environmental receptors from leachate emissions/sewage spills would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

Increase in volume of solid waste accepted, handled and stockpiled

Human receptors

The Delegated Officer has determined that the likelihood of moderate impact to human health from leachate emissions, when considering the Applicant's controls and the proposed volume increase, would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

Environmental Receptors

In considering the Applicant's controls and the proposed volume increase, the Delegated Officer has determined that the likelihood of moderate impact to environmental receptors from leachate emissions would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

Increase in volume of green waste storage and processing

Human receptors

In considering the Applicant's controls, the Delegated Officer has determined that the likelihood of impacts to human health from green waste leachate emissions would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

Environmental Receptors

The Delegated Officer has determined that the likelihood of moderate impact to environmental receptors from green waste leachate, in considering the Applicant's controls, would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of Risk Events occurring to be **Unlikely**.

10.4.6 Overall rating of leachate emissions

Liquid waste acceptance and processing (evaporation)

Human receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of leachate emissions/sewage spills on human receptors is **Medium**.

Environmental Receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of leachate emissions/sewage spills to environmental receptors is **Medium**.

Increase in volume of solid waste accepted, handled and stockpiled

Human receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of leachate emissions on human receptors is **Low**.

Environmental Receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of leachate emissions/sewage spills to environmental receptors is **Medium**.

Increase in volume of green waste storage and processing

Human receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of green waste leachate emissions on human receptors is **Low**.

Environmental Receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of green waste leachate emissions to environmental receptors is **Medium**.

10.4.7 Acceptability of risk event

As per DWER's acceptability and treatment of Risk Events the Delegated Officer has determined that the risk event is acceptable and will be subject to some regulatory controls to maintain the risk rating.

10.4.8 Regulatory controls for leachate emissions

The Applicant will be required to implement the following controls to manage the potential impacts from leachate emissions:

- Specifying waste types to be accepted and processing limits;
- Maintenance of infrastructure and equipment including surface water management systems, liquid waste ponds, leachate ponds and the bulk waste area;
- Monitoring of inputs and outputs, surface waters, ambient groundwater, leachate, leak detection and freeboards;
- Management actions to be taken at any time the freeboard exceeds the specified operational level; and
- Complaints recording, annual compliance reporting, annual environmental reporting and maintenance of records.

The application included a proposal to dispose of any sludges and non-conforming green waste within the landfill cell. As disposal of putrescible wastes to the on-site cell is not permitted under the licence application, the Applicant will be required to remove and dispose of any sludges and non-conforming green waste to an appropriately licenced facility.

10.5 Risk assessment – dust impacts

10.5.1 Hazard characterisation and impact

Premises operations including vehicle movements and waste handling, or processing may generate dust emissions which may cause adverse health and amenity impacts outside of the premises. The requested increase in annual throughputs may result in an increase in the frequency of vehicle movements at the premises, and the overall volume of waste being moved and processed. Dust emissions may also have potential impacts to plant health of sensitive flora species, by suppressing their photosynthetic and respiratory function.

Key source of potential dust emissions from the addition of Category 61 and increased throughputs of Categories 61A, 62 and 63 relate to the increase in the number and frequency of vehicle movements.

10.5.2 Criteria for assessment

The relevant criteria for assessment of dust emissions as PM₁₀ is 50 µg/m³ over 24 hours as specified in the National Environment Protection (Ambient Air Quality) Measure (NEPM). The

NEPM is the relevant criteria for assessment in relation to human health and wellbeing.

Amenity impacts can also be assessed against the general provisions of the EP Act, specifically whether fugitive dust unreasonably interferes with the health, welfare, convenience, or comfort of any person.

The threshold of dust levels that are likely to cause negative impacts to vegetation is likely to vary for different plant species and assemblages. For the vegetation typical of the Pilbara region, dust generation rates would generally be required to be quite high in order to have noticeable impact.

10.5.3 Licence Holder controls

The Applicant's proposed controls are discussed in section 8.

10.5.4 Consequence

Human receptors

Taking into consideration the distance to sensitive receptors and the Applicant's proposed controls, if dust emissions occur during general premises activities, then the Delegated Officer has determined that the impact of dust emissions on amenity will be low level on a local scale. Therefore, the Delegated Officer considers the consequence of dust emissions from landfilling operations, including application of cover material, to be **Minor**.

Environmental receptors

If dust emissions occur during general premises activities, then the Delegated Officer has determined that the impact of dust emissions on plant health will be low level on a local scale. Therefore, the Delegated Officer considers the consequence of dust emissions from landfilling operations, including application of cover material, to be **Minor**.

10.5.5 Likelihood of Risk Event

Human receptors

Taking into consideration the distance to sensitive receptors and the Applicant's proposed controls, the Delegated Officer has determined that dust emissions resulting in impacts to public health/amenity during general premises operations may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood to be **Rare**.

Environmental receptors

Taking into consideration the distance to the CRCP and the Applicant's proposed controls, the Delegated Officer has determined that dust emissions resulting in impacts to native flora during general premises operations may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood to be **Rare**.

10.5.6 Overall rating

Human receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of dust emissions impacting public health and/or amenity during general operations is **Low**.

Environmental receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of dust emissions impacting native flora during general landfilling is **Low**.

10.5.7 Acceptability of Risk Event

As per DWER's acceptability and treatment of Risk Events the Delegated Officer has determined that the Risk Event is acceptable and will generally not be subject to regulatory controls.

10.5.8 Regulatory controls for dust emissions

The Applicant will be required to implement the following controls to manage the potential impacts from dust emissions:

- Infrastructure requirements including operation and maintenance of a water cart, dust suppression sprinklers and dust suppression infrastructure on C&D crushing and screening equipment;
- Operational requirements including maximum site speed limit of 10 km per hour on unsealed roads and areas, implemented with signage, use of water cart to maintain stockpiles in a damp state and use of dust suppression infrastructure whilst crushing and screening; and
- Stockpiles of C&D materials must be maintained in a damp state.

These controls generally replicate the Applicant's proposed controls which the Delegated Officer considers necessary in managing potential impacts.

10.6 Risk assessment – odour impacts

10.6.1 Hazard characterisation and impact

The acceptance of liquid wastes has the potential to generate odour emissions which may impact the amenity of persons outside the premises. The proposed liquid waste types of sewage, septage, grease and food and beverage wastes are particularly odourous as they contain organic matter. Some liquid waste types may interact to create additional odour impacts. No active treatment of liquid wastes is proposed.

The request to increase the volume of green waste being stored and processed at the facility may contribute to additional odour emissions particularly if the additional green waste is not stored appropriately and begins to decompose.

10.6.2 Criteria for assessment

There are no set threshold or concentration criteria for odour assessment. Under section 49(5) of the EP Act, it is an offence to emit or cause to be emitted, an unreasonable emission from any premises.

An unreasonable emission is defined in the EP Act (section 49(1)) as an emission or transmission of noise, odour or electromagnetic radiation which unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person.

10.6.3 Licence Holder controls

The Applicant's proposed controls are discussed in section 8.

10.6.4 Consequence

Liquid waste facility

Taking into consideration the proposed capacity and distance to sensitive receptors, if odour emissions occur, the Delegated Officer has determined that the impacts to amenity would be mid-level on a local scale. Therefore, the Delegated Officer considers the consequence of

odour emissions to be **Moderate**.

Increase in green waste acceptance processing

Taking into consideration the proposed capacity and distance to sensitive receptors, if odour emissions occur, the Delegated Officer has determined that the impacts to amenity would be low level on a local scale. Therefore, the Delegated Officer considers the consequence of odour emissions to be **Minor**.

10.6.5 Likelihood of Risk Event

Liquid waste facility

Taking into consideration the distance to and transient nature of sensitive receptors and the controls proposed by the Applicant, the Delegated Officer has determined that odour impacts from the sewage facility will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of odour impacts to be **Unlikely**.

Increase in green waste acceptance and processing

Taking into consideration the distance to and transient nature of sensitive receptors and the controls proposed by the Applicant, the Delegated Officer has determined that odour impacts from the sewage facility may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood of odour impacts to be **Rare**.

10.6.6 Overall rating

Liquid waste facility

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of odour emissions from the sewage facility impacting amenity is **Medium**.

Increase in green waste acceptance and processing

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of odour emissions from the sewage facility impacting amenity is **Low**.

10.6.7 Acceptability of Risk Event

Liquid waste facility

As per DWER's acceptability and treatment of Risk Events the Delegated Officer has determined that the risk event is acceptable and may be subject to some regulatory controls to maintain its acceptability.

Increase in green waste acceptance and processing

As per DWER's acceptability and treatment of Risk Events the Delegated Officer has determined that the Risk Event is acceptable and will generally not be subject to regulatory controls.

10.6.8 Regulatory controls for odour emissions

The Delegated Officer has determined that with the implementation of the applicant's proposed controls, that additional regulatory controls are not required to manage odour emissions from the premises. Odour emissions from the premises will be subject to the general provisions of the EP Act and the *Environmental Protection (Unauthorised Discharge) Regulations 2004*.

10.7 Risk assessment – noise impacts

10.7.1 Hazard characterisation and impact

Activities within the premises may generate noise emissions which may result in health and amenity impacts for people near the premises. Noise may also impact native fauna of the CRCP resulting in disruption to feeding and breeding habits.

Key source of potential noise emissions from the addition of Category 61 and increased throughputs of Categories 61A, 62 and 63 relate to the increase in the number and frequency of vehicle movements. Noise emissions may also occur from the increase in handling of wastes, processing of green wastes and any receipt of waste outside of normal operating hours.

For the purposes of the risk assessment, normal hours of operation are between the hours of 0600 hrs to 1700 hrs Monday to Sunday.

10.7.2 Criteria for assessment

The Criteria for assessment of noise emissions is the *Environmental Protection (Noise) Regulations 1986* (Noise Regulations) and the premises activities during construction and operation will be subject to these regulations.

10.7.3 Licence Holder controls

The Applicant's proposed controls are discussed in section 8.

10.7.4 Consequence

Human receptors

Taking into consideration the hours of normal operations and distance to sensitive receptors, the Delegated Officer has determined that the impact of noise emissions from general operations will be low level amenity impacts on a local scale. Therefore, the Delegated Officer considers the consequence of noise emissions during general operations to be **Minor**.

Environmental receptors

Taking into consideration the hours of normal operations and distance to sensitive receptors, the Delegated Officer has determined that the impact of noise emissions from general operations on native fauna will be minimal on a local scale. Therefore, the Delegated Officer considers the consequence of noise emissions during general operations to be **Minor**.

10.7.5 Likelihood of Risk Event

Human receptors

The Delegated Officer has determined that the likelihood of noise emissions from the general operations at the premises impacting amenity may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood to be **Rare**.

Environmental receptors

The Delegated Officer has determined that the likelihood of noise emissions from general operations impacting native fauna may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood to be **Rare**.

10.7.6 Overall rating

Human receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of noise impacting amenity and public health during general landfilling operations is **Low**.

Environmental receptors

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of noise impacting native fauna during general landfilling operations is **Low**.

10.7.7 Acceptability of Risk Event

As per DWER's acceptability and treatment of Risk Events the Delegated Officer has determined that the risk event is acceptable and will be subject to some regulatory controls to maintain its acceptability.

10.7.8 Regulatory controls for noise emissions

The Applicant applied for normal operational hours being between the hours of 0600 hrs to 1700 hrs Monday to Sunday, unless prior notification has been given to the gatehouse and the premises is attended for the duration of any out-of-ordinary operational scenarios. The hours of normal operations determined in the conditions of the licence are consistent with the Applicant's proposed operating hours with the allowance for out-of-ordinary operational scenarios. Incidents of out-of-ordinary operational scenarios are required to be recorded. Additional controls will include maintaining all plant and equipment and complaints recording, consistent with the Applicant's proposed controls.

11. Determination of licence conditions

The conditions in the issued licence have been determined in accordance with the *Guidance Statement: Setting Conditions*. This decision report provides a summary of the regulatory conditions to be applied to this works approval.

As information requested during the assessment process was not provided (see section 2) the requirement to provide this information has been imposed on the licence.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the licence under the EP Act.

As part of the assessment, DWER considered the relevant provisions of the EP Act, in particular, whether the application of financial assurance provisions was appropriate given the characteristics of the waste proposed for acceptance, and the nature of the design and construction of the landfill infrastructure. Section 86B(1) of the EP Act provides that financial assurance can be required under the conditions of a works approval or licence. DWER does not currently have a published policy position on the determination and imposition of financial assurances. No other financial assurances are required to be held by the Shire of Ashburton under the EP Act and no other financial assurances are known to be required under other written laws with regards to the operation of the premises facility.

The Delegated Officer considers that in the absence of published policy or precedent, a financial assurance will not be required upon issuing of the licence. DWER may consider, as appropriate, the imposition of financial assurances in the future, due to complexities associated with the operation of the premises including stability of infrastructure being dependent on the protection of the Pindan Sand Ridge from interference by humans or nature; variations to construction not assessed as part of the works approval; and potential future proposal for mixed waste disposal.

The following matters related to the Pindan Sand Ridge are also relevant in the context of this determination:

- In the absence of data showing otherwise, the Delegated Officer considered that the integrity of the Pindan Sand Ridge is essential to the long-term stability of the landform. While the sand ridge is subject to an exemption under section 19 of the Mining Act this is only in force for two-year periods and may be subject to extension. Due to the short-term duration of the exemption and extension terms allowed under the Mining Act, the Delegated Officer does not consider that the exemption provides long-term certainty that any disturbance of the Pindan Sand Ridge can be prevented in perpetuity. Further, the exemption does not provide for the prevention of disturbance of the Pindan Sand Ridge by natural causes (erosion by wind or water).
- It is also noted that due to the designation of the land, over which the premises is situated, as a Reserve managed under a Management Order, permission may be required under the Mining Act for any entity to disturb the land. DWER are of the understanding that should either an exemption extension be sought, or a mining approval be sought under the Mining Act, that DMIRS would be required to consult with the Applicant as the Management Body under the Management Order. The Delegated Officer, therefore, considered it appropriate to impose a condition requiring the Applicant to inform any authority of the relevant provisions of this licence in regard to any potential disturbance of the Pindan Sand Ridge.
- The works approval included a condition that specified the circumstances under which the Applicant (the works approval holder) would be required to provide delineated areas of land that are necessary for long term stability. This information was also requested in correspondence dated 23 October 2019 from DWER’s Director General (re-sent on 28 June 2021) and requested again on 22 September 2021. The Delegated Officer maintains that this information will be required to inform any potential assessment of the impact of disturbance of the Pindan Sand Ridge, either by human or natural causes. The information may also be required to inform the ongoing management and decision making on the effectiveness of infrastructure constructed at the premises. As a result, conditions have been determined on the licence that require the Applicant to provide this information within 14 days of any request being made by the Department.

12. Consultation summary

Table 12: Consultation Summary

Method	Comments received	DWER response
Application advertised on DWER website on 13/10/2021	No comments	N/A
Stakeholder letter sent to Department of Biodiversity Conservation and Attractions on 13/10/2021	Advised that the CRCP has not yet been extended however DBCA holds an interest in the lands due to the flora, fauna, landscape and Aboriginal cultural heritage values of the area and maintains responsibilities for the management of fire, feral animals and weeds under a memorandum of understanding.	Noted. Standard controls for fencing to be maintained and implementation of controls to deter pests have been included in the licence. The Applicant’s Operational Environmental Management Plan provides further commitments for feral animal and weed monitoring.

Method	Comments received	DWER response
Stakeholder letter sent to Department of Planning, Lands and Heritage on 13/10/2021	No response received	N/A
Stakeholder letter sent to Department of Mines, Industry Regulation and Safety on 13/10/2021	No response received	N/A
Stakeholder letter sent to Department of Health on 13/10/2021	<p>As the ponds are in reasonable proximity to environmentally sensitive areas, please ensure the pond liners and sensors are well maintained and the facility be secured with a minimum 1.8 m high fence.</p> <p>The development is to comply with the provisions of the Health (Miscellaneous Provisions) Act 1911, related regulations and guidelines with regards to nuisances, dust and odour controls.</p> <p>On-site infrastructure, surface water management systems and evaporation ponds need to be designed and maintained to ensure they do not breed mosquitos.</p>	Noted. Maintenance requirements are specified in the licence conditions.
Stakeholder letters sent to previous and current tenement holders on 13/10/2021	<p>North Rossa provided they have applied for a nearby tenement and have no comments at this time.</p> <p>No comments received from current tenement holder.</p>	Noted.
Licence Holder referred draft documents on 25/11/2021	See Appendix 2.	See Appendix 2.

13. Conclusion

Based on the assessment in this decision report, the Delegated Officer has determined that a licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting.

In accordance with DWER's *Guidance Statement Licence Duration*, the licence will be granted for the maximum period of 20 years. The Delegated Officer notes that in accordance with the EP Act the licence may be amended at any time including varying conditions or imposing new conditions and requirements where necessary. The licence may be revoked or suspended on certain grounds regardless of the expiry date.

Key aspects of the decision related to this licence are:

- A number of activities originally proposed in the application including disposal of any putrescible wastes, and the acceptance and burial of tyres have not been assessed or authorised, either because the scope of the application was amended by the Applicant, or because the Applicant has not demonstrated that the infrastructure required for the activity has been constructed in accordance with the works approval (refer to section 2.1). DWER requires that an application or applications for a licence amendment be made to carry out these activities.
- Any licence amendment application seeking to carry out disposal of putrescible wastes into the Class IV cell must include information on waste acceptance and separation methodologies, landfill gas collection and management infrastructure (supported by gas generation modelling) record keeping practices, and discussion of potential impacts to differential settlement/stability within the cell, recovery options and contingency methods for maintaining operations in the event that the cell is subject to unplanned closure.
- Separation distance to groundwater for this assessment has been determined based on the level of the base of the concrete slab in the secondary leachate collection sump (being the lowest point of the Cell 1 landfill) and the highest inferred groundwater levels as recorded during the pre-construction groundwater monitoring events (2018 and 2019). Additional groundwater monitoring required during the works approval construction phase was not undertaken and therefore there is uncertainty on the maximum natural groundwater level. The receipt of additional groundwater data as required by controls in this licence may inform the Department's re-assessment of risk relating to landfill infrastructure integrity and leachate emissions and the suitability of controls determined on the licence. This may influence the risk rating to some or all of the activities at the premises.
- DWER considers that, due to the waste types proposed to be accepted, and the potential for unplanned closure scenarios to occur over the life of operations at the premises, a detailed closure plan is necessary to be developed in the early life of the operation of Cell 1 for the premises. The Delegated Officer considers that unplanned closure scenarios may include, but are not limited to, failure or compromise of the landfill liner system, an occasion of interference of the Pindan Sand Ridge (either by human or natural causes) that may impact on stability of the landfill cell), and/or damage to the landfill by a catastrophic event such as fire or cyclonic weather.
- The closure plan should include, but not be limited to, detail on progressive closure implementation, closure completion outcomes, supporting information and data to inform the proposed closure plan, and information to demonstrate that planned and unplanned closure may be implemented in a timely manner should it be required (this may include evidence of contractual and/or available financial provisions for both planned and unplanned closure).

TRACEY HASSELL
A/SENIOR MANAGER WASTE INDUSTRIES
REGULATORY SERVICES

Delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
Supporting documentation provided by the Applicant			
1	Emergency Response Plan (ERP), Talis Consultants Pty Ltd April 2021.	(Talis, 2021a)	DWERDT451210
2	Leachate Management Plan, Talis Consultants Pty Ltd May 2021	Application Documentation	DWERDT451210
3	Licence Application for the Pilbara Regional Waste Management Facility	Application Documentation	DWERDT451210
4	Licence Application Additional Information – Stability Risk, Talis Consultants Pty Ltd, dated 10 August 2021.	Application Documentation	A2041859
5	Licence Application – Response to second request for further information for licence application, Talis Consultants Pty Ltd, dated 6 October 2021.	Application Documentation	A2052823
6	Operational Environmental Management Plan (OEMP), Talis Consultants Pty Ltd May 2021	(Talis, 2021b)	DWERDT451210
7	Phoenix Environmental Sciences 2017, <i>Flora and vegetation survey and terrestrial fauna survey for the Pilbara Regional Waste Management Facility</i>	Phoenix 2017	Flora and fauna survey (DWERDT145428)
8	Talis Consultants Pty Ltd 2018, <i>Phase 1 Hydrogeological Risk Assessment DRAFT</i>	N/A	Phase 1 hydrogeological risk assessment (DWERDT145419)
9	Talis Consultants Pty Ltd 2018, <i>Phase 2 Hydrogeological Risk Assessment</i> ; incl. Talis Consultants Pty Ltd 2018, <i>Seepage assessment liner performance</i> .	N/A	Phase 2 hydrogeological risk assessment (DWERDT145417)
10	Licence Application – Response to draft licence documentation, Talis Consultants Pty Ltd, dated 8 December 2021 (including revised Asbestos Management Plan, dated December 2021)	N/A	DWERDT536167
Other reference documents			
11	DEE 2008, <i>Bioregion – Pilbara</i> . Department of the Environment and Energy, Canberra.	DEE 2008	www.environment.gov.au

	Document title	In text ref	Availability
12	DOH 2009, <i>Guidelines for Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia</i> . Department of Health, Perth.	N/A	www.health.wa.gov.au
13	EPA Victoria 2015, <i>Best practice environmental management, Siting, design, operation and rehabilitation of landfills (VIC BPEM)</i> . Environment Protection Authority Victoria, Melbourne.	EPA Victoria 2015	www.epa.vic.gov.au
14	DER 2015, <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	N/A	www.dwer.wa.gov.au
15	DER 2015, <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	N/A	www.dwer.wa.gov.au
16	DER 2016, <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	N/A	www.dwer.wa.gov.au
17	DER 2016, <i>Guidance Statement: Environmental Siting</i> . Department of Environment Regulation, Perth.	N/A	www.dwer.wa.gov.au
18	DER 2017, <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	N/A	www.dwer.wa.gov.au
19	DWER 2019, <i>Guideline: Decision making</i> . Department of Water and Environmental Regulation, Perth.	N/A	www.dwer.wa.gov.au
20	DWER 2019, <i>Guideline: Industry Regulation Guide to Licensing</i> . Department of Water and Environmental Regulation, Perth.	N/A	www.dwer.wa.gov.au
21	DEC 2012, <i>Guidelines for managing asbestos at construction and demolition waste recycling facilities</i> . Department of Environment and Conservation, Perth.	DEC 2012	www.dwer.wa.gov.au
22	DEE 2008, <i>Bioregion – Pilbara</i> . Department of the Environment and Energy, Canberra.	DEE 2008	www.environment.gov.au

	Document title	In text ref	Availability
23	<i>National Environment Protection (Ambient Air Quality) Measure</i>	NEPM	https://www.legislation.gov.au/Details/C2004H03935
24	Contaminated Sites Ground and Surface Water Chemical Screening Guidelines Department of Health	DOH 2014	www.health.wa.gov.au

Appendix 2: Summary of Licence Holder's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder comment	DWER response
1	<p>The acceptance criteria for Asbestos Containing Material (ACM) within Table 1 specifies that it must be wrapped in heavy duty plastic. The Licence Holder has requested that ACM also be permitted to be contained in a manner that prevents asbestos fibres entering the atmosphere during transportation.</p>	<p>It is noted that an updated version of the proposed Asbestos Management Plan – version 1b (AMP) was provided with the Licence Holder's response.</p> <p>This proposed change includes waste types and control measures that are considered to achieve a similar outcome to those assessed for the original application.</p> <p>Table 1 of the licence has been amended.</p>

Condition	Summary of Licence Holder comment	DWER response
1	<p>The Licence Holder clarified that some Contaminated Solid Wastes may contain asbestos, however due to the other properties of the waste it would not be suitable for disposal into the asbestos monocell. The Licence Holder clarified they would dispose of these types of wastes into the Class IV landfill and provided an updated Asbestos Management Plan (AMP) to account for this.</p>	<p>It is noted that an updated version of the proposed AMP – version 1b was provided with the Licence Holder’s response.</p> <p>It is agreed that Contaminated Solid Wastes containing asbestos are most appropriately disposed of into the Class IV landfill cell and not the asbestos monocell. The updated AMP contains control measures for both disposal options.</p> <p>Table 1 is amended to clarify contaminated solid wastes containing ACM are to be accepted as contaminated solid wastes for the purposes of landfilling into the Class IV landfill cell, and where material contains, or is suspected to contain ACM it is appropriately contained.</p> <p>Table 2 is amended to ensure that contaminated solid waste containing, or suspected of containing ACM is disposed of immediately upon acceptance.</p> <p>Table 3 is amended to ensure that contaminated solid waste containing, or suspected of containing ACM is covered immediately upon disposal to the Class IV landfill cell.</p>

Condition	Summary of Licence Holder comment	DWER response
1	<p>The Licence Holder clarified that they seek approval to accept per- and poly-fluoroalkyl substances (PFAS) materials, as discussed within documentation related to the original works approval application. The Licence Holder also indicated that Special Waste Type 3 – solid wastes impacted by PFAS – was included in the licence application documentation as attachment 6B.</p>	<p>DWER notes that burial of PFAS materials were referred to in the original works approval application, however as they were not mentioned in the licence application they were not included as a waste type within the scope of this assessment.</p> <p>The Licence Holder makes reference to Special Waste Type 3 being listed within Attachment 6B of the Licence application. It is noted that Attachment 6B was provided with the application for works approval W6225/2019/1. No Attachment 6B was provided with the licence application to which this assessment relates.</p> <p>It is noted that licence application did make reference to the acceptance of PFAS liquid wastes; however, this waste type was subsequently removed by the Applicant when the liquid waste types proposed for the scope of this assessment were reduced (refer to section 2.1).</p> <p>As PFAS solid and liquid wastes were not included in the scope of the application that was advertised publicly, and have not been risk assessed in determining the licence DWER are unable to consider adding this waste type to the conditions determined for the final instrument.</p> <p>The Licence Holder may apply for acceptance of PFAS wastes in a future licence amendment.</p>

Condition	Summary of Licence Holder comment	DWER response
1	Inert Waste Type 2	<p>As discussed within this Decision Report the construction of the tyre monocell was specified within the conditions of the works approval and therefore acceptance and disposal of tyres under Category 57 and 63 may not be authorised under the licence until such time as the Applicant has demonstrated the proposed infrastructure is constructed in accordance with the works approval. Alternatively, the Licence Holder may apply to amend the conditions of the works approval to reflect alternative proposed infrastructure for the storage and disposal of tyres at the premises.</p> <p>Conditions 3 and 4 of the works approval outline the evidence required to demonstrate works have been constructed as specified within the works approval. Once the Licence Holder has submitted a compliance certification in relation to the tyre monocell the Licence Holder may request the acceptance of tyres through a licence amendment. DWER will carry out an assessment of the compliance certification as part of the licence amendment application validation.</p>
11	The Licence Holder suggested that the product specification of 0.0001% for asbestos should instead read 0.001%.	The typographical error has been corrected.

Condition	Summary of Licence Holder comment	DWER response
19	<p>The draft licence contained a condition limiting the operating hours to 0600 to 1700 Monday to Sunday. The Licence Holder has requested that flexibility be given to operating the facility outside of these hours due to unforeseen circumstances.</p> <p>The Licence Holder notes that any operations outside of these timeframes will be supervised by qualified personnel, and permission to access the site outside of these hours will be sought from the Shire of Ashburton.</p>	<p>The Delegated Officer notes that this condition duplicating a proposed control that was taken directly from the Licence Holder's Operational and Environmental Management Plan.</p> <p>The Delegated Officer considers this to be a reasonable request given the proposed sporadic and limited nature of access to the site outside of operating hours and with additional proposed controls in place. The risk assessment has been updated to reflect the acceptance of waste during out-of-ordinary operational scenarios.</p> <p>The main control measure offered by specifying operating hours is to ensure that the site is manned at all times it is operational, and securely locked when no personnel are present.</p> <p>Therefore, this condition has been amended to permit operations outside of normal hours where the gatehouse has been notified and the site is attended. Recording requirements for out-of-ordinary operational scenarios have been added to Condition 43.</p> <p>The Delegated Officer notes that the Licence Holder is required to meet the assigned levels in the <i>Environmental Protection (Noise) Regulations 1997</i> during out-of-ordinary operations. Should DWER identify that the site is regularly operating after hours, the licence controls may be reviewed.</p>

Condition	Summary of Licence Holder comment	DWER response
23	<p>The draft condition specified that all equipment and machinery be fitted with exhaust silences and acoustic panels to minimise noise emissions. The Licence Holder requests that these requirements are overly prescriptive and not relevant for all types of equipment and machinery, and the condition be amended to specify noise emission controls where necessary.</p>	<p>The Delegated Officer notes that this condition duplicating a proposed control that was taken directly from the Licence Holder's Operational and Environmental Management Plan.</p> <p>The Delegated Officer notes that the Licence Holder is required to meet the assigned levels in the <i>Environmental Protection (Noise) Regulations 1997</i>. The condition has been amended to ensure that where noise emissions from equipment and machinery do not comply with the assigned levels within the noise regulations, the licence holder must install and maintain additional devices to control minimise noise emissions for that piece of equipment or machinery.</p>
23	<p>The draft condition specified that the pond must be emptied prior to the onset of the wet season, and the pond liner integrity assessed. The Licence Holder has requested that this condition be amended to clarify that visual inspection is sufficient.</p>	<p>The Delegated Officer considers that visual inspection is sufficient to identify damage and the condition is amended to specify visual inspection. Condition 43 required the Licence Holder to maintain books relating to any maintenance or infrastructure that is performed in the course of complying with condition 23.</p>
23	<p>The draft condition specified that a 10,000 L all-wheel drive water cart is required for dust suppression. The Licence Holder notes that while it did originally propose this control measure, due to budgetary constraints only a standard 10,000 L water cart is available at this time.</p>	<p>It is noted that the reference to an all-wheel drive water cart was included as specified by the Licence Holder.</p> <p>The condition has been amended to remove reference to the requirement for an all-wheel vehicle. It is noted that it is a requirement that the fire suppressant equipment available on the premises must be suitable for the control of fires that may occur anywhere on the premises.</p>

Condition	Summary of Licence Holder comment	DWER response
40 and 41	The Licence Holder has requested the submission timeframe for annual reports is extended from 30 days to 90 days, particularly due to the volume of information required as well as closure of laboratories over the Christmas period and cyclone season.	The Delegated Officer considers 90 days to be appropriate. The condition is amended.