Government of Western Australia
Department of Water and Environmental Regulation

# Amendment Report

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| **Licence Number** | L8889/2015/1 |
| **Licence Holder** | Eastern Metropolitan Regional Council |
| **ACN** | N/A |
| **File Number:** | DER2015/000777-1 |
| **Premises** | Red Hill Waste Management Facility<br>Legal description –<br>Lot 1 Diagram 15239, Lot 2 on Diagram 68630 and Lot 11 on Diagram 69105 Toodyay Road Red Hill and Lot 12 on Plan 26468 Toodyay Road, Gidgegannup |
| **Date of Report** | 30/03/2020 |
| **Status of Report** | FINAL |

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**MANAGER WASTE INDUSTRIES**
**REGULATORY SERVICES**
*An officer delegated by the CEO under section 20 of the EP Act*

## Contents

# 1. Definitions and interpretation

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

**Table 1: Definitions**

| Term | Definition |
|---|---|
| AACR | Annual Audit Compliance Report |
| AER | Annual Environment Report |
| Amendment Report | refers to this document |
| Annual period | means the inclusive period from 1 January until 31 December in the same year |
| AS 4454 | means Australian Standard AS4454 Composts, soil conditioners and mulches |
| Category/ Categories/ Cat. | categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations |
| CEO | means Chief Executive Officer.<br>CEO for the purposes of notification means:<br>Director General<br>Department Administering the *Environmental Protection Act 1986*<br>Locked Bag 33 Cloisters Square<br>PERTH WA 6850<br>info@dwer.wa.gov.au |
| Daylight hours | means the hours between sunrise and sunset |
| Delegated Officer | an officer under section 20 of the EP Act |
| Department | means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act. |
| DWER | Department of Water and Environmental Regulation |
| EP Act | *Environmental Protection Act 1986* (WA) |
| EP Regulations | *Environmental Protection Regulations 1987* (WA) |
| Existing Licence | The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review |
| FOGO | Food organics and garden organics |

| Term | Definition |
|---|---|
| Green waste | means waste that originates from flora and which does not contain or has not been treated or coated with, preserving agents, biocides, fire retardants, paint, adhesives or binders |
| Licence Holder | Eastern Metropolitan Regional Council |
| Minister | the Minister responsible for the EP Act and associated regulations |
| MS | Ministerial Statement |
| Noise Regulations | *Environmental Protection (Noise) Regulations 1997* (WA) |
| OFA | odour field assessment |
| Prescribed Premises | has the same meaning given to that term under the EP Act. |
| Premises | refers to the premises to which this Amendment Report applies, as specified at the front of this Amendment Report. |
| Revised Licence | the amended Licence issued under Part V, Division 3 of the EP Act, with changes that correspond to the assessment outlined in this Amendment Report. |
| Risk Event | as described in *Guidance Statement: Risk Assessment* |

# 2. Amendment description

The following guidance statements have informed the assessment and decision outlined in this Amendment Report.

- *Guideline: Decision Making (June 2019)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*
- *Guidance Statement: Setting Conditions (October 2015)*

## 2.1. Purpose and scope of assessment

On 7 December 2018, the Eastern Metropolitan Regional Council (the Licence Holder) submitted an application to the Department of Water and Environmental Regulation (DWER) to amend L8889/2015/1. Licence L8889/2015/1 is in place for the Red Hill Waste Management Facility, a Prescribed Premises for the following categories:

- Category 12 – Screening etc of material
- Category 62 – Solid waste depot
- Category 64 – Class II or III putrescible landfill site
- Category 65 – Class IV secure landfill site
- Category 67A – Compost manufacturing and soil blending

The scope of the amendment application relates to the operation of a mechanical evaporator at the Class III leachate ponds located on Lot 12 of the Premises. In addition, the Licence Holder requested an increase to the Category 12 production capacity from 50,000 to 200,000 tonnes per annual period.

As part of the assessment DWER has also considered the relocation of green waste processing activities, which are currently occurring on a recently constructed hardstand on Lot 12, within the scope of the amendment. DWER had originally intended to assess this infrastructure and operational change as part of a separate amendment relating to an interim food organics and garden organics (FOGO) facility at the same location. However, as the Licence Holder has already undertaken relocation works and is currently using the new hardstand infrastructure, it was considered prudent to finalise this aspect of the assessment as soon as possible. In February 2020, DWER became aware that an additional hardstand had been constructed to the south without prior approval or notification to DWER. As this extension area was proposed to be used for green waste and final compost product storage, an assessment of its suitability for this purpose was added to the scope of this amendment.

Table 2 lists the documents and information considered in the amendment process and submitted as part of the assessment process.

**Table 2: Application documents**

| Document description | Scope | Document source | Date received |
|---|---|---|---|
| Supporting documents submitted during previous amendment assessment:<br>• Procedure – Class IV Leachate Evaporator<br>• EMR0085MK 1010 Attenuated Pivot Evaporator Operation and Maintenance Manual<br>• Environmental Noise Assessment, Lloyd George Acoustics | Mechanical evaporator | Amendment Notice 3 application | 6 July 2018 |

| Document description | Scope | Document source | Date received |
|---|---|---|---|
| Application (Amendment) signed by Sandra Evans and attached supporting documentation including:<br>• Attachment 2 – Figures<br>• Attachment 8A – Pathogen Dispersion Assessment of Leachate Evaporator, Talis Consulting<br>• Attachment 8B – Environmental Noise Assessment, Lloyd George Acoustics (same as Attachment 8B above) | Mechanical evaporator | Current amendment application | 7 December 2018 |
| Response to Request for Information letter issued 26 July 2019, including:<br>• Email from Sandra Evans dated 18 September 2019 – Providing preliminary leachate sampling results for H-3 and C-14 from the East Metropolitan Health Service<br>• Email from Sandra Evans dated 22 October 2019 – Long-lived isotope analysis including attached Radiation Professionals laboratory report<br>• Email from Sandra Evans dated 5 November 2019 – including 'Radiation Professionals Pty Ltd Water Sampling Procedure'<br>• Email from Stuart Parr (Radiation Professionals) dated 22 November 2019 – including 'Exclusion Zone for Evaporation Unit – New Storage Pond', 'Red Hill Environmental Management System Procedure – Class IV Leachate Evaporator', 'Mechanical evaporator specifications' and 'EMRC Public Dose H3 C14 Ra226.xlsx'<br>• Determination of Potential Worker and Public Doses Due to Mechanical Evaporation of Leachate Pond L10, Radiation Professionals dated 16 December 2019. | Mechanical evaporator | Current amendment application | Various as noted |
| Email requesting amendment to the Category 12 throughput from Tanya Beinhauer. | Screening and crushing | Outcome of compliance inspection | 18 September 2019 |
| Response to draft licence amendment including:<br>• Letter response<br>• Procedure – Assisted Evaporation Procedure, February 2020<br>• Updated Figure 2 – Premises layout<br>• Supplementary email from Sandra Evans dated 25 February 2020 | Mechanical evaporator<br>Screening and crushing | Response to draft | 6 and 25 February 2020 |
| Response to Request for Information letter issued 24 May 2019, including:<br>• Attachment A – Construction Report: New Greenwaste Processing Hardstand and Leachate Pond | Green waste processing | Separate amendment application (interim FOGO facility) | 17 June 2019 |
| Response to Review of Construction Compliance Report, issued 18 July 2019:<br>• Letter Construction Report<br>• Greenwaste leachate pipe calculations spreadsheet (received by separated email 4 November 2019)<br>• Greenwaste hardstand drainage construction (received by | Green waste processing | Construction compliance assessment | 9 August 2019 |

| Document description | Scope | Document source | Date received |
|---|---|---|---|
| separate email 28 October 2019) | | | |
| Response to Request for Further Information letter issued 28 August 2019:<br>• Email response from Sandra Evans | | Separate amendment application (interim FOGO facility) | 28 October 2019 |
| Response to Request for Further Information letter issued 8 November 2019:<br>• Letter response<br>• Hardstand permeability test results<br>• Green waste processing hardstand cross sections | Green waste processing | Separate amendment application (interim FOGO facility) | 17 December 2019 |
| Response to Environmental Inspection Report issued 24 January 2020:<br>• Photograph of green waste processing hardstand. | Green waste processing | Outcome of compliance inspection | 17 February 2020 |
| Email from Sandra Evans regarding green waste hardstand pad extension | Green waste processing | Current amendment application | 6 March 2020 |

## 2.2. Background

The Licence Holder operates the Premises as a waste management facility which includes the following activities: Class III putrescible landfilling, Class IV secure landfilling, operation of a waste transfer facility, composting and screening of material. These are prescribed activities under the EP Act and are licensed under L8889/2015/1. A separate organisation leases a portion of the Premises and conducts landfill gas extraction and power generating activities.

The Premises operates from 7:00 am to 4:00 pm Monday to Friday, 8:00 am to 4:00 pm on Saturdays and 10:00 am to 4:00 pm on Sundays. These operating hours apply to all of the major aspects of site activities including receipt of kerbside collection truckloads, waste disposal at the tipping face, operation of the waste transfer station and composting operations.

The Premises layout is shown in Figure 1.

### 2.2.1. Mechanical evaporation

Managing excess leachate at the Premises has been a recurring challenge for the Licence Holder for a number of years. In 2013, the leachate management system at the Premises reached its capacity and excess leachate from the green waste processing area and Class III landfill was directed to the Class IV cell for temporary storage. At this time, the Premises stopped accepting Class IV waste for disposal.

From 2013 to 2018, the Licence Holder used the Stage 2 Class IV cell to store excess leachate. By 2018, approximately 60,000 $m^3$ of leachate was estimated to be held in the Stage 2 Class IV cell. DWER understands that a mechanical evaporator was installed and fully commissioned within the Class IV cell in April 2015 (EMRC, March 2016 – *Red Hill Annual Monitoring and Compliance Report 2015*). The installation of this equipment was not approved by DWER at the time.

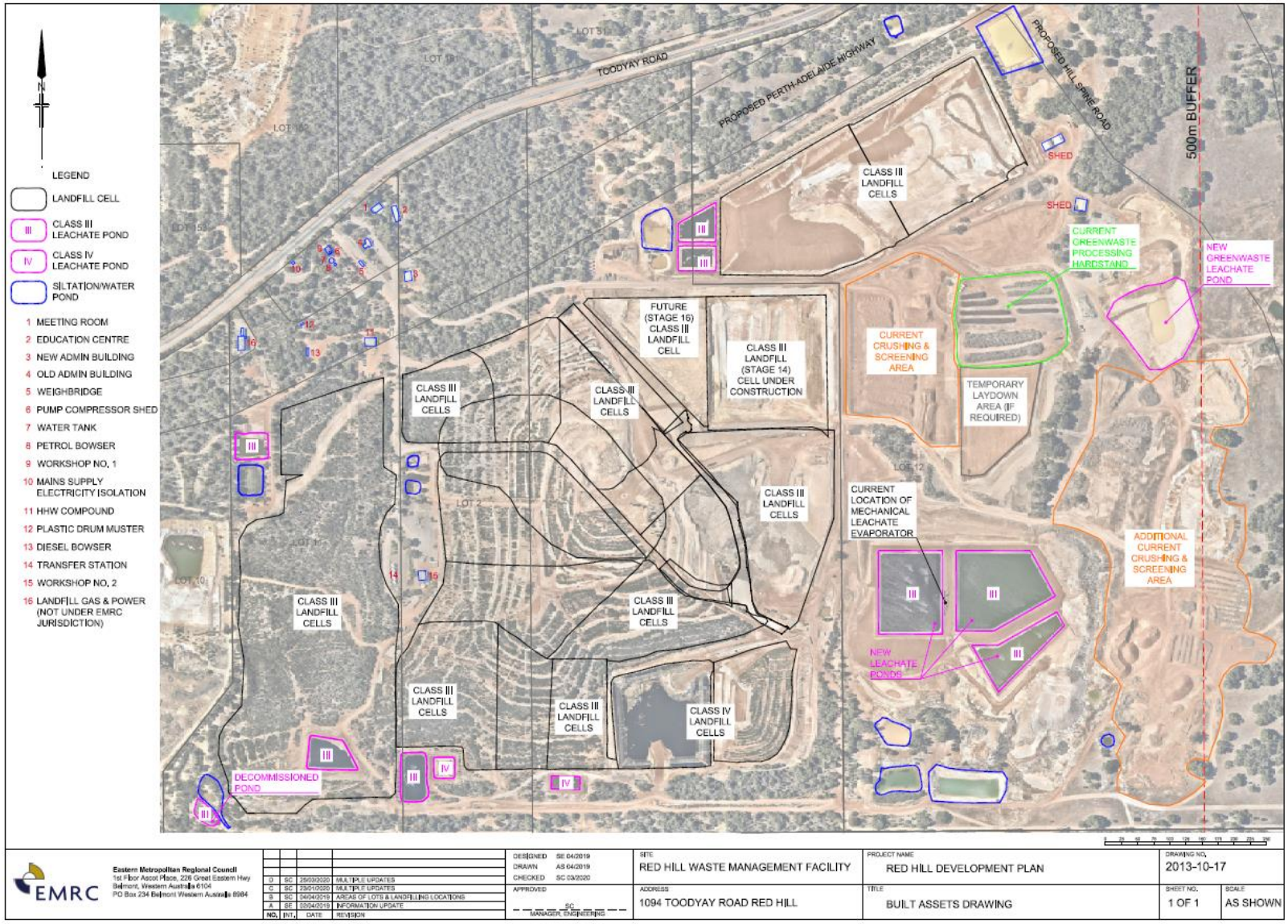


**Figure 1: Premises layout**

In November 2017, the Licence Holder applied for a licence amendment to construct three new Class III leachate ponds (one holding pond and two evaporation ponds) on Lot 12 of the Premises. This amendment application relates to Amendment Notice 3. The scope of this amendment application included the relocation of the existing mechanical evaporator system operating in the Stage 2 Class IV cell to the new Class III leachate ponds on Lot 12.

In June 2018, the Licence Holder advised DWER to remove the mechanical evaporator component from the scope of the application (Amendment Notice 3). This action was undertaken to allow the Licence Holder more time to gather technical information relating to mechanical evaporation to support a separate amendment application to be submitted at a later date.

Subsequent to this, the Licence Holder completed construction of the three Class III leachate ponds on Lot 12 in December 2018. These ponds provide a combined operational capacity of 87,626 $m^3$. In 2019, the Licence Holder started draining leachate from the Stage 2 Class IV cell and redirecting it to the new ponds on Lot 12. The Licence Holder has since confirmed via email correspondence on 26 March 2020 that this activity is now complete. The Licence Holder continues to periodically deploy pumps in the Class IV cell to transfer any stormwater accumulating on top of the liner to the Class III leachate ponds.

In December 2018, the Licence Holder submitted the current amendment application. At the time the application was submitted, the mechanical evaporator was situated in the Stage 2 Class IV cell. The Licence Holder indicated on the Application Form that it was their intention to move the mechanical evaporator to the new leachate holding pond on Lot 12 when leachate was pumped into the new pond.

DWER understands that the mechanical evaporator is now located between the Class III leachate holding pond and adjacent evaporation pond. Figure 2 shows the location of the Stage 2 Class IV cell, newly constructed Class III leachate ponds and the current location of the mechanical evaporator.

Based on discussions during an on-site DWER compliance inspection in September 2019, DWER understands that the Licence Holder has been periodically turning on the mechanical evaporator at its new location on Lot 12. The Licence Holder indicated that this was necessary to maintain function and prevent deterioration of the equipment.

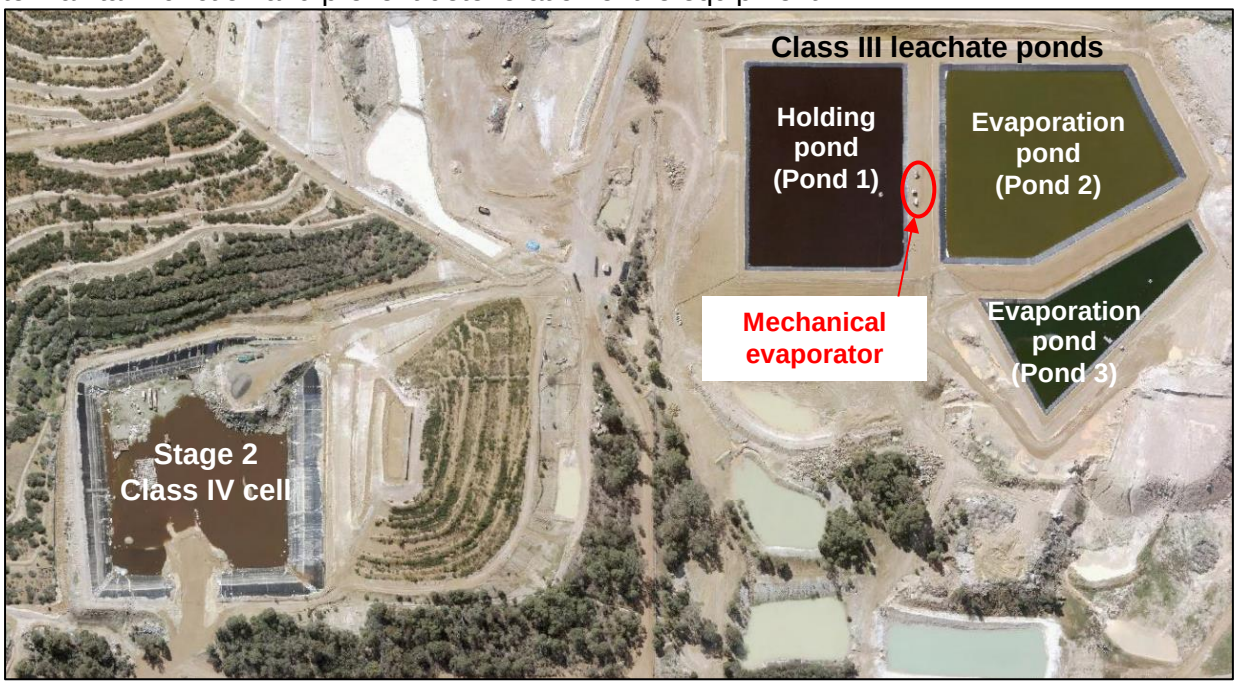


**Figure 2: Stage 2 Class IV cell and Class III leachate ponds (aerial imagery August 2019).**

### 2.2.2. Screening and crushing activities

The Licence Holder extracts lateritic gravel during the construction of new landfill cells. This material is crushed and screened on the Premises to produce a ferricrete gravel product which is used on-site and sold commercially. These activities meet the description of Category 12 screening etc of material in Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations).

A DWER compliance inspection was undertaken at the Premises on 3 September 2019. During the inspection, DWER identified that the Licence Holder was likely to have exceeded the approved Category 12 production capacity of 50,000 tonnes during the 2018 annual period. The Licence Holder subsequently confirmed that they had screened a total of 162,000 tonnes during the 2017-2018 financial year and 102,600 during the 2018-2019 financial year.

At the time, DWER officers advised the Licence Holder that a licence amendment would be required to approve an increase in the Category 12 production capacity if they expected that future annual throughputs would continue to exceed 50,000 tonnes. As two licence amendments were currently under assessment at the time, the Delegated Officer advised the Licence Holder that an amendment request for this item may considered within the scope of one of the existing amendment applications. In this regard, the Licence Holder submitted a licence amendment request for the increased Category 12 production capacity by email on 18 September 2019.

### 2.2.3. Green waste processing

The Licence Holder has conducted composting at the Premises to recycle green waste into mulch and compost since 1999. These activities were undertaken at the former Greenwaste Facility in the north section of Lot 1 under the Prescribed Premises Category 67A. The Premises currently processes green waste from council verge collections, green waste bins, transfer stations and commercial customers.

During early 2019, the Licence Holder constructed a new hardstand pad in the north of Lot 12 which was intended to be used for processing green waste and FOGO waste. The Licence Holder constructed this infrastructure without seeking prior authorisation or notifying DWER. Further discussion of this matter is provided in Section 2.3.3.

Between February and September 2019, without obtaining appropriate approvals from DWER, the Licence Holder moved all green waste processing activities on the Premises to the new northern hardstand pad on Lot 12 (Figure 3). The Licence Holder also proposes to use this hardstand as an interim FOGO processing facility. FOGO processing is outside of the scope of this amendment and is being assessed under a separate amendment application.

Between September and November 2019, the Licence Holder constructed a new hardstand pad to the south of the recently constructed green waste processing hardstand (Figure 3). The Licence Holder constructed this infrastructure without seeking prior authorisation or notifying DWER. Construction of the southern hardstand pad came to DWER's attention in February 2020 when the Licence Holder provided an updated site layout map showing the hardstand extension (Figure 1). After seeking clarification from the Licence Holder, DWER was informed that the purpose of this hardstand is a temporary laydown area for storage of clean green waste, final compost products, ferricrete and plant equipment. The Licence Holder has stated that final compost product will only be stored temporarily on this hardstand and only when required.

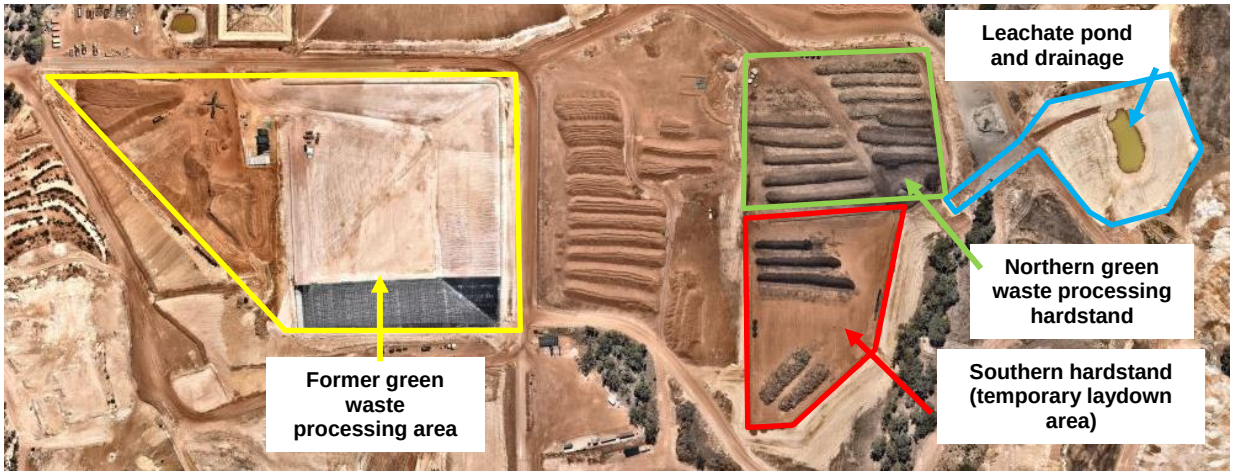


**Figure 3: March 2020 aerial imagery showing former and new green waste processing areas**

## 2.3. Equipment and infrastructure specifications

### 2.3.1. Mechanical evaporation

The Licence Holder proposes to operate a Minetek Attenuated Pivot Evaporator 1010 System to evaporate leachate stored in the leachate holding pond on Lot 12 of the Premises.

The purpose of the mechanical evaporator is to increase the rate of evaporation from the leachate holding pond, thereby reducing the volume of leachate stored at the Premises. The mechanical evaporator achieves an increased rate of evaporation by emitting small droplets of liquid into the air. Mechanical evaporation achieves a higher rate of evaporation than evaporation ponds by increasing the surface area of water, increasing the air to water mixing ratio, increasing the air velocity and ejection of water into the air to achieve increased 'hang time'.

The Minetek Evaporator is reported to achieve an evaporation efficiency of approximately 50%, that is, approximately 50% of the water pumped through the unit is evaporated (Couton and Timones, 2017).

The Minetek Attenuated Pivot Evaporator 1010 System (Figure 4) comprises the following components:

- one 160 kVA generator;
- one 1010 galvanised attenuated pivot evaporation system unit with skid;
- one 22 kW submersible pontoon pump (Franklin multistage submersible pump capable of pumping 10 litres per second);
- one motor centre with two variable speed drives mounted to a galvanized skid;
- one weather station;
- two pressure switches (low and high); and
- an interconnecting electrical cable and ladder system.

The evaporator works by introducing high velocity into the outlet duct via an axial flow fan, at the point of exhaust the evaporator pushes the leachate through accelerator nozzles under pressure which atomize the leachate into fine droplets before discharge to air. Heavy droplets fall back to the pond or ground surface and the fine mist evaporates. The evaporator unit has the following specifications:

- operating flow rate of 10 litres per second;
- evaporating approximately 25,000 litres per hour under optimal conditions;
- ejection port approximately 4 metres above ground level;
- outlet duct with 1 metre diameter;
- 37 kW, 415 V, IP66 electric motor; and
- casing, inlet and outlet sound attenuation.

The mechanical evaporator is designed to operate at temperatures from 5 to 45ºC and relative humidity from 0 to 90%.

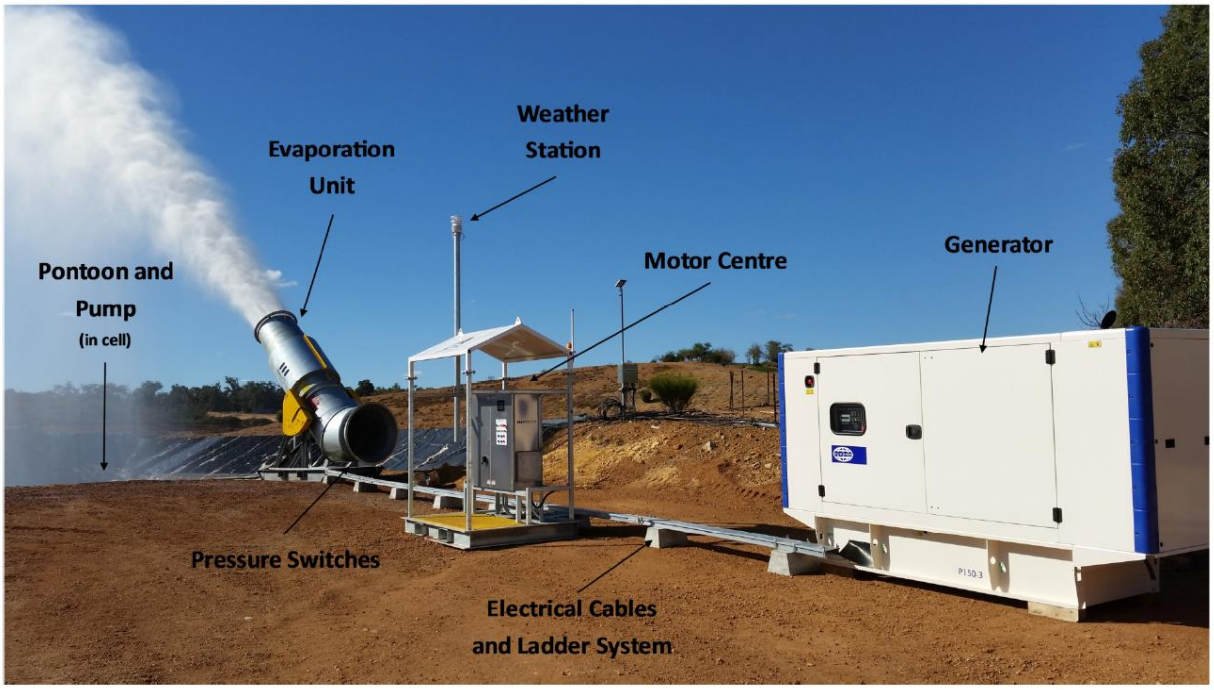


**Figure 4: Minetek mechanical evaporator system**

### 2.3.2. Screening and crushing activities

Crushing and screening equipment is not permanently located at the Premises. Different models of crushing and screening equipment are brought onto the Premises temporarily during campaigns and are operated by contractors engaged by the Licence Holder to undertake these activities.

### 2.3.3. Green waste processing area

New infrastructure which will be associated with green waste processing is summarised in Table 3 and shown in Figure 5.

**Table 3: New infrastructure for FOGO and Green Waste processing**

| Infrastructure | Relevant instrument | Assessment process |
|---|---|---|
| Northern hardstand pad | Infrastructure not previously assessed/approved | Construction specifications assessed as part of this amendment process |

| Infrastructure | Relevant instrument | Assessment process |
|---|---|---|
| Southern hardstand pad (temporary laydown area) | Infrastructure not previously assessed/approved | Construction specifications partially assessed as part of this amendment process |
| Leachate pond | Amendment Notice 4 | Construction compliance assessment process separate to this amendment process |
| Drain between northern hardstand pad and leachate pond | | |

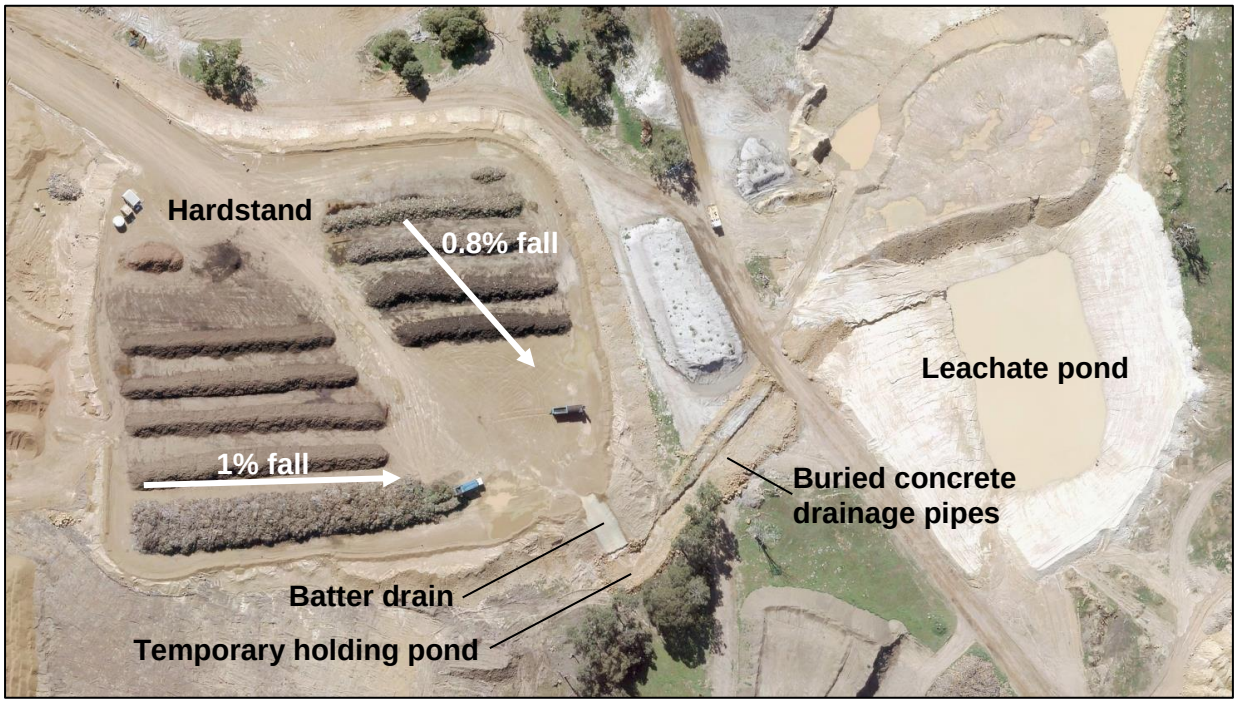


**Figure 5: Northern green waste processing hardstand, leachate drainage and leachate pond**

## Northern hardstand pad

As the Licence Holder did not seek approval from DWER before constructing the northern hardstand pad, the Delegated Officer has initiated the assessment of the suitability of this infrastructure within the scope of this amendment package.

DWER notes that the Existing Licence included approval to construct a new green waste facility, however the Delegated Officer determined that these conditions are not relevant to the new hardstand constructed in 2019 because:

- The new hardstand was constructed in a different location to that which was assessed and approved under the Existing Licence.
- The new hardstand was not constructed to the specifications assessed and approved under the Existing Licence.
- Verbal correspondence between the Delegated Officer and Sandra Evans (EMRC) on 15 July 2019, confirmed that the Licence Holder did not intend to construct the new green waste processing hardstand to comply with the conditions in the Existing Licence.

The northern hardstand pad has been constructed to the specifications presented in Table 4.

**Table 4: Northern hardstand specifications**

| Component | Specification |
|---|---|
| Area | 20,000 $m^2$ |
| Leachate barrier | Constructed of a minimum thickness of 500 mm clay compacted by a large flatbed roller.<br>Permeability ranging from $1.6x10^{-10}$ to $1.2x10^{-9}$ m/s (based on three samples tested in October 2019) and remoulded density ratio of 95%. |
| Protective cover | 300 mm of ferricrete |
| Grading | Fall of 0.8-1% towards the south-eastern corner. During a site inspection in September 2019, DWER observed that stormwater/leachate was ponding on the hardstand which was not draining effectively (Figure 6 and Figure 7). A photograph provided by the Licence Holder in February 2020 did not show any pooling of stormwater/leachate on the hardstand (Figure 8). |
| Bunding design | Ferricrete bunding about 0.5 m high surrounding the perimeter of the hardstand. DWER noted during a site inspection in September 2019 that this bunding was in poor condition and may have required remedial works. |
| Stormwater management | Stormwater outside of the hardstand to be prevented from entering the hardstand by its elevated height above the surrounding ground level and the perimeter bund.<br>Stormwater and leachate within the hardstand will be managed using temporary ferricrete bunding to delineate 'active' and 'inactive' zones, described as follows:<br>• Active areas are those which contain stockpiled waste or materials undergoing composting. Stormwater/leachate generated in active areas will be diverted to the leachate pond.<br>• Inactive areas are those where there are no materials stockpiled or which are being used for the storage of clean green waste or final product materials. Stormwater/leachate generated within inactive areas will be diverted to the environment via existing stormwater structures on the Premises. |

**Key Findings:**

(1) The construction specifications of the northern green waste processing hardstand provide a suitable leachate barrier to prevent infiltration of leachate to soil and groundwater. The protective layer will prevent the barrier becoming damaged by heavy vehicle operations.

(2) The northern hardstand observed during September 2019 was not sufficiently graded to prevent pooling of stormwater/leachate. The Delegated Officer is not aware of whether remedial works have been undertaken to resolve this issue since the inspection. A photograph provided by the Licence Holder in February 2020 does not show pooling of stormwater/leachate on the hardstand (Figure 8).

**Figure 6: Stormwater/leachate pooling on the green waste processing hardstand, September 2019**

**Figure 7: Stormwater/leachate pooling on the green waste processing hardstand, September 2019**

**Figure 8: Northern green waste processing hardstand, photograph provided by Licence Holder February 2020**

## Southern hardstand pad

The southern hardstand pad is proposed to be used as a temporary laydown area for storage of clean green waste, final compost products, ferricrete and plant equipment as required. Stormwater collected on this hardstand will be released to the environment. As the Licence Holder did not seek approval from DWER before constructing the hardstand pad, the Delegated Officer has initiated the assessment of the suitability of this infrastructure within the scope of this amendment package.

The specifications of this hardstand are summarized in Table 5.

**Table 5: Southern hardstand specifications**

| Component | Specification |
|---|---|
| Area | 16,500 $m^2$ |
| Leachate barrier | Unknown material and thickness<br>Dry density ratio of 94.5-95.5% |
| Protective cover | Unknown material and thickness |
| Grading | Fall of approximately 2% towards the south-eastern corner. |
| Bunding design | Ferricrete bunding about 1 m high surrounding the perimeter of the hardstand. |
| Stormwater management | Stormwater/leachate on the hardstand to drain off the south-eastern corner via a designated gap in perimeter bund. During heavy rainfall events, excess stormwater will flow along drainage lines and into stormwater ponds near the southern boundary of the premises. |

**Key Findings:**

(3) The ability of the southern hardstand pad to prevent infiltration is unknown as no permeability test results were provided and the Licence Holder has not confirmed what material the hardstand was constructed with or the thickness of the hardstand pad.

(4) The Licence Holder considers the southern hardstand pad to be an 'inactive area' and therefore it was not designed to contain stormwater/leachate.

## Leachate pond and drainage

Construction of the new leachate pond, including drainage infrastructure from the hardstand, was previously approved by DWER in Amendment Notice 4. A separate construction compliance process was undertaken to assess the suitability of these items of infrastructure and their compliance with conditions of the licence. This assessment was finalised on 8 November 2019 when DWER issued a letter to the Licence Holder to confirm that Conditions G16, G17 and G18 of the licence had been met.

The leachate conveyance and storage infrastructure comprises a batter drain, temporary holding pond, concrete drainage pipes and a leachate pond. This infrastructure has been constructed to the specifications presented in Table 6.

**Table 6: Leachate conveyance and storage infrastructure specifications**

| Component | Function | Specifications |
|---|---|---|
| Batter drain | Provides drainage for leachate from the south-eastern corner of the hardstand. | • Lined with a concrete revetment mattress. |
| Temporary holding pond | Provides temporary storage of leachate at the base of the batter drain and head of the drainage pipes. | Liner design from base to surface:<br>• minimum 500 mm clay base;<br>• geosynthetic clay liner (Bentofix NSP 5300) which has a permeability of $2.0x10^{-11}$ m/s;<br>• 200 mm ferricrete protection layer;<br>• geotextile cushioning protection; and<br>• rock pitching. |
| Concrete drainage pipes | Conveys leachate from the temporary holding pond to the leachate pond. | • 2 x 600 mm diameter parallel concrete pipes.<br>• Sand bedding installed below pipes.<br>• Covered with a minimum 600 mm soil cover. |
| Leachate pond | Stores leachate for loss by evaporation. Leachate may also be transferred from this pond to the Class III leachate ponds to the south to maintain | • Constructed in an existing topographical depression.<br>• Capacity of 7,255 $m^3$.<br>• Internal pond batter gradients varying |

| Component | Function | Specifications |
|---|---|---|
| | the 500 mm operational freeboard. | between 1:3 and 1:6.<br>• Lined with a minimum of 1 m of compacted clay, placed in 300 mm lifts and compacted with a dozer.<br>• Subgrade testing recorded laboratory density ratio of 95.6% and permeability of $6.16x10^{-10}$ m/s.<br>• Testing of the compacted clay liner recorded laboratory density ratio of 95.1-95.3% and permeability of $4.71x10^{-9}$ to $8.53x10^{-9}$ m/s. |

The construction compliance assessment for leachate conveyance and storage infrastructure identified a number of departures between the constructed infrastructure and licence conditions. Despite this, the Delegated Officer is satisfied that the risk of leachate being discharged to the environment from the leachate pond or drainage infrastructure will be appropriately managed. This is based on the following outcomes:

- The Licence Holder provided justification for design departures from those specified in Condition G16 of the licence including the liner design and batter specifications.
- The Licence Holder resolved deficiencies in the drainage infrastructure design by replacing the original unlined open drain with a new design comprising a concrete lined batter drain, lined temporary holding pond and concrete culverts to ensure leachate is contained during transit between the hardstand and leachate pond.
- The Licence Holder has indicated that they intend to implement operational controls to ensure the leachate pond does not overtop.

**Key Findings:**

(5) The requirements of Conditions G16, G17 and G18 have been satisfied and these conditions will be removed from the licence as part of this amendment.

(6) Conditions in the licence will be amended to ensure that the licence reflects acceptable leachate management procedures and requires the Licence Holder to implement operational measures to prevent overtopping of the leachate pond.

(7) The southern hardstand pad (temporary laydown area) was not considered at the time of the construction compliance assessment because DWER was not aware that it had been constructed. The Licence Holder does not intend to contain stormwater/leachate from the southern portion of the hardstand within the green waste leachate pond. Therefore this infrastructure change will not affect the capacity of the green waste leachate pond to accommodate leachate from this area.

## 2.4. Operational processes

### 2.4.1. Mechanical evaporation

The Licence Holder intends to operate the mechanical evaporator seven days a week during daylight hours. The system will only operate in certain weather conditions which prevent spray drift.

The system may be operated in automatic or manual mode and will mainly be set to automatic mode. In automatic mode, the system uses in built sensors to ensure that weather conditions are optimal for evaporation and ensure spray drift is minimal. The sensors include low and high pressure switches, humidity, wind speed, wind direction and temperature instrumentation and were preset by a Minetek technician.

The operational settings are:

- relative humidity – 0 to 80%;
- wind speed – variable depending on wind direction:
    - 3 m/s during wind from an angle of 85º to 135º;
    - 7 m/s during wind from an angle of 135º to 225º;
    - 7 m/s during wind from an angle of 225º to 280º;
    - 7 m/s during wind from an angle of 280º to 85º;
- wind direction – all wind directions are acceptable; and
- temperature – ≥ 5ºC.

If any of the operational settings are violated by current weather conditions, the mechanical evaporator will automatically shut down with the potential to restart within five minutes if the weather conditions become favourable again. The Site Engineer is responsible for programming the mechanical evaporator and is to inform the Environmental Operations team when the programmed weather data is changed.

A 150 m exclusion zone for unauthorised personnel will be in force around the mechanical evaporator at all times.

The Licence Holder proposes to use the mechanical evaporator to evaporate leachate stored in the Class III holding pond on Lot 12. When the new leachate ponds were constructed on Lot 12, their short term purpose was to store and accommodate leachate which was previously being stored in the decommissioned Stage 2 Class IV cell. Once this leachate is successfully removed from the Class IV cell, the long term purpose of Lot 12 ponds is storage and management of leachate generated and collected in the Class III cells on the Premises in one centralised leachate management system. The mechanical evaporator will therefore be used to evaporate leachate generated from Class III cells which may have interacted with Class IV waste during storage in the Stage 2 Class IV cell.

### 2.4.2. Screening and crushing activities

The location of screening and crushing activities on the premises is not static. The location changes based on the part of the premises under development at the time. Currently, the Licence Holder undertakes screening and crushing activities on Lot 12 to the west of the new green waste processing hardstand. This location is close to the Stage 16 area which is currently under development. The area comprises a 30,000 $m^2$ ferricrete hardstand which is graded at a slope of 1-2% to the north north-east. The hardstand drains to a drainage channel to the north of the hardstand which in turn drains to a siltation and stormwater pond to the east of the Farm Stage 1 cell. This infrastructure is shown in Figure 9.

An additional screening and crushing area is located further to the south-east on Lot 12, as shown in Figure 1.

Screening and crushing activities are currently undertaken during standard operating hours at the premises, 7:00 am to 4:00 pm Monday to Friday and 8:00 am to 4:00 pm on Saturday. Following review of the draft licence amendment, the Licence Holder requested approval from DWER to undertake screening and crushing from 7:00 am to 6:00 pm Monday to Saturday and confirmed that screening and crushing activities are not carried out on Sunday.


**Figure 9: Current screening area and related stormwater infrastructure near Stage 14 cell**

### 2.4.3. Green waste processing

The Licence Holder intends to continue processing green waste at the Premises in a manner which is consistent with their former greenwaste operations. The only change to green waste processing which is proposed within the scope of this amendment is the change in location from the former facility on Lot 1 to the new hardstand on Lot 12 (Figure 3).

The Licence Holder receives and processes two separate green waste streams. These waste streams and their respective composting processes and procedural controls are summarised in Table 7.

**Table 7: Description of green waste processing activities**

| Waste stream | Final product | Description of process | Odour potential (without controls) | Proposed process controls | Product specification |
|---|---|---|---|---|---|
| **Garden organics (GO)**<br>Mobile green bin (MGB) garden waste collections. This waste stream has a high level of contamination and comprises domestic garden waste such as grass clippings, leaves, flowers and branches less than 30 mm in diameter. | Soil improver | • Trucks deliver waste directly to the receiving windrow. Each windrow is formed to a maximum volume of 1000 $m^3$.<br>• Windrows are turned every seven days, with 10,000 L of water added.<br>• The total composting process takes 16 weeks.<br>• The final product is screened to produce a soil improver with the residual material (oversize Green Waste and physical contaminants) removed and disposed to landfill. | Peak odour generation likely to occur on receipt and during turning of windrows | • The size and duration of transfer activities will be planned taking into account wind conditions.<br>• Odour monitoring will be conducted during transfer activities by placing site personnel at the nearest downwind sensitive receptor based on the prevailing wind direction at the time. | None |
| **Uncontaminated Green Waste (UG)**<br>Clean green waste from member council parks and gardens maintenance, kerb-side collections and public disposal at the onsite waste transfer station. | Compost | • Waste is stockpiled until approximately 2000 $m^3$ has accumulated.<br>• Waste is then ground, formed into a 2000 $m^3$ windrows and wetted with 10,000 L of water. This process takes 1-2 days for each batch.<br>• Windrows are turned every seven days, with an additional 10,000 L of water added. Turning processes take 1-2 days to complete.<br>• The total composting process takes 12 weeks. | Peak odour generation likely to occur on receipt, during grinding and during turning of windrows | | AS 4454 |

# 3. Other approvals and legislative context

## 3.1. Planning approval

The Licence Holder has indicated that no planning approvals are required for the proposed amendment.

## 3.2. Part IV of the EP Act

The Premises is currently subject to three Ministerial Statements (MS) under Part IV of the EP Act. In regulating the Premises under Part V, Division 3 of the EP Act, DWER will seek to avoid duplication of requirements imposed under Part IV. Pursuant to section 59B(7) of the EP Act, DWER will also not amend a Part V licence that is contrary to, or otherwise than in accordance with, an implementation agreement or decision.

A summary of the respective Ministerial Statements is provided below:

- MS 274 (15 July 1992) – Relates to the Red Hill Waste Management Facility Extension;
- MS 462 (21 November 1997) – Relates to the establishment of Class IV waste disposal cells at the existing Red Hill Waste Management Facility; and
- MS 976 (9 July 2014) and MS 1092 (5 March 2019) – Relate to the proposal to construct and operate a resource recovery facility within the existing Red Hill Waste Management Facility, for the processing of waste to produce energy, using either anaerobic digestion or gasification technology.

MS 274 and 462 are the main statements that relate to the construction, operation and post closure management of waste handling and landfilling aspects at the Red Hill Waste Management Facility. The proposed licence amendment does not propose to alter or duplicate requirements covered under these existing Statements.

The scope of the amendment relates to MS 274 which was changed under section 45C of the EP Act on 26 June 2018. The changes approved the inclusion of Lot 12 within the authorised extent of MS 274 and construction and operation of Class III landfill cells and leachate ponds on Lot 12. The proposed mechanical evaporation of Class III leachate is encompassed within the authorised extent of MS 274.

MS 274 includes the following condition which relates to surface water management at the Premises:

> *7.7* *Surface water from active areas of the site will be controlled with retention basins and drains. Water retained will be monitored at 3 monthly intervals to ensure it is of satisfactory quality to release. Water that has been contaminated to an unacceptable level will be recirculated on site.*

MS 976 includes the following conditions which relate to odour impacts and controls at the Premises:

> *6-1* *The proponent shall reduce the cumulative odour levels prior to operation of the anaerobic digestion or gasification facility. In order to demonstrate this, the proponent shall comply with the requirements of conditions 6-2 to 6-4.*
>
> *6-2* *The proponent shall prepare a Cumulative Odour Reduction Report.*
>
> *6-3* *The Cumulative Odour Reduction Report required pursuant to condition 6-2 shall:*
>
> *(1) investigate options and propose measures to reduce the cumulative odour impact from the Red Hill Waste Management Facility by*

*management measures such as relocating the greenwaste windrows; and*

*(2) provide a re-rerun of the model (SLR Consulting Australia 2012 'Resource Recovery Facility: Odour Impact Assessment for Lot 8 (Site E) Toodyay Road' Report) to demonstrate that the chosen measures from 6-1(1) provides an overall improvement in predicted cumulative odour impacts,*

*to the satisfaction of the CEO on advice of the DER.*

*6-4 Prior to operation of the anaerobic digestion or gasification facility the proponent shall implement management measures approved by the CEO to meet condition 6-1.*

### 3.3. Contaminated Sites Act 2003

The premises is classified as '*Contaminated - remediation required'* under the *Contaminated Sites Act 2003*. The reasons for classifications state that groundwater beneath the southern portion of the site has been impacted by landfill leachate and contains metals and nutrients.

## 4. Amendment history

Table 8 provides the amendment history for L8889/2015/1.

**Table 8: Licence amendments**

| Instrument | Issued | Amendment |
|---|---|---|
| L8889/2015/1 | 19/05/2015 | Licence granted |
| N/A | 29/04/2016 | Notice of amendment and schedule of licences with amended expiry dates |
| L8889/2015/1 | 06/09/2017 | Amendment Notice 1 – approval to accept and bury PFAS contaminated solid waste in existing Class III landfill cells (Farm Stage 1 and 2 and Stage 15). |
| L8889/2015/1 | 01/05/2018 | Amendment Notice 2 – approval to accept and store paint wastes and updates to landfill acceptance criteria for PFAS impacted solid wastes (Special Waste Type 3). |
| L8889/2015/1 | 09/07/2018 | Amendment Notice 3 – construction and operation of three leachate ponds (one holding pond and two evaporation ponds) to manage excess leachate currently being stored in the decommissioned Class IV cell. |
| L8889/2015/1 | 9/08/2018 | Amendment Notice 4 – construction of an eastern green waste leachate storage pond for disposal of leachate by evaporation. |
| L8889/2015/1 | 01/11/2018 | Amendment Notice 5 – increase of the capacity of the Class III leachate holding pond by deepening the pond by 3 m. |
| L8889/2015/1 | 06/05/2019 | Amendment Notice 6 – extension to the licence duration |
| L8889/2015/1 | 30/03/2020 | Revised Licence including:<br>– approval for the operation of the mechanical evaporator to evaporate leachate from the Class III leachate ponds on Lot 12;<br>– an increase to the Category 12 production capacity;<br>– approval for the relocation of green waste processing activities to the new hardstand on Lot 12; and<br>– amalgamation of Amendment Notices 1-6 into the Revised Licence. |

# 5. Emissions

## 5.1. Mechanical evaporator

### 5.1.1. Noise

The Licence Holder engaged Lloyd George Acoustics to undertake an Environmental Noise Assessment (ENA) for the operation of the mechanical evaporator on Lot 12 of the Premises. The ENA comprised noise modelling of the cumulative noise emissions from existing activities at the Premises and operation of the mechanical evaporator. Noise emissions from the mechanical evaporator were based on manufacturer supplied sound power levels.

The ENA assessed compliance of cumulative noise emissions against the assigned levels in the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations). Four residential premises, as shown in Figure 10, were selected as sensitive receptors for the assessment and therefore the assigned levels for 'noise sensitive premises: highly sensitive areas' were used in the assessment. The ENA used the assigned levels for 0700 to 1900 hours Monday to Saturday (daytime). An influencing factor of 2 dB was applied to one receptor to the north (R1) due to the presence of a nearby quarry, the other three receptors (R2, R3 and R4) had no influencing factor applied.

The ENA determined that the allowable noise level prescribed by the Noise Regulations was 47 dB(A) at R1 and 45 dB(A) at R2, R3 and R4. These are based on the Monday to Saturday (daytime) assigned levels with an influencing factor applied to R1. The results of the noise modelling are summarised in Figure 11. Note that the results in Figure 11 reference the 'Evaporator (Attenuated) Noise Level' because the mechanical evaporator unit proposed for use by the Licence Holder includes in built sound attenuation.


**Figure 10: Location of receptors considered in the Environmental Noise Assessment**

| Location | Existing Noise Level, dB(A) | Evaporator (Attenuated) Noise Level, dB(A) | Total Noise (Attenuated) Level, dB(A) |
|---|---|---|---|
| R01 | 47 | 18 | 47 |
| R02 | 37 | 28 | 37 |
| R03 | 40 | 23 | 40 |
| R04 | 41 | 30 | 41 |

**Figure 11: Summary of noise modelling results from Environmental Noise Assessment**

The conclusions of the ENA are summarised as follows:

- The mechanical evaporator did not change or significantly contribute to the existing noise levels at the four sensitive receptors.
- The predicted noise levels at the four sensitive receptors complied with the Monday to Saturday (daytime) assigned levels.
- The mechanical evaporator in isolation will be tonal, however given that it is significantly less than the total noise level, the tonality is unlikely to be audible and therefore not subject to any penalties.

**Key findings:**

(8) The ENA indicated that the mechanical evaporator would be operated between 7:00 am and 7:00 pm Monday to Saturday. However, the Licence Holder has indicated that the mechanical evaporator will be operated seven days a week during daylight hours. Based on the actual operating hours, the ENA should also have included an assessment against the assigned levels for 1900 to 2200 hours all days (night time), 0900 to 1900 hours Sunday and public holidays (daytime) and 2200 hours to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (night time).

(9) Based on the daytime and night time assigned levels in the Noise Regulations which were excluded from the ENA, the allowable $L_{A10}$ noise levels at R1 would be 42 dB(A) and 37 dB(A) and the allowable $L_{A10}$ noise levels at R2, R3 and R4 would be 40 dB(a) and 35 dB(A). Based on the modelled noise levels from the mechanical evaporator, it is considered that the mechanical evaporator would not significantly contribute to exceedances of the relevant assigned levels which weren't considered in the ENA.

(10) If the existing noise levels modelled for the Premises in the ENA are also representative of Sunday noise levels, they indicate that the Premises currently does not comply with the daytime and night time assigned levels applicable on Sundays. The Delegated Officer is not aware of whether the existing noise levels modelled in the ENA accurately represent the noise emissions from activities undertaken at the Premises on Sundays. As the mechanical evaporator is not considered to significantly contribute to the total noise levels at the Premises, the Delegated Officer considers that these findings do not impact the outcome of this amendment assessment.

### 5.1.2. Leachate

Mechanical evaporation is a potential source of leachate emissions to air and land. The main considerations in the risk assessment for leachate emissions from the mechanical evaporator are:

i) the nature of leachate emissions generated during mechanical evaporation;
ii) the extent of leachate dispersion during mechanical evaporation; and
iii) the leachate quality in terms of contaminant types and concentrations.

These considerations are discussed in the following sections.

**Leachate emissions**

During mechanical evaporation, small droplets of leachate are ejected into the air above the unit. Minetek literature indicates that once droplets are in the air, evaporation is primarily achieved through a reduction in droplet size, rather than complete evaporation of droplets to dryness (Couton and Timones, 2017). This process results in the concentration of non-volatile dissolved species in the partially evaporated droplets (Couton and Timones, 2017). It is also possible for small droplets to completely evaporate. This process would result in the precipitation of dissolved species into particulate matter (Couton and Timones, 2017).

**Key findings:**

(11) The main fate of leachate droplets undergoing mechanical evaporation is partial evaporation.

(12) The Delegated Officer considers that potential emissions which may occur during mechanical evaporation include:

- Fallout of partially evaporated leachate droplets in an area surrounding the mechanical evaporator.
- Suspension of partially evaporated leachate droplets into the air as liquid aerosols with potential for off-site migration.
- Precipitation of non-volatile contaminants during complete evaporation of small droplets and suspension in air as solid aerosols with potential for off-site migration.
- Volatilisation of volatile contaminants dissolved in leachate with potential for off-site migration.

**Leachate dispersion**

In a typical closed-loop or semi-closed loop application of a mechanical evaporator, partially evaporated droplets are returned to the feed pond (Couton and Timones, 2017). A closed-loop configuration of the mechanical evaporator occurs where fallout from the evaporation plume is completely captured by the feed pond, as shown in Figure 12.

Minetek literature indicates that partially evaporated droplets act in a suppressing manner with respect to any particulate matter present, including that generated during mechanical evaporation. This is achieved through the bombardment of particulate matter by the multitude of partially-evaporated droplets falling back to the pond (Couton and Timones, 2017).

The Licence Holder has indicated that the orientation, location and operational settings (i.e. wind speed and direction limitations) of the mechanical evaporator have been determined with consideration of the most common wind conditions and to minimise the amount of spraydrift which falls outside of the ponds. Although their preferred position for the mechanical evaporator does not achieve a closed-loop configuration in the sense that all spray is

contained within the leachate holding pond, the Licence Holder has indicated that all liquid overspray will drain back into either the holding pond or evaporation ponds.

Aerial photography of the Premises (Figure 13) shows that the mechanical evaporator is not oriented to emit over the leachate holding pond. This causes deposition of leachate onto the ground surface resulting in a visibly wet area between the leachate holding pond and the adjacent evaporation pond.

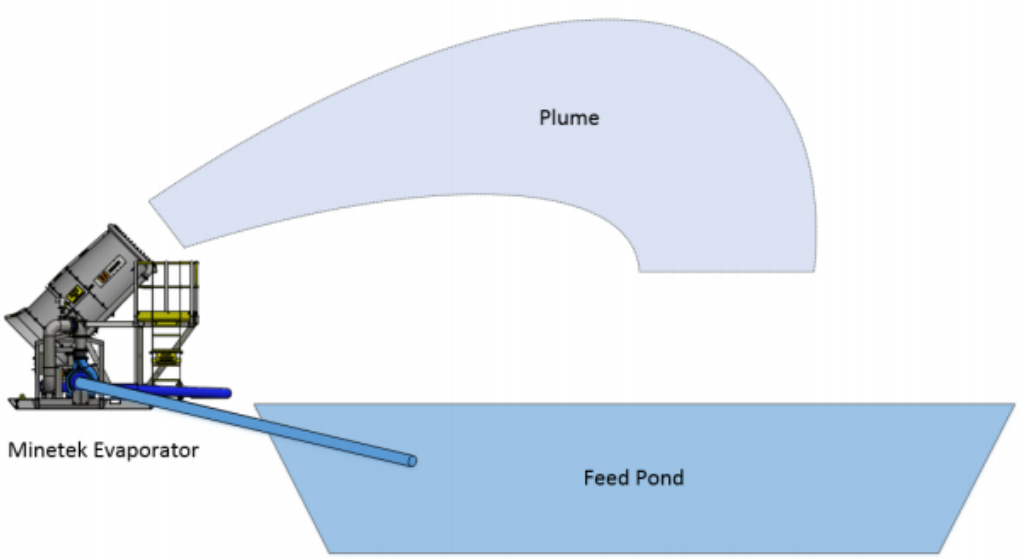


**Figure 12: Example of mechanical evaporator in closed-loop configuration (Couton and Timones, 2017)**

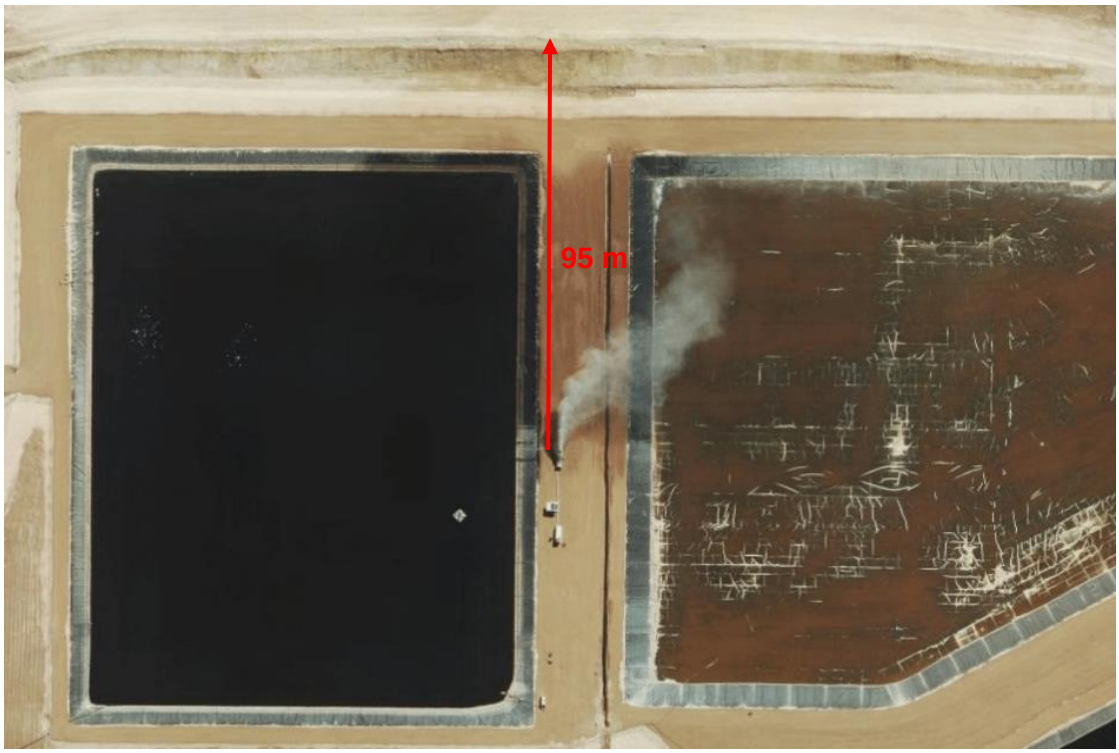


**Figure 13: February 2019 aerial photography showing mechanical evaporation plume and fallout area.**

**Key findings:**

(13) The Delegated Officer considers that the most effective control for minimising emissions during mechanical evaporation is achieving a closed-loop configuration in the pond footprints to retain leachate and contaminants within the system. In a closed-loop configuration, the main fate of partially evaporated droplets is fallout and collection into the leachate feed pond and the main fate of contaminants dissolved in leachate is containment and gradual concentration within the leachate feed pond.

(14) The Delegated Officer understands that the key factors in achieving a closed-loop configuration include:

- Orientation of the mechanical evaporator so that emissions are directed over the feed pond.
- Sizing of the feed pond to ensure it is large enough to capture the bulk fallout from the evaporation plume.
- Strategic placement of the mechanical evaporator in relation to the feed pond based on the prevailing wind direction at the Premises.
- Monitoring of weather conditions and suitable operational settings to prevent overspray and spray drift, for example during strong winds or unfavourable wind directions.

(15) The current configuration of the mechanical evaporator does not direct leachate over the leachate holding pond and does not achieve a closed-loop configuration.

(16) The current configuration of the mechanical evaporator may cause soil contamination of the soil between and around the Class III leachate ponds.

(17) While the site is operational as a waste management facility, accumulation of contaminants in onsite soil is not considered to present a complete source-pathway-receptor risk event. The only direct receptors to soil contamination on an operational site are staff, contractors and visitors who are not considered under this assessment (refer to Section 6). However, contaminants in soil have the potential to spread offsite via infiltration to groundwater or mobilisation into stormwater. The Delegated Officer's risk assessment for these risk events is provided in Section 8.

(18) The implications of potential soil contamination caused by the mechanical evaporator will need to be considered when the Licence Holder undertakes closure, decontamination and rectification works at the Premises in the future. The mechanical evaporator may also require consideration as a contaminant source as part of ongoing contaminated sites investigations under the *Contaminated Sites Act 2003*.

The Licence Holder engaged Talis to prepare a report titled *Pathogen Dispersion Assessment of Leachate Evaporator* (Talis, 2018) to support the licence amendment application. The report included a leachate dispersion assessment and soil contamination assessment. The purpose of these assessments was to determine whether there was potential for non-evaporated leachate to enter the surrounding environment and assess the resulting potential impacts. The mechanism for leachate to enter the environment is via overspray or spray drift beyond the extent of the pond.

The leachate dispersion assessment was primarily focused on odour emissions. Based on odour modelling conducted by Talis, the extent of the odorous gas phase was typically a

100 m radius around the evaporator. Talis expected that the extent of liquid aerosols would be slightly larger but did not specifically model this component of emissions. Talis observed the mechanical evaporator in use at the Stage 2 Class IV cell and noted that the bulk of larger (visible) aerosols fell away within a 100-150 m radius of the mechanical evaporator.

The soil contamination assessment was intended to validate the dispersion model by using empirical data to assess the presence, nature and extent of potential overspray of contaminants. The soil contamination assessment was carried out downwind of the Stage 2 Class IV cell to investigate the potential overspray which occurred while the mechanical evaporator was in use at this location. Shallow soil samples were collected along two transects to the south-west of the cell.

Results from the soil contamination assessment are summarised as follows:

- No visual or olfactory signs of contamination were observed during soil sampling with the exception of a saline crust at two locations. Talis suggested that this saline crust may be a sign of overspray deposition and subsequent evaporation from the ground surface.
- Heavy metal concentrations did not appear to show any discernible impacts from possible overspray.
- Organic compounds including total recoverable hydrocarbons, benzene, toluene, ethylbenzene, xylenes, methyl tert-butyl ether and naphthalene were not detected above the laboratory limit of reporting (LOR).
- Nutrients were generally at low levels and did not suggest impacts from overspray, with the exception of total phosphorus which was elevated (160 mg/kg) at one sampling location adjacent to the Class IV cell.
- *Escherichia coli* and thermotolerant coliforms were not detected above the LOR.
- Talis concluded that while overspray may be occurring from the mechanical evaporator, there was no evidence of accumulation of contaminants of potential concern in the soil environment.

**Key findings:**

(19) The leachate dispersion assessment presented in the *Pathogen Dispersion Assessment of Leachate Evaporator* (Talis, 2018) was primarily focussed on the dispersion of odorous compounds. The report did not specifically model the extent of aerosol dispersal around the mechanical evaporator.

(20) The potential extent of leachate dispersion in the form of liquid and solid aerosols from the mechanical evaporator remains uncertain. Visual observations indicate that the evaporation plume extends approximately 100-150 m from the evaporator. The Delegated Officer considers that a 300 m radius around the mechanical evaporator therefore provides a conservative estimate of the likely extent of leachate dispersion around the evaporator (based on favourable climatic conditions). Figure 14 presents a 300 m buffer around the leachate holding pond. This area is not intended to act as an exclusion zone, but rather demonstrates that the evaporation plume is unlikely to disperse beyond the site boundary.

(21) The Delegated Officer identified the following deficiencies in the soil contamination assessment:

- The report did not indicate how long and at what rate the mechanical evaporator had been in operation at the Class IV cell prior to the investigation (e.g. ten hours per day, seven days a week for six months or otherwise). Without this information, the Delegated Officer could not determine whether the observed soil impacts were indicative of a short

period of evaporation or the cumulative impacts from long term evaporation.

- The report did not discuss the potential differences in overspray which may occur between the Stage 2 Class IV cell and the Class III leachate ponds on Lot 12. The potential for overspray to occur at these locations is different due to the local topography, different orientation of the mechanical evaporator with respect to the leachate pond and operational settings used to control evaporation in different weather conditions.
- The highest concentrations of contaminants associated with overspray would be expected to occur in soil at the ground surface and in close proximity to the evaporator unit. The soil contamination assessment did not sample ground surface material as soil samples were collected from 0.1-0.25 metres below ground level.

(22) Based on the factors above, the Delegated Officer considers that the information presented in the *Pathogen Dispersion Assessment of Leachate Evaporator* is of limited use in assessing the potential for, and impacts of, overspray from the mechanical evaporator in its current location on Lot 12.

**Figure 14: 300 m buffer around the perimeter of the leachate holding pond**

## Leachate quality

The quality of leachate affects the human health and environmental risks associated with leachate emissions from the mechanical evaporator. Class III leachate which has interacted with Class IV waste has the potential to contain a range of contaminants which may be harmful to the environment and human health. These may include but are not limited to metals, nutrients, hydrocarbons, pathogens, pesticides, herbicides, perfluoroalkyl and polyfluoroalkyl substances (PFAS) and radioactive isotopes.

To gain an understanding of potential leachate quality, DWER reviewed the leachate monitoring data reported in the 2018 Annual Environmental Report (AER) (EMRC, 2019). As previously discussed, the mechanical evaporator will be used in the short term to evaporate Class III leachate previously stored in the Class IV cell and in the long term to evaporate Class III leachate received directly from the leachate collection system at Class III cells. Talis (2018) reported that leachate stored inside the Class IV cell could be considered the 'worst case' scenario for the mechanical evaporator.

During 2018, leachate stored in the Stage 2 Class IV cell (sampling location C4S2) was sampled three times (February, May and October). The maximum and minimum concentrations of parameters detected above the laboratory limit of reporting (LOR) are summarised in Table 9. To provide an indication of leachate quality, data were screened against assessment criteria from the DWER guideline *Assessment and management of contaminated sites* (DER, 2014) and the *PFAS National Environmental Management Plan* (NEPC, 2018) including:

- **Department of Health domestic non-potable use guidelines** (DOH NPUG) (DOH, 2014). These guidelines are intended for the assessment of water used for irrigation of gardens, parks and reserves, growing vegetables, flushing toilets or washing vehicles and the recreational use of surface water. Non-potable use guidelines are generally ten times the Australian Drinking Water Guideline health-related guideline value, or where there is no health value, the unadjusted aesthetic guideline value is used.
- **Recreational water health-based guidance values** (NEPC, 2018). These guidelines are from the PFAS National Environmental Management Plan (NEMP) and are intended for the assessment of water used for recreational purposes.
- **ANZECC and ARMCANZ fresh water trigger values for slightly to moderately disturbed ecosystems.** This guideline was selected for comparison due to the presence of fresh water ecosystems in the vicinity of the Premises (refer to Section 6).
- **Freshwater aquatic ecosystem guideline values for slightly to moderately disturbed ecosystems** (NEPC, 2018). These guidelines are from the PFAS NEMP and are equivalent the ANZECC and ARMCANZ guidelines. The 99% species protection level is used for slightly to moderately disturbed ecosystems due to potential for bioaccumulation and biomagnification.

The following parameters were not detected above the LOR in leachate stored within the Class IV cell during 2018: cadmium, mercury, naphthalene, acenaphthene, anthracene, fluoranthene, benzo(a)pyrene, aldrin, dieldrin, atrazine, benzene, ethylbenzene, xylenes, TRH $C_6$-$C_{10}$, TRH $C_{34}$-$C_{40}$, chlorobenzene, 1,2-dichlorobenzene and 8:2 fluorotelomer (perfluorodecane sulfonate).

The concentrations of contaminants in leachate stored in the Class IV cell, as sampled during 2018, were below the DOH NPUG values with the exception of total dissolved solids, chloride, sodium, ammonia and iron. The concentrations of perfluorooctane sulfonate (PFOS) and perfluorohexane sulfonate (PFHxS) exceeded the health based guidance values for recreational water in the PFAS NEMP. A number of metals and nutrients in leachate exceeded the ANZECC and ARMCANZ fresh water trigger values for slightly to moderately disturbed ecosystems. The concentration of PFOS exceeded the PFAS NEMP fresh water guideline value for slightly to moderately disturbed ecosystems.

**Table 9: 2018 Sampling results from leachate stored in the Class IV cell**

| Parameter | Units | Minimum | Maximum | DOH NPUG | ANZECC and ARMCANZ fresh water[1] |
|---|---|---|---|---|---|
| pH | pH units | 8.1 | 8.3 | 6.5-8.5 | *6.5-8.5* |
| Total dissolved solids | mg/L | **3600** | **4000** | 600 | - |
| Total suspended solids | mg/L | 58 | 73 | - | - |
| Biochemical oxygen demand | mg/L | 24 | 41 | - | - |
| Potassium | mg/L | 310 | 379 | - | - |
| Chloride | mg/L | **1200** | **1460** | 250 | - |
| Sodium | mg/L | **733** | **949** | 180 | - |
| Magnesium | mg/L | 84.3 | 98.8 | - | - |
| Calcium | mg/L | 165 | 175 | - | - |
| Sulfate | mg/L | 410 | 487 | 1000 | - |
| Total nitrogen | mg/L | *78* | *120* | - | *0.45*[2] |
| Nitrate | mg/L | 0.03 | 0.04 | 500 | - |
| Nitrite | mg/L | <0.01 | 0.02 | 30 | - |
| Total oxidized nitrogen | mg/L | 0.009 | 0.013 | - | *0.2*[2] |
| Ammonia | mg/L | ***55*** | ***90*** | 0.5 | *1.1* |
| Total phosphorus | mg/L | *1.6* | *2.1* | - | *0.02*[2] |
| Orthophosphates | mg/L | <0.01 | *0.74* | - | *0.01*[2] |
| Aluminium | mg/L | 0.031 | *0.097* | 0.2 | *0.055* |
| Arsenic | mg/L | *0.088* | *0.099* | 0.1 | *0.013 (as As V)* |
| Chromium | mg/L | *0.026* | *0.033* | 0.5 (as Cr VI) | *0.001 (as Cr VI)* |
| Copper | mg/L | <0.0002 | *0.0015* | 20 | *0.0014* |
| Iron | mg/L | 0.031 | ***0.92*** | 0.3 | *0.3* |
| Lead | mg/L | <0.0002 | 0.0017 | 0.1 | *0.0034* |
| Manganese | mg/L | 0.36 | 0.53 | 5 | *1.9* |
| Nickel | mg/L | *0.072* | *0.082* | 0.2 | *0.011* |
| Zinc | mg/L | *0.025* | *0.068* | 3 | *0.008* |
| Prometryn | µg/L | 0.2 | 0.2 | - | - |
| Terbutryn | µg/L | 0.1 | 0.1 | 4000 | - |
| Toluene | µg/L | <1 | 1 | 25 | *180* |
| TRH $C_{10}$-$C_{16}$ | µg/L | 890 | 1100 | - | - |
| TRH $C_{16}$-$C_{34}$ | µg/L | 1600 | 2100 | - | - |
| PFOS[3] | µg/L | - | ***0.92*** | 0.7[4] | *0.00023*[5] |
| PFHxS[3] | µg/L | - | **1.3** | 0.7[4] | - |
| PFOA[3] | µg/L | - | 1 | 5.6[4] | *19*[5] |
| 6:2 FTS[3] | µg/L | - | 0.21 | - | - |
| PFBA[3] | µg/L | - | 0.72 | - | - |
| PFBS[3] | µg/L | - | 0.65 | - | - |
| PFHpA[3] | µg/L | - | 0.25 | - | - |
| PFHxA[3] | µg/L | - | 0.7 | - | - |
| PFPeA[3] | µg/L | - | 1 | - | - |

[1]Freshwater guidelines based on 95% species protection level for slightly to moderately disturbed ecosystems.
[2]Default trigger values for upland rivers in south-west Australia.
[3]PFAS sampling results for C4S2 are based on one sampling event conducted during Q2 2018. PFAS abbreviations are provided in the DWER *Interim Guideline on the Assessment and Management of PFAS* (2017).
[4]Recreational water health-based guidance values from the PFAS NEMP (NEPC, 2018).
[5]Freshwater aquatic ecosystem guideline values for slightly to moderately disturbed ecosystems (99% species protection level due to potential for bioaccumulation and biomagnification) from the PFAS NEMP (NEPC, 2018).

**Key findings:**

(23) The screening assessment above demonstrates that contaminant concentrations recorded in Class III leachate may have the potential to cause impacts to:

- human receptors who become exposed in a recreational or non-potable exposure scenario; and
- ecological receptors in slightly to moderately disturbed fresh water ecosystems.

However, in order for this risk to be realised during mechanical evaporation, a complete source-pathway-receptor linkage must exist between Class III leachate and receptors. The Delegated Officer's risk assessment for these exposure scenarios is provided in Section 8.

In addition to the general landfill leachate contaminants discussed above, radioactive isotopes are an additional type of contaminant associated with Class III leachate at the Premises. The source of radioactive isotopes in leachate is the disposal of low level radioactive biomedical waste in Class III cells which has been approved at the Premises since 2014.

DWER sought advice from the Radiological Council of Western Australia on assessing the potential risks from mechanical evaporation of leachate containing radioactive isotopes. The Radiological Council responded that further information would be required to assess the risks associated with misted droplets reaching a person prior to evaporation. Specifically, more information was required on the levels of radioactivity in leachate to assess radioactivity against the activity concentration limits for water for members of the public. The Radiological Council requested the following information from the Licence Holder to inform their assessment:

- Radiological analysis of Class III leachate for longer-lived radioisotopes (half-life greater than one year) that have been disposed on-site.
- Selection of radioisotopes for analysis based on the Licence Holder's records of the full suite of radionuclides that have been disposed at the site.
- At a minimum, leachate analysis must include tritium and carbon-14.

The Licence Holder undertook further sampling and analysis of leachate to satisfy the Radiological Council's request and submitted a report titled *Determination of Potential Worker and Public Doses Due to Mechanical Evaporation of Leachate Pond L10* (Radiation Professionals, December 2019). The content of this report is briefly summarised as follows:

- Based on radioactive waste inventories received by the Licence Holder, tritium (H-3), carbon-14 (C-14) and radium-226 (Ra-226) were the radioisotopes considered for radioanalysis.
- On 11 September 2019, four samples were collected for analysis from the leachate holding pond (Pond 1) and one sample was collected for analysis from the adjacent leachate evaporation pond (Pond 2).
- An exposure assessment for members of the public was conducted based on the concentrations of radioisotopes detected in leachate and conservative estimation of a number of exposure parameters including:
  - dose conversion factors;
  - mechanical evaporator operating time;
  - receptor breathing rates;
  - water/air mixing rates; and
  - evaporation rates of droplets.
- The exposure scenario considered in this assessment was very conservative. For

example, the assumptions included that the mechanical evaporator operated 10 hours per day 365 days per year when it is only intended to be used during the summer months. In addition, the exposure parameters for members of the public did not factor in any dilution of leachate droplets between the mechanical evaporator and receptors. Given that the site boundary is at least 300 m from the mechanical evaporator, this adds a significant degree of conservatism into the exposure assessment.

- The exposure assessment determined that the potential annual public dose resulting from exposure to the mechanical evaporator was $3.2 \times 10^{-7}$ mSv/year for H-3, $1.75 \times 10^{-6}$ mSv/year for C-14 and $6.69 \times 10^{-2}$ mSv/year for Ra-226. The total public dose of 0.07 mSv/year was below the public dose limit of 1 mSv/year.

The Radiological Council assessed the data provided and issued their final assessment of the risk from the mechanical evaporator to DWER on 20 December 2019.

The Radiological Council determined that, given the conservative nature of the assumptions and calculations provided in the Radiation Professionals report, potentially exposed persons on the site are unlikely to receive an effective dose exceeding the Radiological Council's constraint of 0.5 mSv per year. There will be no radiological impact to persons off-site. On this basis, it was considered that no additional controls are required with respect to the radiological aspects for the use of the mechanical evaporator on Class III leachate.

### 5.1.3. Odour

Leachate from Class III putrescible landfill cells has the potential to generate offensive odours. Mechanical evaporation provides a pathway for the dispersal of odorous gaseous compounds and liquid aerosols off-site to impact sensitive receptors.

The Licence Holder engaged Talis to prepare a report titled *Pathogen Disperson Assessment of Leachate Evaporator* which included an assessment of odour emissions from the mechanical evaporator. To inform this assessment, Talis attended the Premises on 13 August 2018 to observe the mechanical evaporator in operation at the Stage 2 Class IV cell. Ambient odour inspection of the evaporator by Talis failed to identify any notable odour strength. Talis also highlighted that the leachate itself (i.e. stored in the pond, not during evaporation) was relatively odour free compared to other sources of odour at the Premises.

Talis conducted odour emission modelling to compare the potential odour impacts from a ground level area source (leachate pond) and a mechanically ventilated stack emission source (mechanical evaporator). Talis concluded from this comparative modelling that the impact area from a mechanical evaporator would be considerably smaller than that expected from a leachate pond. Talis considered that odour impacts from the mechanical evaporator would be largely confined to a 100 m radius area around the equipment.

**Key findings:**

(24) The information provided by the Licence Holder to characterise and assess potential odour emissions from the mechanical evaporator is not consistent with guidance in the DWER *Guideline: Odour* Emissions. However, as this guideline was published more than six months after the amendment application was submitted, the Delegated Officer has determined that it would be inappropriate to assess the provided information against the requirements of this guideline.

(25) The Delegated Officer is satisfied that the Licence Holder has provided sufficient information to inform an odour risk assessment for the operation of the mechanical evaporator at the Class III leachate ponds on Lot 12.

(26) DWER officers who attended the Premises during 2019 did not identify significant odours associated with leachate stored in the Stage 2 Class IV

cell or the Class III leachate ponds on Lot 12.

## 5.2. Screening and crushing activities

### 5.2.1. Dust

Dust emissions may arise during screening and crushing activities on the Premises. The Licence Holder controls dust generation during screening and crushing by using dust suppression from two on-site 15,000 L water trucks. The Licence Holder did not receive any dust related complaints during the 2018 annual period when the Licence Holder exceeded the approved Category 12 throughput.

### 5.2.2. Noise

Screening and crushing equipment has the potential to generate noise emissions. The Licence Holder did not receive any noise related complaints which were attributed to screening activities during the 2018 annual period.

**Key findings:**

(27) As discussed in Key Finding (10), the existing noise levels modelled for the Premises in the ENA may indicate that the Premises does not currently comply with the daytime and night time assigned levels applicable on Sundays. As the Licence Holder has confirmed that screening and crushing activities will not be undertaken on Sundays, the Delegated Officer considers that these findings do not impact the outcome of this amendment assessment.

## 5.3. Green waste processing

### 5.3.1. Odour

Aerobic composting of green waste has the potential to generate offensive odours which may impact the amenity of sensitive receptors. The activity which has the highest likelihood of generating offensive odour emissions is the turning of windrows in the early stages of composting. Green waste windrows at the Premises are generally turned every seven days. Other peak odour emission stages include the receipt of green waste, especially where it has become anaerobic during storage and transport in bins, and grinding of green waste before composting.

There is a history of odour complaints being made about the Premises, both to the DWER and via the Licence Holder's internal complaints management system. There are multiple potential odours sources at the Premises and complaints are not always able to be attributed to a specific source. Based on the 2018 AER for the Premises, one of 11 odour complaints received by the Licence Holder during 2018 was attributed to green waste processing activities.

The Licence Holder's current controls for odour emissions include:

- taking into account local wind conditions when planning windrow turning; and
- responding to odour complaints with deployment of a sentry to check for odours and adjustment of onsite processes accordingly where practicable.

**Key findings:**

(28) DWER officers who attended the Premises during 2019 did not identify significant odours associated with stockpiled green waste on Lot 12. Windrow turning and grinding activities were not being undertaken at the time of the inspection.

(29) The Licence Holder remains subject to commitments 6-1, 6-2, 6-3 and 6-4 in MS 976. Relocation of green waste processing to the new location on Lot 12 will not reduce the cumulative odour impact of the Premises and the Licence Holder has not proposed any other changes which would significantly reduce odour emissions from green waste processing.

(30) The existing odour impact extent from current operations (including relocation of green waste processing) and the reliability of historical odour complaints relating to the Premises are not known. Detailed analysis tools outlined in the *Guideline: Odour Emissions,* such as odour field assessments (OFAs) and community surveys, would help to address this data gap, inform future amendment applications and demonstrate the Licence Holder's progress towards satisfying conditions in MS 976.

(31) The Delegated Officer has determined that the relocation of green waste processing activities has the potential to increase odour emissions from the Premises. This is based on the following factors:

- Relocation of green waste processing activities has reduced the separation distance to sensitive receptors. The closest sensitive receptors to the new green waste processing area are to the north and east, 650 m and 540 m away respectively. The new facility is approximately 375 m further east than the former facility.
- The new green waste processing location is sited in an elevated part of the Premises. This means that there is the potential for terrain channelling of odour plumes towards receptors downslope.

(32) The Delegated Officer considers that four OFAs over an 18 month period will provide an objective means of assessing the existing odour impact extent at the Premises and verifying the odour risk assessment presented in Section 8. The Delegated Officer has included this a regulatory control in the Revised Licence. The primary objective of OFAs will be the characterisation of odour plume extent and impacts in the direction of sensitive receptors most likely to be impacted by odour (i.e. receptors within 1 km of the Premises).

### 5.3.2. Dust

Dust emissions including bioaerosols may be generated during turning of windrows, grinding and general vehicle and loader movements associated with green waste processing activities. The Licence Holder currently manages dust emissions through the use of onsite water carts for dust suppression on unsealed roads and dusty wastes and irrigation of green waste during composting to maintain moisture content.

### 5.3.3. Leachate

Leachate is generated during composting by the breakdown and decomposition of waste and through the interaction of rainfall and stormwater with waste and final products. The Licence Holder has indicated that they intend to capture and contain leachate from the 'active' parts of the green waste processing hardstand which is used to store materials undergoing composting. Stormwater/leachate generated in areas storing clean green waste and final

products, or areas where no materials are stored, will be diverted to the environment via existing stormwater structures on the Premises.

Contaminants which are commonly associated with green waste leachate include nutrients, metals and organic compounds (e.g. terpenes and phenols). Anaerobic conditions in stockpiles may also cause high biological oxygen demand (BOD).

Based on monitoring of the former green waste leachate pond on Lot 1, as reported in the 2018 AER, the main contaminants associated with green waste leachate at the Premises are metals, nutrients and hydrocarbons. These results indicated that leachate concentrations exceeded the premises' surface water discharge quality criteria for pH, total dissolved solids, total nitrogen, total phosphorus, copper, iron, lead and zinc. These criteria were developed as part of the Licence Holder's commitments under Part IV of the EP Act and are based on the ANZECC and ARMCANZ fresh water guidelines and Swan Canning Clean-up Program Action Plan.

Pesticides (aldrin, dieldrin, atrazine, prometryn and terbutryn), polycyclic aromatic hydrocarbons, benzene, toluene, ethylbenzene and xylenes were not detected in the two samples of green waste leachate collected during 2018.

**Key findings:**

(33) The Licence Holder proposes to release stormwater to the environment from empty hardstand areas not being used for the storage of any materials. If temporary bunding is used effectively to prevent stormwater ingress from other parts of the hardstand, there is a relatively low potential for stormwater in these areas to become contaminated. The Delegated Officer considers that this an acceptable management approach.

(34) The Licence Holder also proposes to release stormwater from clean green waste and final product storage areas to the environment. Although these materials may not generate significant volumes of leachate through decomposition and breakdown, they will interact with rainfall and stormwater during inclement weather. Liquid which has percolated through waste material including composting feedstocks and final products should be managed as leachate because it is likely to contain potential contaminants from the waste.

(35) There is some uncertainty as to the potential difference in water quality of leachate derived from materials undergoing composting compared to clean green waste and final compost products. However, as these different media are comprised of the same basic materials (green waste in various stages of decomposition), it is considered likely that they will contribute similar contaminants to leachate during interaction with rainfall and stormwater.

(36) The Licence Holder has not provided sufficient justification for why stormwater/leachate from i) active composting areas and ii) inactive clean green waste and final product areas should be managed differently.

(37) The Licence Holder's commitments under MS 274 include surface water management from active areas of the site. The Delegated Officer considers that areas used for the storage of green waste and final composting products are active areas. The Licence Holder has not demonstrated that their current proposal is consistent with their surface water management commitments under MS 274.

(38) Based on the presence of a number of potential contaminant sources at the Premises and its existing classification as *'Contaminated – remediation required'*, the Licence Holder should seek to manage their operations to

reduce emissions and prevent impacts to surface water and groundwater. The Licence Holder has not demonstrated that their current proposal will achieve this objective.

### 5.3.4. Noise

Noise emissions may be generated through the use of mobile plant and equipment including the green waste grinder, loaders and vehicles. The Licence Holder's current controls for these noise emissions are the general operational time restrictions for the Premises and the use of broadband 'clackers' on site vehicles.

# 6. Location and receptors

In accordance with *Guidance Statement: Risk Assessment,* the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 10 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

**Table 10: Receptors and distance from activity boundary**

| Residential and sensitive premises | Distance from Prescribed Premises |
|---|---|
| Residential premises | To the south and south-east of the Premises, multiple lots approximately:<br>• 700 m or more from the mechanical evaporator;<br>• 390 m or more from the screening areas; and<br>• 1180 m or more from the green waste processing area.<br>These lots are separated from the Premises by a vegetation buffer (approx. 260-320 m wide) located on Lot 501 on Plan 40105, Parkerville (owned by the Licence Holder) and a drainage/public recreation reserve (approx. 50-125 m wide) on Lot 62 on Plan 23731, Parkerville (vested in the Shire of Mundaring).<br>Immediately to the east of the Premises, Barbarich Estate comprising multiple lots approximately:<br>• 870 m or more from the mechanical evaporator;<br>• 395 m from the screening areas; and<br>• 540 m or more from the green waste processing area (including the pond).<br>Immediately to the north, north-west and north-east of the Premises, multiple lots approximately:<br>• 935 m or more from the mechanical evaporator;<br>• 430 m or more from the screening area; and<br>• 650 m or more from the green waste processing area. |
| Recreational users of John Forrest National Park | The national park is adjacent to the southern boundary of the Premises, 730 m south-west of the mechanical evaporator, 630 m south of the screening area and 980 m south-west of the green waste processing area. |

Table 11 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

## Table 11: Environmental receptors and distance from activity boundary

| Environmental receptors | Distance from Prescribed Premises |
|---|---|
| Parks and Wildlife Management Lands and Waters | John Forrest National Park: adjacent to the southern boundary of the Premises, 730 m south-west of the mechanical evaporator and 980 m south-west of the green waste processing area. |
| Groundwater | Based on groundwater levels presented in the as built drawings for the Class III leachate ponds on Lot 12, groundwater is approximately 9.6 m below ground level at the current location of the mechanical evaporator. Based on December 2018 groundwater contours previously provided by the Licence Holder, groundwater flow beneath the Class III leachate ponds is inferred to be to the south, towards Christmas Tree Creek.<br><br>Based on survey cross sections provided by the Licence Holder, the depth to the groundwater table below the base of the green waste processing hardstand is inferred to be a minimum of 13 m. The green waste processing hardstand and leachate pond are inferred to be located in the vicinity of a groundwater divide.<br><br>There are two distinct water bearing layers underlying the site:<br>• The upper layer comprises of a perched water table associated with shallow lateritic sediments mainly on low lying areas which had developed above pallid zone clays (impermeable layer of kaolinitic clays). Perched aquifers are reported to be limited in their lateral extent and considered ephemeral during and post winter.<br>• The lower layer comprises the regional groundwater table within granite bedrock (fracture systems) or within extensive saprolite grits (porous, weathered bedrock) often semi confined by pallid zone clays.<br><br>The Premises is not located within a *Rights in Water and Irrigation Act 1914* proclaimed Groundwater Area. |
| Surface water | Christmas Tree Creek<br>• 690 m south of the mechanical evaporator and 1020 m south of the green waste processing area (including pond).<br>• Flows in a westerly direction parallel to the southern boundary and is a tributary to the Jane Brook and Swan River.<br><br>Susannah Brook<br>• 2000 m north of the mechanical evaporator and 1520 m north of the green waste processing area.<br>• Ephemeral stream which drains from the Darling Scarp into the upper reaches of the Swan River.<br><br>Strelley Brook<br>• 1200 m west of the mechanical evaporator and the green waste processing area.<br>• Small tributary of Jane Brook.<br><br>The Premises is located within the *Rights in Water and Irrigation Act 1914* proclaimed Surface Water Area for the Swan River System. |
| Threatened and Priority Ecological Communities | Buffer for the Central Granite Shrublands located 2300 m west of the mechanical evaporator and green waste processing area. |
| Threatened/Priority Fauna | The following species were identified within 2000 m of the Premises boundary:<br>• Two endangered species (Baudin's cockatoo and Carnaby's cockatoo)<br>• One vulnerable species (forest red-tailed black cockatoo)<br>• One species of migratory bird protected under an international |

| Environmental receptors | Distance from Prescribed Premises |
|---|---|
| | agreement (fork-tailed swift)<br>• One Priority 4 species (quenda)<br>• One species of special conservation interest (south-western brush-tailed phascogale) |
| Green Growth commitment areas | • Quenda habitat 1200 m south-west and 2000 m north-west of the mechanical evaporator and 1500 south-west and north-west of the green waste processing area.<br>• Vegetation complexes present on the Premises and within 2 km of the Premises boundary including Dwellingup, Helena 2, Murray 2, Yarragil 1 and Darling Scarp.<br>• Regionally Significant Natural Areas Parks and Wildlife Conservation Program – Phase 2 conservation area 1800 m north-west of the mechanical evaporator and 1600 m north-west of the green waste processing area. |
| Ramsar Sites<br>Important Wetlands<br>Geomorphic Wetlands<br>Bush Forever sites<br>Western Swamp Tortoise Habitat<br>Regional Parks<br>Waterways Conservation Areas<br>Threatened/Priority Flora<br>Public Drinking Water Source Areas | None within 2 km of the Premises boundary |

# 7. Pathways

## 7.1. Wind

Wind is the main pathway for dust and noise, and in the case of the mechanical evaporator is also a potential pathway for leachate. Information on the prevailing wind direction was obtained from the closest available Bureau of Meteorology weather station – Perth Airport (No. 009021). Based on the climate data for Perth Airport station (May 1944 to August 2019), the prevailing wind direction is easterly to north-easterly in the morning and westerly to south-westerly in the afternoon. Morning and afternoon wind roses for the Perth Airport station are shown in Figure 15 and Figure 16.

The mechanical evaporator has an onboard weather station to control its operation in automatic mode. DWER is not aware of whether a separate, purpose-built, weather station is present on the Premises. If one is not already present, the Licence Holder would benefit from having an on-site weather station to measure local wind speed, direction and temperature. A reliable record of local weather conditions would help inform the complaint validation process and operational decisions, especially in relation to odour and dust generating activities at the Premises.

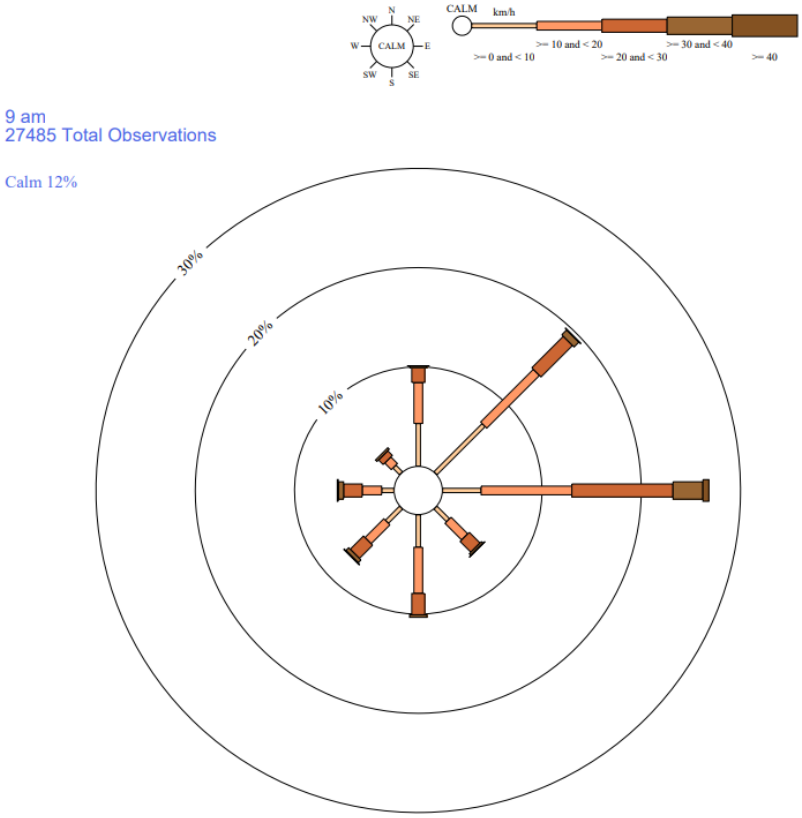


**Figure 15: 9 am wind rose for the Perth Airport station May 1944 to August 2019**

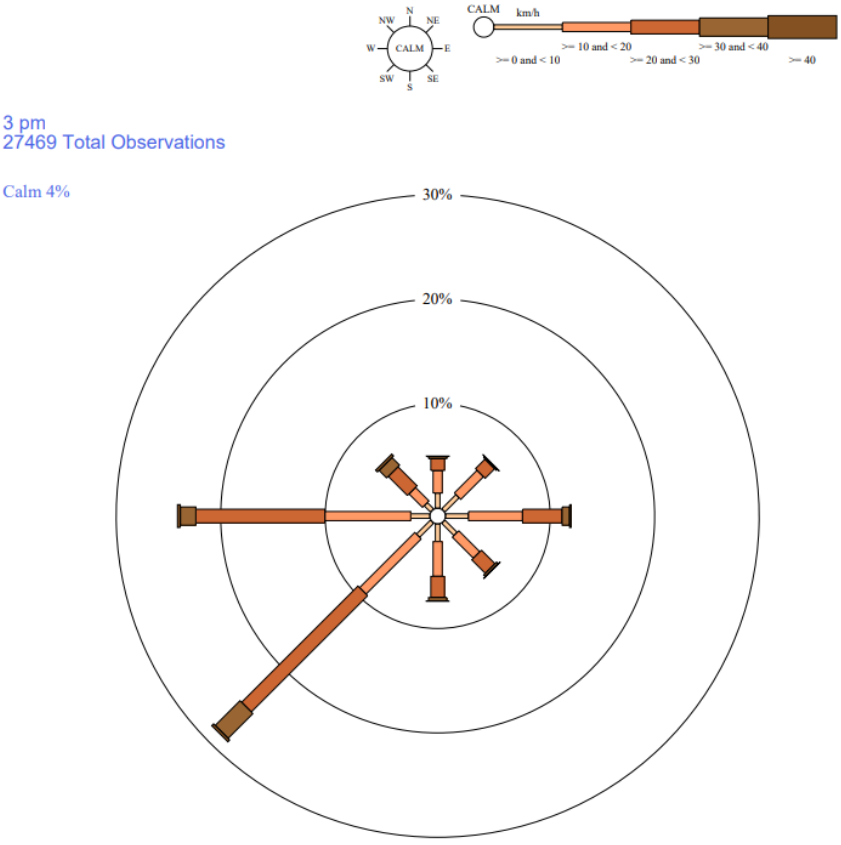


**Figure 16: 3 pm wind rose for the Perth Airport station May 1944 to August 2019**

## 7.2. Land and water

Overspray or spray drift during mechanical evaporation may result in the fallout of leachate emissions from the evaporation plume onto the ground surface. This process could result in the accumulation of contaminants in soil where they may infiltrate to groundwater or be mobilised via stormwater runoff across the ground surface. These are additional pathways considered in the risk assessment in Section 8. The geological profile present within the vicinity of the Class III leachate ponds on Lot 12 has been described as sandy, silty clay with cap rock less than one metre below the ground surface in some sections (Talis, 2017).

The depth to the groundwater table in the vicinity of the Class III leachate ponds on Lot 12 is approximately 9.6 m and groundwater flow is inferred to be to the south.

Stormwater management on the Premises includes diversion from certain active areas (e.g. landfill cells, leachate ponds and operational areas) and collection into designated drainage channels and siltation/stormwater ponds. DWER understands that stormwater is not completely contained within the boundary of the Premises. Stormwater stored in siltation ponds on the western boundary of the Premises is allowed to discharge during storm events and stormwater runoff from the Premises may also occur in an uncontrolled manner in other parts of the Premises.

The Licence Holder has indicated that stormwater within the Class III leachate pond compound drains back into the holding or evaporation ponds.

Leachate generated during green waste processing which is not contained within the bunded hardstand or leachate pond may infiltrate to soil and groundwater or be dispersed in stormwater runoff.

A similar geological profile to that described at the Class III leachate ponds is inferred to be present in the vicinity of the green waste processing area, however the depth to cap rock in this location is not known.

The depth to the groundwater table in the vicinity of the green waste processing area is at least 13 m. The green waste processing hardstand and leachate pond are inferred to be located in the vicinity of a groundwater divide. Based on December 2018 groundwater contours provided by the Licence Holder, groundwater flow beneath the green waste processing hardstand and leachate pond is inferred to be to the north, west and south. However, it is noted that there is a limited number of bores in the vicinity of this infrastructure and there is some uncertainty about the actual location of the groundwater divide and direction of groundwater flow.

The northern green waste processing hardstand and southern hardstand (temporary laydown area) have been designed to prevent stormwater ingress through their elevated location and the use of perimeter bunding around the hardstand. The Licence Holder has indicated that stormwater and leachate in ‘inactive’ parts of the hardstand (refer Section 5.3.3) will be allowed to drain to the environment via existing stormwater drainage infrastructure at the Premises.

# 8. Risk assessment

Table 12 below describes the operational phase Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. This table identifies whether the emissions present a material risk to public health or the environment, requiring regulatory controls. A risk assessment for the construction phase was not conducted because no infrastructure is required to be constructed and the mechanical evaporator is already on-site.

**Table 12: Risk assessment for proposed amendments during operation**

| Risk Event | | | | Consequence rating[1] | Likelihood rating[1] | Risk[1] | Reasoning | Regulatory controls (refer to conditions of the granted instrument) |
|---|---|---|---|---|---|---|---|---|
| **Source/ Activities*** | **Potential emissions** | **Potential receptors, pathway and impact** | **Applicant controls** | | | | | |
| Mechanical evaporation of leachate | Leachate | Air/windborne pathway dispersing leachate droplets, particulates or volatilized compounds to closest sensitive receptors, residences approximately 700 m south, 880 m east and 935 m north of the mechanical evaporator. | • Operational settings linked to onboard weather station to avoid overspray during unfavourable weather conditions; and<br>• Siting of mechanical evaporator in consideration of most common wind conditions. | Minor | Unlikely | Medium | If the mechanical evaporator is operated in its current location, at least 300 m to the Premises boundary, there will be minimal off-site emissions of leachate droplets or particulates. Volatilized compounds will be considerably diluted in the atmosphere before being dispersed off-site.<br><br>The Delegated Officer considers that there will be minimal health effects from operation of the mechanical evaporator. The risk event will probably not occur in most circumstances. | Condition 4 - Mechanical evaporator equipment requirements |
| | | Air/windborne pathway dispersing leachate droplets, leachate derived particulates or volatilized compounds to terrestrial and aquatic environmental receptors. | | Minor | Unlikely | Medium | Based on reasons discussed above, the Delegated Officer considers that there will be minimal off-site impacts and non-detectable impacts at a wider scale. The risk event will probably not occur in most circumstances. | |
| | Leachate | Deposition of leachate droplets or particulates onto the ground surface.<br><br>Seepage to groundwater may cause contamination or deterioration of local groundwater, causing amenity and health impacts to potential users and down-gradient aquatic and terrestrial ecosystems.<br><br>Contaminants in soil may be mobilised into stormwater runoff and cause impacts to terrestrial and aquatic ecosystems. | • Stormwater drainage infrastructure within the Class III leachate pond compound directs runoff back into leachate ponds. | Minor | Unlikely | Medium | Based on the depth to groundwater and sandy, silty clay soil present within the vicinity of the leachate ponds, the Delegated Officer considers that it is unlikely there will be gross seepage of contaminants in soil to groundwater.<br><br>The Licence Holder has indicated that stormwater within the Class III leachate pond compound is contained and drains back into the leachate ponds.<br><br>Therefore, the Delegated Officer considers that there will be minimal health and amenity impacts and minimal off-site environmental impacts at the local scale. The risk event will probably not occur in most circumstances. | Condition 4 - Mechanical evaporator equipment requirements |
| | Odour | Air/windborne pathway causing amenity impacts to closest sensitive receptors, residences approximately 700 m south, 880 m east and 935 m north of the mechanical evaporator. | • Operational settings linked to onboard weather station to avoid overspray during unfavourable weather conditions; and<br>• Complaints management system including investigation and response. | Minor | Possible | Medium | Potential odour impacts from mechanical evaporation are likely to be minor compared to other odour sources at the Premises. The Delegated Officer considers that an additional odour source at the Premises has the potential to cause low level impacts to the amenity of sensitive receptors. The risk event could occur at some time. | Condition 4 - Mechanical evaporator equipment requirements |
| | Noise | Air/windborne pathway causing amenity impacts to closest sensitive receptors, residences approximately 700 m south, 880 m east and 935 m north of the mechanical evaporator. | • Operation of the mechanical evaporator during daylight hours Monday to Sunday.<br>• Noise attenuation on the mechanical evaporator.<br>• Complaints management system including investigation and response. | Minor | Unlikely | Medium | Based on the results of the ENA, the mechanical evaporator does not significantly contribute to the total noise levels emitted by existing activities on the Premises. The Delegated Officer considers that an additional noise source at the Premises may cause low level impacts to the amenity of sensitive receptors. This risk event will probably not occur in most circumstances. | Condition 4 - Mechanical evaporator equipment requirements |

| Risk Event | | | | Consequence rating[1] | Likelihood rating[1] | Risk[1] | Reasoning | Regulatory controls (refer to conditions of the granted instrument) |
|---|---|---|---|---|---|---|---|---|
| **Source/ Activities*** | **Potential emissions** | **Potential receptors, pathway and impact** | **Applicant controls** | | | | | |
| Screening and crushing activities | Dust | Air/windborne pathway causing amenity impacts to closest sensitive receptors, residences approximately 430 m north, 870 m east and 980 m south of the current screening area and 835 m north, 395 m east and 390 m south of the additional screening area. | • Dust suppression using on-site water trucks; and<br>• Complaints management system including investigation and response. | Minor | Unlikely | Medium | The Licence Holder's dust controls provide adequate mitigation of dust emissions. The Delegated Officer considers that there is a residual risk of low level amenity impacts from dust emissions. This risk event will probably not occur in most circumstances. | Condition 4 - Screening and crushing equipment requirements |
| | Noise | | • Operation of screening and crushing equipment limited to 7:00 am to 6:00 pm Monday to Saturday; and<br>• Complaints management system including investigation and response. | Minor | Possible | Medium | The Delegated Officer considers that noise emissions from screening activities have the potential cause low level amenity impacts and this risk event may occur at some time.<br><br>The Licence Holder has confirmed that they will not undertake screening and crushing on Sundays when the assigned noise levels are stricter. | Condition 4 - Screening and crushing equipment requirements |
| Green waste processing:<br>Stockpiling of raw green waste<br><br>Composting of green waste including turning of windrows<br><br>Stockpiling of finished soil improver and compost | Odour | Air/windborne pathway causing impacts to amenity of closest residences approximately 540 east, 650 m north and 1180 south of the premises and recreational users of John Forrest National Park | • Planning of transfers done taking into account wind direction;<br>• Licence Holder's complaint management protocol includes remedial actions to reduce odours where possible; and<br>• Odour monitoring at down-wind receptors. | Moderate | Possible | Medium | History of complaints indicates that existing landfill and composting operations at former location further west may have caused amenity issues at nearby receptors. The new green waste processing hardstand is closer to sensitive receptors than the former facility.<br><br>The Licence Holder's operational controls and complaint management protocol provide suitable response to manage potential emissions. The Delegated Officer considers that mid-level amenity impacts on a local scale could occur at some time.<br><br>Due to the uncertainty about existing odour impacts at the Premises, odour field assessments (OFAs) will be required as a regulatory control to verify this risk assessment and confirm that operations on the Premises are not causing unreasonable odour emissions. | Condition 4 - Infrastructure requirements for the green waste processing hardstand<br><br>Condition 28 - Complaint recordkeeping and reporting<br><br>Conditions 24-26 - Odour field assessments |
| | Leachate | Leachate generated during decomposition of green waste discharging to surface water or infiltrating to groundwater. Potential deterioration of surface water and groundwater quality and impacts to amenity and health of potential users, freshwater and terrestrial ecosystems. | • Green waste processing undertaken on hardstand with low permeability (<$1x10^{-9}$ m/s); and<br>• Construction of dedicated drainage infrastructure and leachate pond to capture and store leachate;<br>• The active portion of the hardstand used to store materials undergoing composting will be bunded to contain leachate and the inactive area will allow leachate/runoff to flow into the environment via existing stormwater structures; and<br>• Operational controls will be implemented (i.e. pumping to Class III leachate ponds) to maintain minimum freeboard of 500 mm. | Minor | Possible | Medium | Based on the proposed controls, the Delegated Officer considers that low level onsite impacts could occur at some time. This risk rating would be reduced if the hardstand drainage and bunding was designed to contain leachate from clean green waste and final composting products.<br><br>The Delegated Officer has determined that leachate should be contained from all parts of the hardstand being used for storage of final compost products or long term storage of green waste. Short term (less than two weeks) storage of clean green waste is lower risk and will be an acceptable activity on the temporary laydown area. | Condition 4 - Infrastructure requirements for the green waste processing hardstand and leachate pond<br><br>Condition 5 – Waste processing requirements for green waste (limiting storage time for green waste on temporary laydown area) |

| Risk Event | | | | Consequence rating[1] | Likelihood rating[1] | Risk[1] | Reasoning | Regulatory controls (refer to conditions of the granted instrument) |
|---|---|---|---|---|---|---|---|---|
| **Source/ Activities*** | **Potential emissions** | **Potential receptors, pathway and impact** | **Applicant controls** | | | | | |
| Vehicle and loader movements<br><br>Operation of the green waste grinder | Noise | Air/windborne pathway causing impacts to amenity of closest residences approximately 540 east, 650 m north and 1180 south of the premises and recreational users of John Forrest National Park. | • Operational time restrictions for the Premises; and<br>• Use of broadband 'clackers' on site vehicles. | Slight | Possible | Low | The Delegated Officer considers that the processing of green waste at the proposed location will have only a slight impact on noise emissions from the Premises. There will be minimal impacts to amenity and this risk event could occur at some time.<br><br>There is some uncertainty as to whether the Premises currently complies with Sunday assigned levels in the Noise Regulations. For this reason, the Delegated Officer has limited the operating hours of the grinder to 7:00 am to 6:00 pm Monday to Saturday. | The provisions in the *Environmental Protection (Noise) Regulations 1997* are sufficient to regulate noise emissions from these activities.<br><br>Condition 4 - Equipment requirements for green waste grinder<br><br>Condition 28 - Complaint recordkeeping and reporting |
| Operation of the green waste grinder<br><br>Turning of the green waste<br><br>Vehicle and loader movements | Dust (including bioaerosols) | Air/windborne pathway causing impacts to amenity and public health of closest residences approximately 540 east, 650 m north and 1180 south of the premises and recreational users of John Forrest National Park. | • Dust suppression by application of water to unsealed roads and dusty wastes; and<br>• Irrigation of compost windrows with stormwater to maintain moisture content. | Slight | Unlikely | Low | The Licence Holder's dust controls and the distance from the green waste processing hardstand to receptors provide adequate mitigation of dust emissions. The Delegated Officer considers that there will be minimal amenity and health impacts and this risk event will probably not occur in most circumstances. | Condition 4 - Equipment requirements for the green waste grinder<br><br>Condition 28 - Complaint recordkeeping and reporting |
| Fire in the green waste | Smoke emissions | Air/windborne pathway causing impacts to amenity and public health of closest residences approximately 540 east, 650 m north and 1180 south of the premises and recreational users of John Forrest National Park. | • Operators to have fire extinguisher training; and<br>• Water carts available in the event of a fire; and<br>• Red Hill Emergency Preparedness and Response Plan. | Minor | Unlikely | Medium | The Delegated Officer considers that smoke from a green waste fire will cause low level amenity impacts at the local scale and this event will probably not occur in most circumstances.<br><br>The Licence Holder's fire prevention and response measures are suitable controls. Additional conditions relating to windrow dimensions and separation are required to provide emergency services with appropriate access during fire incidents. | Condition 5 - Process requirements for green waste processing<br><br>Condition 28 - Complaint recordkeeping and reporting |

*Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)*

# 9. Consultation

**Table 13: Summary of consultation**

| Scope | Method | Comments received | DWER response |
|---|---|---|---|
| Mechanical evaporator | Local Government Authority advised of proposal (28/02/2019) | The City of Swan replied on 29/03/2019 confirming that no development approval was required as the proposal is for Public Works and the Licence Holder is therefore exempt from the requirement to obtain a development approval.<br><br>The City of Swan had no other concerns or comments in relation to the proposed amendment. | No response required |
| | Radiological Council advised of proposal (25/02/2019 and 18/06/2019) | The Radiological Council replied on 30/07/2019 to request further information from the Licence Holder.<br><br>The Radiological Council provided their final assessment of information from the Licence Holder on 20/12/2019. Their findings are summarised in Section 0. | Summarised in Section 0 |
| | Department of Health (28/02/2019) | The Department of Health replied on 29/03/2019 and confirmed that they had no objection to the proposed amendment and flagged that comments would be provided by the Radiological Council under separate advice. | No response required |
| Green waste processing (the scope of this stakeholder referral also included the interim FOGO facility which is being assessed under a separate amendment) | Local Government Authority advised of proposal (26/07/2019) | The City of Swan replied on 2/08/2019 confirming that no Development Approval was required from the City of Swan as the proposal is for Public Works which are in line with the purpose and intent of the City's planning scheme that has effect.<br><br>The City of Swan recommended that a condition regarding odour nuisances be placed on the operation, which can be readily enforced, should it be appropriate in those circumstances where surrounding properties are unreasonably affected. The City of Swan suggested this condition take the form of a requirement to prepare an Environmental Management Plan addressing odour emissions which includes:<br>• odour monitoring parameters needing to be implemented & actions required to address breaches;<br>• exhaust ventilation requirements & mechanical treatment & filtration of exhaust emissions required;<br>• whether the operation will pose an odour problem to surrounding neighbours & to what extent; and<br>• what industry proven solutions can be implemented to mitigate odour emissions, where likely, to | The Delegated Officer has taken into consideration these comments and determined that they are more relevant to the interim FOGO facility component of the referral than the movement of green waste processing activities which presents a lower risk of odour emissions.<br><br>The Delegated Officer will factor these comments into the separate |

| Scope | Method | Comments received | DWER response |
|---|---|---|---|
| | | ensure neighbours are not unreasonably affected. | amendment assessment for the interim FOGO facility. |
| Mechanical evaporator, screening and crushing | Applicant referred draft documents (16/01/2020) | Comments received 6/02/20 and summarised in Appendix 2 | Responses summarised in Appendix 2 |
| Mechanical evaporator, screening and crushing, green waste processing | Applicant referred draft documents (19/03/2020) | Comments received 26/03/2020 and summarised in Appendix 3 | Responses summarised in Appendix 3 |

# 10. Conclusion

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

**Odour field assessments**

As discussed in Sections 5.3.1 and 8, the Delegated Officer determined that four OFAs over 18 months are required to provide an objective assessment of current odour impacts and sources at the Premises and verify the risk assessment presented in this Amendment Report. Based on the findings of the OFAs, the Licence Holder may choose to prepare an odour improvement plan for the Premises. Following submission of the four OFA reports, DWER will assess whether they provide evidence that current operations at the Premises are causing unreasonable odour emissions. Based on this assessment, DWER may require the Licence Holder to implement odour improvement measures. An appropriate licensing pathway to implement potential improvements will be determined by DWER at the relevant time.

**Stormwater and leachate management**

As part of the second draft referral to the Licence Holder, DWER requested further information about stormwater and leachate management in relation to the southern hardstand pad (temporary laydown area). The Licence Holder did not provide the following information requested by DWER:

- A stormwater drainage plan showing stormwater pathways from the hardstand pad and relevant holding ponds and discharge points.
- A proposed stormwater testing regime (location, frequency and analytes).
- Confirmation of proposed discharge criteria if different from those referenced in the 2018 AER.
- Leachate barrier design (material and thickness) – geotechnical testing results were provided but did not include permeability testing.
- Protective cover design (material and thickness).

The Delegated Officer considers that the southern hardstand is not suitable for the long term storage of green waste and final compost products. This is based on the following considerations:

- Stored green waste and final compost products have the potential to generate contaminated stormwater/leachate emissions, especially during rain events.
- The Licence Holder has not addressed the data gaps identified in their proposed

stormwater/leachate management at the southern hardstand pad. Therefore insufficient information has been provided to demonstrate that the southern hardstand pad will contain potential emissions and prevent uncontrolled discharge of contaminated water into the environment via infiltration to soil and groundwater or overland flow as surface water runoff.

- The Licence Holder has existing commitments under MS 274 to manage surface water from active areas of the site and has failed to demonstrate that this proposal is consistent with these commitments.

The Licence Holder has indicated that the southern hardstand pad will only be used for temporary storage of green waste or final compost products as required. DWER is not confident that the Licence Holder will abide by this commitment in the future and considers there is a high likelihood that the southern hardstand pad will be needed for longer term storage. This is because the northern hardstand pad currently appears to be close to its maximum capacity for storage of green waste and compost (Figure 3) and the Licence Holder is proposing to add an additional activity to this area commencing in July 2020 (interim FOGO facility).

The Delegated Officer considers that the southern hardstand pad may be used for the temporary storage (up to two weeks) of clean green waste. Storage of plant and ferricrete are also suitable uses for this infrastructure. However, the southern hardstand pad is not suitable for storage of final compost products or long term storage of green waste. The Revised Licence has been amended to reflect these requirements. Should the Licence Holder wish to use the southern hardstand pad for the storage of final compost products or longer term storage of green waste they should apply for a separate licence amendment and address the previously requested information as listed above.

## 10.1. Summary of amendments

All proposed changes from this amendment process have been incorporated into the Revised Licence. DWER has also taken this opportunity to update and amend the licence as follows:

- Reformat and restructure the Revised Licence into the current DWER format.
- Consolidate licence conditions from Amendment Notices 1 to 6 into the Revised Licence.
- Remove and amend conditions relating to infrastructure constructed during 2019. This was undertaken in accordance with the findings of two construction compliance assessments completed by DWER, including the green waste leachate pond and the Class III leachate ponds on Lot 12.

Changes made to existing conditions and new conditions are described in the conversion map in Table 14.

## Table 14: Licence conversion map

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| **Condition edits** | | | |
| All relevant | Terminology - licensee | Licence Holder | Updated to standard terminology and nomenclature |
| | Terminology - site | premises | |
| N/A | Category 12 production capacity | N/A | Production capacity increased from 50,000 tonnes per annual period to 200,000 tonnes per annual period as requested by the Licence Holder. |
| G1(a, b) and G2(i) | Waste acceptance specifications including waste types, quantities and acceptance criteria. | Condition 1 | Rewording and reformatting of conditions into current licence structure – moved into the waste acceptance table.<br>Reference to additional requirements of the *Environmental Protection (Controlled Waste) Regulations 2004* added in accordance with current licensing approach.<br>Acceptance criteria for Special Waste Type 2 updated as follows:<br>• Added reference to the DOH *Operational Directive 0651/16 – Clinical and Related Waste Management Policy* for the definition of wastes which require incineration.<br>• Low level radioactive waste must meet the requirements for landfill disposal specified in the Department of Health guideline *Radioactive Waste Disposal: Limits and Procedures for the Disposal of Medical and Research Wastes at Landfill Sites Licensed by the Department of Environmental Protection*. This requirement is consistent with the existing licensing approach but was not previously included in the licence. |
| G1(d) (Amendment Notice 2) | Waste approved for burial | Condition 5 | Rewording and reformatting of conditions into current licence structure – moved into the waste processing table. |
| G1(e, f)<br>(Amendment Notice 2) | Hazardous waste process requirements | Condition 5 | Rewording and reformatting of conditions into current licence structure – moved into the waste processing table. |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| G2(c) | Contaminated solid waste acceptance procedures | Condition 2 | Rewording for clarity. |
| G2(ii, iii and iv) | Special Waste Type 1 procedures | Condition 5 | Rewording and reformatting of conditions into current licence structure – moved into the waste processing table. |
| G3(a) | Monitoring of waste acceptance volumes | Condition 20 | Updated to align with current licensing approach. |
| G3(b) | Annual Environmental Report | Condition 27 | Updated to align with current licensing approach. |
| G3(c) | Complaint record-keeping | Condition 28 | Updated to align with current licensing approach. |
| G3(d)<br>(Amendment Notice 1) | Surface water monitoring requirements | Condition 21 | No change |
| G3(e)<br>(Amendment Notice 1) | Groundwater monitoring requirements | Condition 22 | No change |
| G3(f)<br>(Amendment Notice 1) | NATA accreditation of laboratories | Condition 23 | Minor rewording for clarity. |
| G4 | Annual Audit Compliance Report | Condition 29 | Updated to align with current licensing approach and reference to AACR form in Schedule 2 removed. |
| G5(a) | Controls on the deposition of waste | Condition 9 | Reference to Class III cells added to clarify that this is not applicable to Class IV landfilling activities. |
| G5(b) | | Condition 10 | |
| G5(c) | | Condition 11 | |
| G5(d) | | Condition 12 | |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| G5(e) | | Condition 13 | No change |
| G5(f) | | Condition 14 | Reference to Class III cells added to clarify that this is not applicable to Class IV landfilling activities. |
| G6(a, b) | Fencing and gate requirements | Condition 4 | Reformatting of conditions into current licence structure – moved into the infrastructure and equipment table. |
| G7(a) | Windblown waste controls | Condition 18 | No change |
| G7(b) | | Condition 19 | |
| G8 | Vehicle wash down requirements | Condition 4 | Reformatting of condition into current licence structure – moved into the infrastructure and equipment table. |
| G9(a, b, e) | Greenwaste Facility processes | Condition 5 | • Reformatting of conditions into current licence structure – moved into the waste processing table; and<br>• Name of infrastructure changed from Greenwaste Facility to green waste processing hardstand. |
| G9(c, d, f) | Greenwaste Facility water management | Condition 4 | Rewording and reformatting of condition into current licence structure – moved into the infrastructure and equipment table. |
| G9(g, h, i, j, k, l, m) | Construction and reporting requirements for Greenwaste Facility | Conditions removed | Conditions out of date as the Licence Holder did not proceed with construction of the Greenwaste Facility referenced in these conditions. |
| G9(n, o) | Western and eastern leachate ponds required freeboard | Conditions removed | Conditions superseded by Condition W5 in Amendment Notice 3 (now included in condition 3 in the infrastructure and equipment table) |
| G10, G11, G12, G13, G14, G15, G16, G17 & G18<br>(Amendment Notice 3 and 4) | Construction and reporting requirements for leachate ponds in south of Lot 12 | Conditions removed | Conditions satisfied and now redundant. This infrastructure has been constructed and the engineering certification and construction quality assurance validation report submitted and reviewed by DWER. Written confirmation of this outcome was provided to the Licence Holder on 9 November 2019 and 3 January 2020. |
| A1(a) | Burning of waste controls | Condition 15 | Minor rewording |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| A1(b) | | Condition 16 | No change |
| A1(c) | | Condition 17 | |
| A3(a) | Capping system requirements | Condition 4 | Reformatting of condition into current licence structure – moved into the infrastructure and equipment table.<br>Clerical error requiring the clay hydraulic conductivity to be at least $1x10^{-7}$ m/s corrected to be $1x10^{-7}$ m/s or less. |
| A3(b) | Landfill gas collection system | Condition 4 | Rewording and reformatting of condition into current licence structure – moved into the infrastructure and equipment table. |
| W1 | Wastewater management | Condition 6 | Rewording of condition to provide clearer leachate and wastewater management conditions and account for recent changes at the premises. The changes reflect that:<br>• the Licence Holder does not discharge to sewer;<br>• leachate from the Class III leachate collection system may be recirculated to the active cell or directed to the Class III leachate ponds;<br>• leachate from the Class IV leachate collection system must be directed to the Class IV leachate ponds;<br>• leachate from the green waste processing area must be directed to the green waste processing leachate pond and may then be transferred to the Class III leachate ponds;<br>• mechanical evaporation is not a permitted disposal mechanism for Class IV leachate;<br>• stormwater from the temporary laydown area is permitted to discharge to the environment (noting that this is also subject to the temporary laydown area being used in accordance with green waste processing requirements in Condition 5); and<br>• only certain ponds are approved leachate storage ponds and these are now depicted in the site layout map, Figure 2 in Schedule 1. |
| W2(a) | Stormwater management | Condition 7 | No change |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| W2(b) | Stormwater drain management | Condition 4 | Reformatting of conditions into current licence structure – moved into the infrastructure and equipment table. |
| W3(a) | Separation distance between deepest excavation and highest level of groundwater | Conditions removed | These conditions are redundant as these aspects were assessed as part of approvals to construct and operate infrastructure. |
| W3(b) | Separation distance between waste disposal and surface water | | |
| W4<br>(Amendment Notice 1) | Requirement to construct P1 groundwater monitoring well | Condition removed | The Licence Holder has confirmed that SP46D was constructed to satisfy this condition and it can therefore be removed. |
| W5<br>(Amendment Notice 3) | Leachate freeboard requirements | Condition 4 | Reformatting of condition into current licence structure – moved into the infrastructure and equipment table. |
| Schedule 1 | Premises map | Figure 1 – Premises map | Aerial imagery updated to August 2019 and lot boundaries added. |
| | Premises layout | Figure 2 – Premises layout | Premises layout map added to show current layout of key infrastructure at the Premises and clearly depict leachate pond locations and classifications (Class III, Class IV and green waste).<br>The updated Premises layout map (Figure 1 in the Amendment Report) shows the new location of the green waste processing hardstand. The relocation of green waste processing and construction of new infrastructure are being assessed under a separate licence amendment application for the interim FOGO facility. The extended portion of the hardstand has not been assessed or approved by DWER as the Licence Holder has not provided any construction specifications or documentation relevant to the extension. This area has been removed from the premises layout map (Figure 2 in the licence). |
| | Location of Greenwaste Facility | Map removed | Map out of date |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| | Map of surface water monitoring locations (PFAS Waste Disposal) – Farm Stage 1, 2 and 15<br>(Amendment Notice 1) | Schedule 2, Figure 3 – Map of surface water monitoring locations | Maps moved to Schedule 2 – Monitoring<br>Labelling added to show which locations are required to be monitored |
| | Map of groundwater monitoring locations (PFAS Waste Disposal) – Farm Stage 1, 2 and 15<br>(Amendment Notice 1) | Schedule 2, Figure 4 – Map of groundwater monitoring locations | |
| | Location of existing western leachate pond and approved new eastern leachate pond<br>(Amendment Notice 4) | Map removed | Map out of date |
| Schedule 2 | Annual Audit Compliance Report | Form removed | AACR form is available on the Department's website as referenced in the licence definitions table. |
| Schedule 3<br>(Amendment Notice 1) | Monitoring requirements for PFAS waste disposal | Schedule 2 | • SP38D and SP44D removed as bores have been decommissioned according to Licence Holder;<br>• Schedule number change;<br>• Maps of surface water and groundwater monitoring locations added; and<br>• Reference to groundwater monitoring location P1 updated to SP46D to reflect the Licence Holder's name for the newly constructed bore. |
| Schedule 4<br>(Amendment Notice 2) | Landfill acceptance criteria for Special Waste Type 3 | Schedule 3 | Schedule number change only |
| Schedule 4<br>(Amendment Notice 3) | Leachate pond infrastructure requirements | Schedule removed | Schedule is redundant. This infrastructure has been constructed and the engineering certification and construction quality assurance validation report submitted and reviewed by DWER. |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| **New conditions** | | | |
| - | Rejection of waste which does not meet acceptance criteria | Condition 3 | New condition added for consistency with current licensing approach. |
| - | Infrastructure and equipment controls | Condition 4 | New conditions in the infrastructure and equipment table including:<br>• Operational controls for the mechanical evaporator. These conditions are based on the outcome of this amendment assessment and aim to manage and prevent leachate, noise and odour emissions.<br>• Operational controls for the green waste leachate pond. These conditions were recommended as the result of the recent construction compliance assessment for the green waste leachate pond. An additional requirement to maintain the pond in in an aerobic state relates to managing the odour emissions from the new pond.<br>• Infrastructure controls for the green waste processing hardstand. These conditions are based on the outcome of this amendment assessment and aim to manage and prevent stormwater/leachate and odour emissions.<br>• Infrastructure controls for the temporary laydown area. These conditions are based on the outcome of this amendment assessment and aim to prevent stormwater and leachate ingress from other areas.<br>• Operational controls for the green waste grinder to manage and prevent noise and dust emissions.<br>• Operational controls for screening and crushing equipment to manage and prevent dust emissions. |
| - | Waste processing table | Condition 5 | Reference to additional requirements of the *Environmental Protection Regulations 1987* and *Environmental Protection (Controlled Waste) Regulations 2004* added in accordance with current licensing approach.<br>New conditions relating to green waste processing added to prevent and manage fire risk, leachate emissions and odour emissions. |
| - | Dust suppression water | Condition 8 | New condition to clarify permitted sources of dust suppression water. This condition was added to clarify queries which arose during the September 2019 compliance inspection at the Premises. |

| Existing licence condition | Condition summary | New condition reference | Conversion notes |
|---|---|---|---|
| - | Odour field assessments | Conditions 24 to 26 | New conditions requiring the completion of four OFAs over an 18 month period and submission of OFA reports to DWER. These conditions were added to characterize the current odour impact extent from existing operations at the Premises and verify the risk assessment for odour emissions from the relocation of green waste processing activities. The draft originally proposed that OFAs were completed on a quarterly basis over 12 months, however these requirements were amended to be more flexible in light of the expected impact of COVID-19 on odour industry capacity during 2020. |
| - | Maintenance of accurate and auditable books | Conditions 30 and 31 | New record keeping requirements to align with current licensing approach. |

## Appendix 1: Key documents

| | Document title | In text ref | Availability |
|---|---|---|---|
| 1 | Licence L8889/2015/1 – Red Hill Waste Management Facility | L8889/2015/1 | accessed at www.dwer.wa.gov.au |
| 2 | Application form and supporting documents | N/A | DWER records (DWERDT114826) |
| 3 | Supporting documents to Amendment Notice 3 assessment (operating procedure and manufacturer's manual) | N/A | DWER records (A1717623) |
| 4 | DER, December 2014. *Assessment and management of contaminated sites*. Department of Environment Regulation, Perth. | DER 2014 | accessed at www.dwer.wa.gov.au |
| 5 | DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth. | DER 2015a | |
| 6 | DER, November 2016. *Guidance Statement: Environmental siting.* Department of Environment Regulation, Perth. | DER 2016 | |
| 7 | DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth. | DER 2017a | |
| 8 | DER, January 2017. *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS).* Department of Environment Regulation, Perth. | DER 2017b | |
| 9 | DWER, June 2019. *Guideline: Decision Making*. Department of Water and Environmental Regulation, Perth. | DWER 2019a | |
| 10 | DWER, June 2019. *Guideline: Odour Emissions.* Department of Water and Environmental Regulation, Perth. | DWER 2019b | |
| 11 | ANZECC and ARMCANZ, 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* | ANZECC and ARMCANZ 2000 | accessed at www.waterquality.gov.au |
| 12 | Couton, DM and Timones, JC, 2017. *Recent Insights into Mechanically-Enhanced Evaporation of Mine Affected Waters*, 2017 World of Coal Ash Conference in Lexington, Kentucky, May 9-11, 2017. | Couton and Timones 2017 | accessed at http://www.flyash.info/2017/070-Couton-woca2017p.pdf |
| 13 | DOH, February 2007. *Radioactive* | DOH 2007 | DWER records |

| | | | |
|---|---|---|---|
| | *Waste Disposal: Limits and Procedures for the Disposal of Medical and Research Wastes at Landfill Sites Licensed by the Department of Environmental Protection.* Department of Health, Perth. | | (A1858755) |
| 14 | DOH, December 2014. *Contaminated Sites Ground and Surface Water Chemical Screening Guidelines.* Department of Health, Perth. | DOH 2014 | accessed at www.health.wa.gov.au |
| 15 | DOH, January 2016. *Operational Directive 0651/16 Clinical and Related Waste Management Policy.* Department of Health, Perth. | DOH 2016 | |
| 16 | Eastern Metropolitan Regional Council, March 2019. *Annual Monitoring and Compliance Report – 2018.* | EMRC 2019 | DWER records (DWERDT147310) |
| 17 | EPA South Australia, June 2019. *Compost guideline.* Environment Protection Authority of South Australia, Adelaide. | SA EPA 2019 | accessed at www.epa.sa.gov.au |
| 18 | HEPA, January 2018. *PFAS National Management Plan.* Heads of EPAs Australia and New Zealand. | PFAS NEMP 2018 | accessed at www.epa.vic.gov.au |
| 19 | Radiation Professionals, 16 December 2019. *Determination of Potential Worker and Public Doses Due to Mechanical Evaporation of Leachate Pond L10.* | Radiation Professionals 2019 | DWER records (A1855155) |
| 20 | Talis Consultants, October 2017. *Technial specification: Red Hill Waste Management Facility – Leachate Pond Construction.* | Talis 2017 | DWER records (A1566070) |
| 21 | Talis Consultants, September 2018. *Pathogen Dispersion Assessment of Leachate Evaporator*. | Talis 2018 | DWER records (DWERDT114826) |

## Appendix 2: Summary of Licence Holder comments on first draft

The Licence Holder was provided with the draft Amendment Report and Licence on 16 January 2020 for review and comment. The Licence Holder responded on 6 February 2020 and provided supplementary information on 25 February 2020. The following comments were received on the draft Amendment Report and Licence.

| Condition | Item | Summary of Licence Holder comment | DWER response |
|---|---|---|---|
| 4, Table 2 and Schedule 1 | Infrastructure and equipment locations | The Licence Holder provided an updated Figure 2 as requested with all infrastructure labelled appropriately. | Figure 2 in the licence was updated with the new figure provided by the Licence Holder (Figure 1 in the Amendment Report).<br><br>The Delegated Officer notes that the location of the 'current green waste processing hardstand' depicted in the Premises layout map shows:<br>i) Green waste processing activities at the Premises have moved from the former facility on Lot 1 to the new hardstand on Lot 12. DWER is assessing this operational change and new infrastructure under a separate licence amendment application currently underway for the interim FOGO facility.<br>ii) The new hardstand on Lot 12 has been extended to the south compared to that proposed by the Licence Holder in the separate amendment application. Based on aerial imagery, it appears the Licence Holder undertook these works in late 2019. The Licence Holder has not previously notified or obtained a works approval from DWER to construct this infrastructure. DWER currently has no information about the construction specifications of the extended area. The adequacy of the expanded infrastructure will be assessed under a separate licence amendment application currently underway for the interim FOGO facility. The extended portion of the hardstand has not been assessed or approved by DWER and has therefore been removed from the Premises layout map (Figure 2 in the licence). |
| 4, Table 2 | Inspection of the green waste leachate pond | The Licence Holder considers that the request for a daily inspection of the greenwaste leachate pond by site personnel to assess and record the | The requirement for daily inspection was proposed as a regulatory control because the Licence Holder proposed to conduct inspections at this rate in a letter to DWER dated 9 August 2019. This operational control was included in the |

| Condition | Item | Summary of Licence Holder comment | DWER response |
|---|---|---|---|
| | | available freeboard, is too prescriptive and should apply some common sense and practicality to allow for seasonality, i.e. during summer when the greenwaste leachate pond is mostly dry. The requirement to record this data on a daily basis is also too prescriptive and does not serve any purpose other than unnecessary administration and reporting of useless unnecessary information. The intent is to maintain a freeboard equal to or greater than 500 mm and recording this information on a daily basis does not serve this intent and is simply a waste of time especially during summer or when the pond is dry.<br><br>The Licence Holder requested this condition to be removed and amended to regular inspection as required to ensure a freeboard equal to or greater than 500 mm is maintained. | draft Licence to provide assurance that the green waste leachate pond would not overtop. The Delegated Officer considered that this was justified as the Licence Holder has experienced leachate storage shortages in the past and DWER lacked confidence in the water balance calculations submitted to support the design of the new pond.<br><br>The Delegated Officer has considered the Licence Holder's comments and determined that a reduction in inspection frequency from daily to weekly will provide an acceptable alternative control. The Delegated Officer does not consider that the requirement to keep a record of freeboard inspections is an overly onerous requirement. Keeping records of inspections will provide DWER with a means of assessing future compliance with this condition. The Delegated Officer has edited the wording of the condition slightly to make it clear that the only information required to be recorded is compliance (i.e. yes/no) rather than an actual measurement of the available freeboard. |
| 4, Table 2 | Mechanical evaporator siting | The Licence Holder proposes to keep the mechanical evaporator in its current location, between the Class III leachate holding pond and adjacent evaporation pond and oriented to spray towards the north. The Licence Holder stated that this fixed location was determined by the most common wind conditions and would allow the spray to be directed into the main holding pond or adjacent evaporation pond.<br><br>The programming within the weather station is such that a change in conditions is consistent over a short period of time before the evaporator is | The Delegated Officer understands that a closed-loop configuration may not be achievable 100% of the time due to changeable wind conditions and gusts of wind causing overspray. However, the primary concern of the Delegated Officer is that the current orientation of the mechanical evaporator directs the water droplet plume to the north, rather than into the leachate holding pond to its west. Deposition of leachate over the ground surface between and around ponds is expected to lead to the potential accumulation of contaminants within the soil.<br><br>While the site is operational as a waste management facility, accumulation of contaminants in onsite soil is not considered to present a complete source-pathway-receptor risk event. The only direct receptors to soil contamination on an operational site are staff, contractors and visitors who are not |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | shut down. A short gust of wind would not be enough to shut down the evaporator but may cause drift to occur outside the footprint of the ponds.<br><br>Any drift which does fall outside the pond is directed to drain back into one of the three leachate ponds. It is not a closed loop configuration in the sense that all spray is contained within the holding pond, however all liquid drains back into either the holding pond or evaporation ponds. Remote access to the evaporator allows the supervisors to shut down the evaporator immediately should excessive spray be reported.<br><br>The Licence Holder contends the statement that the current configuration of the mechanical evaporator does not achieve a closed-loop system as per Key Finding (15). The statement that a closed loop configuration of the mechanical evaporator occurs where fallout from the evaporation plume is completely captured by the feed pond. This is not possible given the fluky nature of the wind conditions. The weather station parameters are set to minimise the amount of drift which falls outside of the ponds.<br><br>The Licence Holder would also like to add that the 'wet' area that can be seen between the leachate holding pond and adjacent evaporation pond shown in Figure 7, does not cause any impact to the receiving environment due to the | considered under EP Act (Part V) assessments, but rather under other legislation. However, the risk assessment highlights two potential pathways by which contaminants in soil may be spread:<br><br>**1) Infiltration of contaminants to groundwater:**<br>Based on the depth to groundwater and sandy, silty clay soil present within the vicinity of the leachate ponds, the Delegated Officer considers that it is unlikely there will be gross seepage of contaminants in soil to groundwater.<br><br>**2) Mobilisation of contaminants into stormwater and runoff to terrestrial and aquatic ecosystems:**<br>The Licence Holder has indicated that stormwater drainage within the leachate pond compound is diverted back into leachate ponds. This information has been added to the risk assessment in Section 8 and is considered an appropriate control to prevent contaminated stormwater dispersing to the surrounding environment.<br><br>Based on the likelihood and consequence of the risk events above, the Delegated Officer considers that the current siting of the mechanical evaporator is acceptable. Condition 4, Table 2 in the Licence has been amended to specify that the evaporator must be operated in a manner which prevents visible overspray of evaporation droplets beyond the exclusion zone rather than the footprint of the Class III leachate holding pond. This provides increased flexibility to the Licence Holder and an appropriate level of control for the potential risk.<br><br>By declining to move/orient the evaporator to a location better suited to achieving a closed-loop configuration, the Licence Holder may cause soil contamination which could have otherwise been avoided. The implications of this soil contamination will need to be considered when the Licence Holder undertakes closure, decontamination and rectification works at the Premises in the future. The mechanical |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | drainage system as stated previously and any leachate collected via this means is recirculated back into the leachate ponds.<br><br>The Licence Holder has undertaken numerous and detailed investigations in the area of the spray from the mechanical evaporator including assessment of air, vegetation, soil and water across a wide range of parameters and by various experts in this field. The results have provided assurance that not only are there no impacts on the environment, but more importantly all measures that are already in place such as the exclusion zone, provide no impacts to the health of people working or visiting the site. | evaporator may also require consideration as a contaminant source as part of ongoing contaminated sites investigations under the *Contaminated Sites Act 2003.*<br><br>The Licence Holder referenced having undertaken numerous investigations in the area of the spray from the mechanical evaporator including air, vegetation, soil and water. DWER understands that this comment is primarily referencing the *Pathogen Dispersion Assessment of Leachate Evaporator* (Talis, 2018). For the reasons outlined in Key Findings (19), (21) and (22), the Delegated Officer considered that this report was of limited use in assessing the potential for, and impacts of, the long term use of the mechanical evaporator in its current location on Lot 12. |
| 4, Table 2 | Mechanical evaporator operational settings | The Licence Holder provided an operating procedure for the mechanical evaporator and a screenshot showing current operational settings. The evaporator will run in automatic mode during the following conditions:<br>• Relative humidity: 0 – 80%<br>• Wind speed – variable depending on wind direction:<br>  ○ 3 m/s during wind from 85º to 135º;<br>  ○ 7 m/s during wind from 135º to 225º;<br>  ○ 7 m/s during wind from 225º to 280º;<br>  ○ 7 m/s during wind from 280º to 85º; | The Licence Holder has set a maximum allowable wind speed for automatic mode of 7 m/s (approx. 25 km/hr). This means that mechanical evaporation will not occur when wind speeds are greater than 7 m/s as recorded by the on-board weather station. This specification has been added into the conditions of the licence as part of the infrastructure/equipment requirements in Condition 4, Table 2. |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | • Wind Direction – all wind directions are acceptable; and<br>• Temperature: ≥ 5°C. | |
| 4, Table 2 | Operating hours of the mechanical evaporator | The EMRC requests that a degree of common sense and practicality is applied to the evaporator also, to enable flexibility in the use of the evaporator to maximize its function, particularly during the drier months of the year.<br><br>Given the evaporator does not significantly contribute to existing noise levels, the EMRC requests that the evaporator is permitted to operate 7 days a week, during available daylight hours to maximize the opportunity to evaporate leachate from the Class III leachate pond as long as it is operated in a manner which prevents visible overspray of evaporation droplets beyond the footprint of the Class III leachate holding pond and evaporation ponds. | The operating hours for the mechanical evaporator in the draft licence were 7:00 am to 5:00 pm Monday to Sunday. The Delegated Officer based these operating hours on those specified by the Licence Holder in the operating procedure submitted with the amendment application.<br><br>The Delegated Officer considers that changing the operating hours of the mechanical evaporator to daylight hours is an acceptable alternative regulatory control. Based on the evaporator noise levels presented in the ENA, the Delegated Officer considers that the mechanical evaporator is unlikely to significantly contribute to noise levels which exceed the 1900 to 2200 hours (all days) and 2200 to 0700 hours Monday to Saturday and 0900 hours Sunday assigned levels in the Noise Regulations. Condition 4, Table 2 in the Licence has been amended accordingly. |
| 4, Table 2 | Location of screening and crushing equipment | Please note that the location of screening and crushing activities is not static and continually changes based on where a new area is being developed. Currently, this occurs close to Stage 16, however this should not be prescriptive or included in the Licence due the rationale provided. | The potential impacts of noise and dust emissions from screening and crushing are directly related to the location of these activities on the Premises and the proximity to nearby receptors. The risk assessment in this Amendment Report was conducted based on the screening and crushing locations depicted in Figure 2, provided by the Licence Holder in their response to the draft licence.<br><br>Condition 4, Table 2 has been amended to provide clarity that screening and crushing may only occur in specified areas. If the Licence Holder wishes to alter the location of screening and crushing activities on the Premises, they will need to apply for an amendment so that the potential risks from emissions at that location can be assessed by DWER. |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| 4, Table 2 | Screening and crushing equipment operating hours | The Licence Holder provided two different sets of operating hours for screening and crushing equipment on the Premises as follows:<br>• 7:00 am and 5:00 pm Monday to Sunday; and<br>• 7:00 am to 4:00 pm Monday to Friday, 8:00 am to 4:00 pm Saturday and 10:00 am to 4:00 pm Sunday.<br><br>The Licence Holder also requested that the approved operating timeframe be extended from 7:00 am to 6:00 pm. The Licence Holder indicated that this would be consistent with the Noise Regulations and similar requirements for blasting. The Licence Holder confirmed that screening and crushing are not undertaken on Sundays. | An extension of screening and crushing hours from 7:00 am to 6:00 pm Monday to Saturday is acceptable given this will keep operations within the daytime assigned level period of 7:00 am to 7:00 pm.<br><br>As the Licence Holder has confirmed that screening and crushing activities will not be undertaken on Sundays, the operation of this equipment will not contribute to Sunday noise levels which may already exceed the Sunday daytime and night time assigned levels.<br><br>Condition 4, Table 2 in the Licence has been amended accordingly. |
| 4, Table 2 | Regulatory controls on Category 12 activities | The Licence Holder requested clarification as to why conditions have been imposed on the Licence in relation to Category 12 activities if they do not involve the processing of waste. If it is in relation to noise management, then the limitation on the hours of operation of the Premises would assumedly suffice. | Category 12 screening and crushing activities at the Premises have the potential to generate emissions including noise and dust. Although these emissions do not relate to waste handling at the Premises, they have the potential to impact receptors.<br><br>The regulatory controls which are included in Condition 4, Table 2 on the licence directly relate to the mitigation of dust and noise emissions from screening and crushing activities. |
| 6, Table 4 | Leachate and water management | The Licence Holder confirmed that Table 4 adequately described recirculation activities at the Premises. | No changes to the licence required. |
| 27(b) | Recordkeeping of infrastructure and equipment maintenance. | The Licence Holder requested that this requirement is amended to reflect infrastructure that is owned and operated by the Licence Holder only, as some plant and equipment is either hired or contracted through tender etc. | The Delegated Officer considers that this is an acceptable change and has incorporated it into Condition 27(b) in the licence. |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | and whilst the Licence Holder requires such infrastructure to be in good working order, it is not possible for these records to be necessarily made available to the Licence Holder. | |
| 22, Schedule 2, Table 9 | Groundwater monitoring bores | SP38D and SP44D are required to be tested biannually against a number of parameters including PFAS. Please note both SP38D and SP44D have been decommissioned due to site works. The Licence Holder requests for these bores to be removed from the licence. | As these bores have been decommissioned and are not able to be sampled in the future, they have been removed from Table 9 in Schedule 2 and Figure 4 in the Licence.<br><br>The potential requirement for new bores has been assessed separately within the scope of the works approval application for Stage 14 and 16 landfill cells (W6312/2019/1). |
| N/A – Relates to Amendment Report | Operating hours of major aspects of site activities | All major aspects of sites activities including i) receipt of kerbside collection truckloads, ii) waste disposal at the tipping face, iii) waste transfer station and iv) composting operations occur from 7:00 am to 4:00 pm Monday to Friday, 8:00 am to 4:00 pm Saturday and 10:00 am to 4:00 pm Sunday. | Information added to Section 2.2 of the Amendment Report |
| N/A – Relates to Amendment Report | Model of screener and crusher equipment | The Licence Holder confirmed that they do not own or operate rock screens or crushers. The models change depending on the size of the campaign and the contractor conducting the works. | Information added to Section 2.3.2 of the Amendment Report |
| N/A – Relates to Amendment Report | Operating procedure for the mechanical evaporator | The Licence Holder provided the document *Procedure – Assisted Evaporation Procedure.* | DWER has reviewed this document and found it is generally consistent with that previously submitted when the evaporator was in use at the Stage 2 Class IV cell. The procedure includes a map showing the new exclusion zone designated around the Class III leachate ponds on Lot 12. The purpose of this exclusion zone is to prevent site personnel, contractors and visitors approaching the evaporator while it is operating.<br><br>The exclusion zone map has been added to the Licence as Figure 3, as it is now referenced as the allowable limit of visible spray as per Condition 4, Table 2 and discussed above. |

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| N/A – Relates to Amendment Report | Buffer zone and exclusion zone around the mechanical evaporator | The Licence Holder requested that the Delegated Officer reconsider the increase to the buffer around the perimeter of the leachate holding pond from a 150 m to a 300 m radius around the evaporator. Figure 7 in the draft Amendment Report shows the plume and the fallout of leachate created by the evaporator. Given the statement that visual observations indicate that the evaporation plume extends approximately 100 – 150m from the evaporator, then why is the arbitrary number of 300m being applied?<br><br>The Licence Holder requested an explanation of the science and rigour behind the imposition of doubling the buffer to a 300m radius. This is a significant change to the current buffer and has significant flow on impacts on the ability of the site to operate with this limitation. The running of the evaporator is governed by the weather station parameters. These are set to allow little to no drift outside the hold pond or evaporation ponds. Any drift which does fall outside the ponds is directed to flow back into the ponds via drainage structures. The perimeter fence surrounding the ponds serves as the ideal buffer distance whilst the evaporator is in operation. This fence is gated and locked at all times. If access is required the evaporator is shut down by the supervisors to allow access. If imposed, the 300 m buffer would impact on a majority of the working area of the | The 300 m buffer distance discussed in Section 0 was not intended to act as an exclusion zone for site personnel, contractors and visitors. As discussed in Section 6, these receptors are not considered in DWER's risk assessment as they are covered under other legislation.<br><br>The 300 m buffer distance referenced in Key Finding (20) and shown in Figure 14 was used to understand the likelihood of offsite dispersal of the evaporation plume. Although the plume had been observed to be 100-150 m in radius based on visual observations, there was some uncertainty as to the full extent of the non-visible component of the evaporation plume. The Delegated Officer used the 300 m buffer distance to the site boundary to justify that there was sufficient conservatism in the risk assessment, despite this uncertainty.<br><br>Key Finding (20) has been edited to provide clarity on this matter. |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | Red Hill Waste Management Facility and would subsequently stop any current operations from continuing, particularly during the dry months.<br><br>The location of the mechanical evaporator was chosen such that under most weather conditions, the plume and fallout would be directed back onto the leachate pond. The mechanical evaporator cannot be moved around to suit variable weather conditions and it is for this reason that the system is automatically shut down when unfavourable conditions occur as per the programming parameters.<br><br>The fence surrounding the three ponds is an adequate buffer distance. Access cannot be obtained within this area without supervisor permission, at which time evaporator is shut down. Any spray falling between the ponds and fence line is captured and directed to drain back into the storage or evaporation ponds. Again, DWER's assessment is supposed to focus on the risk of emissions and the likely impacts. Given the potential for this impact is mitigated, the EMRC requests reconsideration of the 300m buffer to the current system in place. | |
| N/A – Relates to Amendment Report | Noise from screening and crushing equipment | DWER requested confirmation from the Licence Holder as to whether the existing noise levels referenced in the ENA included noise emissions from screening and crushing activities. | The Delegated Officer requested clarification from the Licence Holder on this matter because Lloyd George Acoustics did not specify which days of the week or specific activities were represented in the 'existing noise levels' modelled in the ENA. If the existing noise levels modelled for |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | The Licence Holder confirmed that screening and crushing activities were included in the existing noise levels. The Licence Holder questioned why clarification was sought by DWER on this issue given there have been no complaints relating to noise other than when blasting has occurred at the site. The Licence Holder said that the DWER assessment is supposed to focus on the risk of emissions and the likely impacts, which clearly in this case, there were none. | the Premises in the ENA are representative of Sunday noise levels, they indicate that the Premises currently does not comply with the daytime and night time assigned levels applicable on Sundays.<br><br>The lack of noise complaints in relation to screening and crushing noise emissions does not necessarily mean that the amenity of sensitive receptors is not being impacted. Local residents are likely to have become desensitised to noise emissions due to the impacts from previous blasting at the Premises. Screening and crushing activities have the potential to significantly contribute to noise levels at the Premises and the proposed increased Category 12 throughput has the potential to increase noise emissions.<br><br>The Premises is required to comply with the Noise Regulations. The Licence Holder has since confirmed that screening and crushing will not occur on Sundays and therefore these activities with no contribute to a potential breach of the Sunday daytime and night time assigned levels. |

## Appendix 3: Summary of Licence Holder comments on second draft

The Licence Holder was provided with a second draft Amendment Report and Licence on 19 March 2020 for review and comment. The Licence Holder responded on 26 March 2020. The following comments were received on the second draft Amendment Report and Licence.

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| N/A – Relates to Amendment Report | Southern green waste hardstand/temporary laydown area | DWER requested the Licence Holder to provide construction specifications of the southern hardstand pad including, where applicable:<br>• Leachate barrier design (material, thickness, geotechnical testing results)<br>• Protective cover design (material and thickness)<br>• Grading design (slope and direction)<br>• Bunding design (materials, height, location)<br>**The Licence Holder responded as follows:**<br>Please note that as explained in an email to DWER sent 6 March 2020, this is NOT for greenwaste processing. The lines shown in the diagram was an error on the drawing and a correct version is shown in Attachment 1. It should not have been included as part of the greenwaste processing area. The hardstand was built as just that, a hardstand for use for storage of plant, materials, ferricrete, clean greenwaste, fully processed greenwaste compost to AS4454 (should it be required). None of these purposes generate leachate.<br><br>Please note the following:<br>• No liquid can drain from the northern hardstand to the southern hardstand.<br>• Please see attached information required for construction purposes including test results. (See Attachment 2).<br>• There are no leachate controls in place as the southern hardstand will not generate leachate. It is separate from the northern hardstand. All | DWER has updated Figure 2 in Schedule 1 of the Licence and Figure 1 in this Amendment Report with the figure provided as Attachment 1 to the Licence Holder's response.<br><br>Nearmaps aerial photography shows that from 17 February to 8 March 2020, the southern hardstand pad was used to store what appears to be final compost product and green waste for at least three weeks. The 8 March aerial photograph is shown in Figure 3. The Licence Holder stated in email correspondence on 26 March 2020 that the volume of compost product currently stored at the premises is due to a decrease in compost demand during the COVID-19 crisis.<br><br>The Delegated Officer acknowledges that the southern hardstand pad will not be used to store materials which are actively undergoing composting and generating significant volumes of leachate through decomposition. However, as discussed in Section 5.3.3, green waste and final compost products are likely to contribute substances such as nutrients, metals and organic compounds to stormwater during rain events. DWER considers that stormwater which has interacted with waste or final compost products should be managed as leachate because it is likely to contain elevated concentrations of contaminants. The composting process does not eliminate contaminants such as metals and nutrients and therefore it cannot be said that final |

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| | | stormwater will run off into the environment, same as if it was a road.<br>• A 1m high perimeter bund is in place for safety purposes. This is constructed using ferricrete.<br>• See attached survey for slope (See Attachment 3). Stormwater is directed to a low point and is discharged through an open drain into the environment. It is stormwater.<br>• The Southern hardstand is a lay down area and will be used as a temporary storage of fully processed compost to AS4454 (if required).<br>• In addition to the above, please note the EPA Compost Guideline for South Australia (see Attachment 4) states:<br><br>*'Finished compost product should be stored on a designated hardstand area that has a minimum 2% drainage gradient to direct the potentially nutrient rich runoff[7] into a stormwater management system capable of removing sediments and nutrients.*<br><br>*7 – finished compost product that has been processed in accordance with this guideline and is ready for immediate sale, is not considered a waste. Therefore surface water that comes into contact with finished compost is not considered leachate'.*<br><br>The EMRC requests the following:<br>• DWER's request to provide construction specifications of southern hardstand pad be removed.<br>• Figure 1 Premises Layout in the draft amendment report is replaced with Attachment 1 of this letter.<br>• Any reference to the southern green waste processing hardstand is removed from the draft amendment report and replaced with temporary laydown area. | compost products are free of potential environmental contaminants.<br><br>The Licence Holder has indicated that the risk from any 'leachate' generated will be negligible. The Delegated Officer has assessed the risk from this Risk Event to be medium (Section 8). When considered in the context of cumulative impacts from multiple potential contaminant sources and existing contamination impacts at the Premises, DWER considers that there is sufficient justification to apply regulatory controls to mitigate this risk.<br><br>The Licence Holder referenced the South Australian EPA *Compost guideline* (2019) which indicates that stormwater interacting with compost is not considered leachate. However, this guideline also highlights that stormwater from compost storage areas will potentially be nutrient rich and require management to remove sediments and nutrients. The Licence Holder is not proposing any interventions to remove nutrients or other contaminants in stormwater/leachate from the southern hardstand pad.<br><br>March 2020 aerial imagery indicates that the perimeter bund between the northern and southern hardstand pads is not continuous and there appears to be potential for leachate to drain from the northern to the southern section.<br><br>The Delegated Officer acknowledges that the storage of ferricrete and plant are low risk activities and unlikely to cause contamination of stormwater. Short term (less than two weeks) storage of unprocessed clean green waste is |

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| | | • Figure 2: Map of the premise's layout in the draft amended licence V2 is replaced with Attachment 1 of this letter. | lower risk and will also be an acceptable activity on the temporary laydown area. |
| N/A – Relates to Amendment Report | Stormwater management at temporary laydown area | The draft Amendment Report stated that the Licence Holder may choose to provide further information listed below to support their proposal. Without this information, the Delegated Officer will require stormwater/leachate from areas storing clean green waste and final products to be contained within a leachate pond.<br>• Stormwater drainage plan for 'inactive' parts of green waste processing hardstand including location of relevant drainage channels, holding ponds and discharge points.<br>• Proposed stormwater testing regime (location, frequency and analytes)<br>• Confirmation of proposed discharge criteria if different from those referenced in the 2018 AER.<br><br>**The Licence Holder responded as follows:**<br>As discussed with DWER officer on 25 March 2020, and as per the EMRC's response described above, the EMRC does not consider there is sufficient justification to warrant the construction of a leachate pond for any potential leachate created from the final composted product. The EMRC had advice from the DER in 2015 that this was not required.<br><br>In the event of a heavy rainfall event/s, excess stormwater captured in the bunded Southern Hardstand Pad will run off and be captured in existing drainage lines that divert stormwater into stormwater ponds further south of the site.<br><br>The EMRC requests the following:<br>• DWER's request to contain leachate from areas storing final composted products in a leachate pond be removed as no leachate will be created and in the event of rainfall during the temporary | The Licence Holder did not provide the following information requested by DWER:<br>• A stormwater drainage plan showing stormwater pathways from the hardstand pad and relevant holding ponds and discharge points.<br>• A proposed stormwater testing regime (location, frequency and analytes).<br>• Confirmation of proposed discharge criteria if different from those referenced in the 2018 AER.<br>• Leachate barrier design (material and thickness) – geotechnical testing results were provided.<br>• Protective cover design (material and thickness).<br><br>The geotechnical testing provided by the Licence Holder indicated that the dry density ratio of samples was 94.5-95.5%. No information was provided about sample permeability, what material was sampled or where samples were collected from. The report locations stated 'General Fill' and 'Green Waste Pad'. |

| Condition | Item | Summary of Licence Holder comment | DWER response |
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| | | storage of mature compost AS4454, the risk from any 'leachate' created will be negligible.<br>• DWER's request to provide a stormwater drainage plan be removed.<br>• DWER's request for a stormwater testing regime be removed. | |
| 4 | Green waste grinder | The EMRC confirms the operation hours are as specified in the draft Licence.<br><br>The EMRC requests that the requirement that green waste is wetted down before grinding be removed as this is undertaken only on a need to basis depending on weather and seasonal conditions. In addition, if the greenwaste is wetted down, it only sticks to and blocks the grinder. | The Delegated Officer considers that the condition requiring green waste to be wetted down before grinding can be removed. The risk from dust emissions during grinding causing impacts to receptors is low (Section 8). |
| 24-26 | Odour field assessments (OFA) | The EMRC requests that under the current circumstances with COVID 19, flexibility is given to the requirement and timing for the EMRC to monitor odour intensity. A number of odour laboratories who do the calibrations that meet the German Standards have shut down in the light of COVID19, so whilst this is possible in normal circumstances, it is not possible now until current circumstances changes. | The Delegated Officer acknowledges the difficulties caused by commercial shutdowns in response to COVID-19. The OFA conditions have been updated to allow the Licence Holder to undertake OFAs over a period of 18 months to allow an additional buffer period should the odour laboratories remain closed for an extended time. Once this limitation lifts, DWER would expect that the four OFAs are spread out across the remaining time within the 18 months period and with appropriate spacing to capture seasonal variability. |
| 6 | Leachate management | The EMRC requests that the requirement for leachate stored in Stage 2 Class IV to be removed and transferred to the southern Class III leachate pond by 1 May 2020 be removed as this is not achievable.<br><br>Whilst the leachate in the Stage 2 Class IV cell has and continues to be pumped out, leachate is continually being created as a result of rainfall events, so this is an ongoing operational matter. | The information provided by the Licence Holder was confirmed by a review of a Nearmaps aerial photograph taken on 8 March 2020 as shown below. This image shows that only a small amount of water remained in the Stage 2 Class IV cell at the time of the photograph.<br><br>Based on this new information, the Delegated Officer has determined to remove the condition relating to residual leachate stored in the Stage 2 Class IV cell from the Revised Licence. |

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| | | Subsequent correspondence from the Licence Holder on 26 March 2020 confirmed that the residual leachate stored inside the Stage 2 Class IV cell has already been transferred to the Class III leachate ponds. Since this time, the cell has been pumped out an additional 2-3 times to remove rainwater which has subsequently collected above the liner. The Licence Holder will continue to pump stormwater which collects above the liner to the Class III leachate ponds, but this can only be done when sufficient water collects to prevent pump failure. |  |