Environmental Management Plan

Banksia Road Landfill

Crooked Brook, WA 6236

Licence Number: L8904/2015/1

Date: March 2021
Prepared by: Cleanaway and Tonkin Consulting
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Contents

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1. Introduction

1.1 Purpose

This Environmental Management Plan (EMP) - Version 003 has been prepared by Tonkin for Cleanaway Pty Ltd for the Banksia Road Landfill (**the Site**). The Site is a Class II and III putrescible landfill and liquid waste facility that is located in Crooked Brook, Western Australia. The EMP provides relevant background information regarding the site, the design of the facility and the strategy and actions that are being taken to operate and manage the site. This EMP has been prepared is in accordance with regulatory requirements and site license requirements. The objective of the EMP is to document management and mitigation measures to prevent or minimise adverse impact on human health and the environment.

1.2 Regulatory Framework

Landfills are recognised as being an important part of the waste management infrastructure in Western Australia and they are regulated by the Department of Water and Environmental Regulation (**DWER**). DWER has responsibilities under Part V of the *Environmental Protection Act 1986.*

In addition, the site must comply with relevant statutory instruments including but not limited to:

- *Environmental Protection Regulations 1987*
- *Environmental Protection (Noise) Regulations 1997*, which specify requirements for noise levels.
- Applicable development approvals issued by the Dardanup Shire Council.

1.3 Landfill Classification

DWER has issued a licence for the site (Licence Number: L8904/2015/1 amendment dated 12 May 2020), referred to hereafter as **the Licence**. The Class III (putrescible) landfill site currently accepts municipal, commercial and industrial waste. This allows for the disposal of 350,000 tonnes per annum of category 64 (solid) waste, and a further 353,000 tonnes per annum of category 61 (liquid) waste.

1.4 Stakeholders

The key stakeholders involved in the site and their specific roles and responsibilities are as follows:

- J&P Metals – owner and adjacent land user
- Cleanaway – operator (lease off J&P Metals).
- DWER - licensor and regulator.
- Dardanup Shire Council - planning authority.
- Customers - local government, private companies and individuals that use the site.
- Contractors and suppliers - organisations that provide services to Cleanaway at this site.
- Interested parties - community groups.

1.5 Supporting Documentation

Cleanaway operates landfills in five states and is seeking to standardise its practices nationwide as appropriate to meet regulatory requirements in each state. This EMP describes the strategy and actions that are being taken to operate and manage the site in accordance with regulatory requirements and industry best practice to

minimise or prevent an adverse impact on human health and the environment. Additional supporting (standalone) documents include:

- *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019),* Department of Water and Environmental Regulation, December 2019
- *Dust Management Plan,* Straetgen-JBS&G, September 2020.
- *Dardanup Waste Management Facility Licence Amendment, Environmental Acoustic Assessment,* Herring Storer Acoustics, May 2020.
- *Landfill Gas Management Plan,* Cleanaway, December 2015
- *Banksia Road Landfill Rehabilitation and Closure Plan, Appendix D – Landscaping Plan,* Tonkin, February 2021
- *Banksia Road Landfill Site Masterplan,* Cleanaway, August 2020 (**the Masterplan**)
- *Emergency Management Plan, Fire Control Procedure,* Cleanaway, October 2020
- *Banksia Road Landfill Rehabilitation and Closure Plan,* Cleanaway, February 2021.
- *Banksia Road Landfill Site, Landscape and Visual Assessment,* EPCAD, February 2021.
- *Climate Classification of Australia Map,* Bureau of Meteorology, Commonwealth of Australia, 2005.

These supporting documents may be subject to review and revision from time to time.

2. Site Information

2.1 Location

The site is located at Banksia Road, Crooked Brook, Western Australia, 6236, (Lot 2 Plan 65861) which is approximately 170 kilometres southwest of the Perth Central Business District. The site is located within a rural area that is predominately surrounded by State Forest and farmland. The site is bounded by the following land uses:

- North - Dardanup Shire former landfill
- East - Dardanup Conservation Park (State Forest)
- South – Dardanup Conservation Park (State Forest) Approx. 1.5 km to nearest residence
- West – Sand mining, Banksia Road, broad-scale agriculture. Closest resident approximately 0.54 km south-west.

A site location and vicinity map is provided in Appendix A *Figure 2.1.*

2.2 Site Description

The site occupies 122 hectares and was originally developed by Kingscape Holdings Pty Ltd (J&P Metals). A licence was issued for the site to operate as a Class II landfill in June 2000. In May 2005, the license was reissued and upgraded to Class III Landfill. In October 2006, the license was transferred to Cleanaway.

The site license currently allows for disposal of 350,000 tonnes per year of Category 64 Class II or Class III putrescible (solid) waste and 353,000 cubic metres of Category 61 (liquid) waste. The site includes a solid waste disposal area, liquid waste area, ancillary facilities and buffer areas. Site plans are provided in *Appendix A- Site Plans.*

The landfill disposal area is an engineered structure that is being developed and filled in a progressive manner. New cells are constructed as previous cells are nearing completion and then filled with waste before being capped. Upon completion, the site will be capped and rehabilitated to provide a stable landform which prevents escape of harmful contaminants into the environment. The final contours of the site will be consistent with the surrounding landform and the rehabilitated landfill footprint is currently proposed to be suitable for open space land uses.

2.3 Geology and Hydrogeology

The site is located on the western edge of the Whicher Scarp with superficial deposits consisting of mainly sandy clays and clayey sands overlain by sandy topsoil and laterite. These deposits are underlain by variably laterised sandy clay or clayey sand over highly plastic sandy or silty clays of the Leederville Formation in the eastern portion of the site, and by the variably iron cemented clayey sands of the Yoganup Formation in the western portion of the site. The site is underlain by a shallow aquifer which is confined and is not connected to the deeper aquifer present in the Leederville formation or to any similar aquifers nearby.

2.4 Local Meteorology

Dardanup experiences a temperate climate with distinctly dry and hot summers (BOM, 2005); this climate is often referred to as Mediterranean. The closest Bureau of Meteorology weather stations are at Dardanup (rainfall only), Marriwood (5 km south, rainfall only) and Boyanup (9 km south, rainfall only). Weather stations at Bunbury (11 km west) and Donnybrook (20 km south) record rainfall, temperature, relative humidity, and wind speed and direction. Wokalup is the closest station recording evaporation and is 32 km north.

Mean annual rainfall is 718.4 and has varied from 484.4 mm in 2010 to 995.6 mm in 1999. On a monthly basis, mean rainfall is < 20 mm/month from December to March, increasing to over 115 mm/month in winter. Pan

evaporation is 1825 mm/yr and is also markedly seasonal. Evaporation exceeds rainfall from October to April, is approximately equivalent in May and September and less than rainfall from June to August. Mean daily temperatures range from approximately 15-30 °C in summer and from 8-18 °C in winter. Wind roses for Perth show that afternoon spring and summer winds are predominantly from the south west at 20-30 km/hr whereas as autumn/winter winds are less frequent but mainly from the west to south-west and more likely to be 10-20 km/hr.

3. Infrastructure

3.1 Overview

The design and layout of the site and the associated infrastructure has been influenced by the existing natural environment, historical land use, adjacent land uses, waste to be received and the need to provide a modern integrated waste management facility. The considerations for the design and layout have been based on an assessment of the requirements for minimising the impact on the environment. These considerations included air, groundwater, surface water and minimising nuisances (such as traffic, noise, odour, dust, and the visual amenity) to ensure that the site can be operated in a safe and efficient manner. Site plans showing the layout and infrastructure at the date of this Environmental Management Plan are provided in *Appendix A - Site Plans.* Details within the Site Plans may be amended from time to time.

3.2 Site Layout

The landfilling activities and ancillary support facilities are located within the boundaries of the site. The historic filling areas are designated as follows:

- Cells 1 and 2 are located near the centre of the site.
- Cells 3 and 4 are located immediately adjacent and to the east of Cells 1 and 2.
- Cell 4B is located immediately adjacent and to the north of Cells 3 and 4.
- Cell 5 is located immediately adjacent and to the south of Cells 1 and 2.
- Cell 6 is located immediately adjacent and to the east of Cell 5.
- Cell 7 is located immediately adjacent and to the east of Cell 6.
- Cell 12 is located immediately adjacent and to the north of Cell 4B.
- Cell 8 is under construction immediately adjacent and to the east of Cell 7.
- Tronox Cells 1 and 2/2A (Previously referred to as Cristal Global / Millennium Cells) are located to the west of Cells 1 and 2.

A description of the landfilling activities in each of these areas is provided in Section 3.6 below. In addition, there are separate processing areas for recovery of metals and construction and demolition wastes.

Landfill Cell Staging

The site has been designed so that development occurs in a staged and progressive manner to minimise environmental risks and health and safety risks and to make efficient use of on-site resources. Specifically, the site layout and filling sequence has been planned to ensure that landfill cells are open for the shortest period of time and site operations are optimised. Site planning also accounts for regular final capping of landfill cells following closure. The staging plan for cell construction and capping is detailed within the *Banksia Road Landfill Site Masterplan*.

3.3 Ancillary Facilities

The principal function of the ancillary facilities is to ensure that the landfill operations activities are regulated and supported, and the site can be operated effectively and efficiently. The ancillary facilities at the site include a weighbridge, administrative offices, amenity building, heavy equipment maintenance workshop, fuelling station and equipment and staff/ visitor parking areas. These facilities are further described below:

- Weighbridge - entry into the site is controlled by means of a manned weighbridge, which is the point where incoming solid waste vehicles are weighed and initial screening is performed. All incoming

waste loads must pass over the weighbridge and the waste data is entered into the company's Wasteman computerised system for reporting and invoicing purposes

- Administrative office- site management, engineering and administrative support staff are based in the portable administrative office, to support the operation of the site. The conference room at the administrative office serves as a Community Centre, and is available for meetings during site visits etc.
- Amenity building - the portable amenity building includes toilets, showers, and lockers for site staff.
- Heavy equipment maintenance area - heavy equipment that is used on-site is serviced and parked in a secured compound area that includes two steel shipping containers and a prefabricated structure that provides protection against weather.
- Fuelling station - an above-ground bunded fuel tank mounted in a secure and lockable container plus a mobile refuelling service truck is maintained on-site to supply fuel for heavy equipment and light vehicles.
- Equipment parking area - an area has been designated for parking and storage of excess equipment while re-deployment is pending.
- Staff parking areas - parking areas are provided for staff and visitors to the site near the administrative offices.

3.4 Site Roads

The principal function of the site roads is to allow all weather access for waste handling and support vehicles. This aspect has been incorporated into the planning and design for the site through its operational life and during the aftercare period. The roads can be categorised into five types, as follows:

- Public Roads Two-way - the main approach road to the site (Banksia Road) and the site entrance is paved and includes road markings and signage suitable for the traffic volumes. The approach roads and entrance include drainage control measures.
- Cleanaway Haul Roads Two-way – these roads are the primary site roads and provide access to the weighbridge, wheel waste and waste disposal / unloading areas. The road surface is regularly swept and watered. Haul roads within the active landfill area are unsealed.
- Cleanaway Roads Two-way – these roads provide secondary access to operational areas of the site including the leachate ponds, stormwater ponds, workshops and Landfill Gas (LFG) flare. These roads are unsealed but are maintained and watered to control dust. The secondary access roads include drainage and sediment control measures.
- Cleanaway Tracks – these tracks provide access to other areas of the site that are not heavily used or provide access for heavy site mobile plant. These tracks provide alternative access between operational areas or to the borrow pits for cover soil.
- Landfill Roads – these unsealed tracks are formed on waste and are temporary in nature to provide access to the working face for waste disposal and change location depending on filling operations. These roads are regularly watered to control dust.

A wheel wash has been installed at the site and was subsequently moved to be positioned near to the weighbridge in late 2020.

3.5 Utility Services

Utility services do not enter the site. All electrical power generation is supplied by multiple diesel generators. Potable water is delivered to the site in bottle dispensers for drinking requirements. Stormwater is collected for on-site use and all taps and facilities are identified with signage indicating that the water is non-potable.

Wastewater is managed through on-site septic treatment systems with pump-out to approved disposal facilities when required. Communications are currently via line of sight internet tower, mobile phones and a two-way radio system.

3.6 Liner Systems

The principal function of the liner systems is to prevent migration of contaminants from the engineered cell into the surrounding environment and to control landfill gas migration. As the site is being developed in a progressive manner, the design and specifications for the liner systems that have been installed at the site have been based on regulatory requirements at the time of cell construction and the waste types that are received in each disposal cell.

3.7 Leachate Management System

The principal function of the leachate management system is to ensure that leachate that is recovered from the landfill cells is managed in accordance with the regulatory requirements. The design and specifications for the leachate systems that have been installed at the site have been based on site license requirements pertaining to the specific waste types that are received in each disposal cell.

Leachate from the landfill cells is managed by pumping or gravity drainage (depending on the cell) to the primary leachate pond which is located to the south of Cell 5. Cells 1, 2 and 5 drain by gravity to the primary pond and all other cells have leachate sumps from which leachate is pumped to the primary pond. From the primary pond leachate can be pumped to three additional leachate ponds located along the southern boundary referred to as Leachate Ponds 1, 2 and 3. All four leachate ponds contain engineered lining systems. Leachate is disposed of via evaporation and is pumped to these ponds as required. The evaporation from the surface of these ponds is supplemented by other disposal measures such as aeration within the ponds and the use of leachate for dust suppression on the active face of the landfill. The properties of the leachate ponds in place at the date of this Environmental Management Plan are summarised below:

- The primary pond has a total surface area of approximately 4,100 m^2. The capacity of the pond has been estimated at approximately 4,800 m^3
- Pond 1 has a total surface area of approximately 6,000 m^2 and a capacity of approximately 7,300 m^2.
- Ponds 2 and 3 are of similar design and have surface areas of approximately 6,400 m^2 each and a volume of approximately 7,250 m^3 each.

The liquid collected from the Tronox ponds is managed in dedicated ponds and is either evaporated or removed from site by Tronox for reuse in their mining processes.

Final capping campaigns will be undertaken regularly at the site and will assist with leachate management by minimising infiltration of rainfall into the ponds. Final capping is discussed in Section 0 and details of the final cap staging are provided within the *Banksia Road Landfill Site Masterplan*.

3.8 Surface Water Management System

The principal function of the surface water management system is to ensure that the landfill operations activities are not adversely impacted by stormwater events. It is designed to ensure that stormwater that contacts the waste does not cause an adverse impact on surface water or groundwater. All water that comes into contact with waste is directed to the leachate management system. Stormwater can cause erosion of soils and contribute sediment to the environment in the catchment area. The surface water management system at the site includes:

- Run-on Control System -to prevent surface water flow onto the active portion of the landfill.
- Run-off Control System - to collect and control the surface water run-off from the active area of the landfill.

Stormwater control at the site is accomplished by a combination of methods including establishing and maintaining grades, constructing bunds and swales, and redirecting the water to control structures. Sediment

control features have been designed to allow settlement under gravity. The stormwater control system has been upgraded in recent years to ensure stormwater is controlled effectively on site. Site stormwater infrastructure includes:

- Perimeter drains to intercept flows from external to the site and prevent flows from the site leaving site. The southern perimeter drain includes a subsurface pipe to minimise the litter entering the stormwater system.
- Internal drains to direct surface water run-on into the active landfill area.
- Stormwater ponds (Referred to as Stormwater Ponds 1 and 2) for retention of stormwater.
- Sedimentation basins to promote settlement of suspended solids.

This infrastructure has been designed to comply with the specifications given in Section 1.2 of the site licence. Stormwater infrastructure is designed to detain stormwater on site in the stormwater ponds. The retained water is used for dust suppression and as fire water should it be required. Stormwater that is not used on site infiltrates or evaporates from the ponds. For further detail on the surface water management system refer to the *Site Infrastructure, Overall Layout, Stormwater Management Plan*.

3.9 Landfill Gas System

The principal function of the landfill gas system is to recover gas from the disposal cells to reduce the potential for discharges to atmosphere and associated odour or subsurface migration. An initial active landfill gas recovery system has been installed at the site. The landfill gas recovery system includes the following major components:

- Permanent vertical extraction wells
- Permanent horizontal extraction wells
- Laterals and headers
- Condensate system
- Blower flare station.

The landfill gas system will be operated and maintained throughout the operational life of the landfill as well as the designated aftercare period. The system will be expanded in the future to recover gas from other disposal areas as the site is developed and capped. In the future, options for beneficial use of the recovered landfill gas, such as for direct use of electricity generation, will be evaluated.

3.10 Final Cover System

The final cover system aims to provide a long-term stable barrier between the waste mass and the environment to protect human health and the environment. The final cover system assists in the management of leachate by minimising infiltration into the waste mass and in the management of landfill gas by providing a barrier to fugitive emissions. The final cover system also facilitates the revegetation of the site and facilitates the eventual post-closure use of the site once waste disposal operations conclude.

The capping of the site will be staged as the site is developed to rehabilitate filled landfill cells. The final cap profile for the site is yet to be finalised with both synthetic cap and phytocap designs being assessed. A phytocap trial is currently being undertaken at the site. A decision regarding the final cap design will be made prior to capping commencing.

Details of the capping staging are provided in the *Banksia Road Landfill Site Masterplan*, with further details regarding the objectives of capping and proposed cap designs provided in the *Banksia Road Rehabilitation and Closure Plan*.

4. Operations Plan

4.1 Overview

The purpose of this section is to present information regarding operating criteria, operating considerations, operating procedures, and maintenance procedures that will be followed for the site. General operational procedures exist for a range of activities at the site. These activities will be performed throughout the operating life of the landfill, as well as the designated aftercare period after the site closes. All pollution control and monitoring equipment will be operated and maintained in accordance with the manufacturer's specifications or as required.

4.2 Management and Staffing

Cleanaway has an established management structure that includes suitably trained and experienced personnel to manage, supervise, operate, monitor, and maintain the site.

Management and operation of the site will be performed by trained and experienced personnel, supported by trained and experienced contractors. The site receives Engineering, Environmental, occupational Health and Safety (OHS) and administrative support from the company's Cleanaway Corporate Group.

4.3 Operating Hours

The hours of operation of the site are as follows:

- Weekdays: Category 64 Waste: 6.00 am to 6.00 pm and Category 61 Waste: 6.00 am to 10.00 pm
- Weekends: Category 64 Waste: 6.00 am to 6.00 pm and Category 61 Waste: 6.00 am to 10.00 pm
- Public Holidays: Open, unless otherwise posted.

4.4 Site Security

Site security involves controlling access to the site and supervising the activities of all personnel on site. The security systems at the site include the following:

- Employing appropriately trained weighbridge staff to control access to the site.
- Managing and controlling the activities of all on-site visitors including contractors, customers, and employees.
- Maintaining physical access control features such as fences, gates, and barriers.

4.5 On-site Equipment

Equipment on-site for the landfill operations is selected based on physical and mechanical specifications and is consistent with facility design, construction, and operation criteria. A variety of equipment is used to support safe and compliant operation, such as:

- A landfill compactor to compact the waste.
- A bulldozer to spread and cover the waste and for general earthmoving activities.
- An excavator to assist in excavating landfill areas and to load aggregate materials and cover soils from stockpiles.
- A front-end loader to load and move materials.

- An articulated dump truck to move cover soils from stockpiles to the working face, supplying materials for access roadways and other earthmoving activities.
- A grader for maintaining roadways.
- Water trucks for controlling dust and for emergency fire response.
- Diesel generators for supplying stand-by power.
- Diesel water pumps for managing stormwater.

Specialised equipment that is required for bulk earthworks, construction of landfill cells and capping of cells will be supplied as required.

The equipment will be maintained on site in the designated operational areas. For each item of plant and equipment, the maintenance schedule and records will be kept, documenting the servicing of the equipment. The exhaust systems of the plant and equipment will be maintained to ensure that noise levels are within requirements.

4.6 Waste Acceptance Procedures

The site license currently allows for disposal of 350,000 tonnes per year of Category 64 Class II and III waste and 353,000 cubic metres of Category 61 liquid waste. The waste acceptance process will follow the *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019),* Department of Water and Environmental Regulation.

A Waste Acceptance Program has been implemented to ensure that only acceptable wastes materials are disposed at the site. The Waste Acceptance Program includes the following control measures:

- A controlled site entrance that includes a weighbridge that is staffed by trained and experienced personnel.
- A data management system that includes recording of all incoming waste loads.
- An area for performing load inspections, including random inspections, and sampling of incoming loads.
- A communication system linking the weighbridge staff and the operating personnel at working face.
- Monitoring of waste during unloading and deposition by operating personnel at the working face.

In the event that prohibited waste is identified in an incoming vehicle, the vehicle will be refused entry and will be redirected to a facility that can receive such wastes. In the event that prohibited waste is found during a load inspection or during waste deposition, the load will be rejected and will be removed from the site by the transporter. The transporter, generator and authorities will be notified. Records of loads that are rejected will be documented.

4.7 On-site Traffic Control

Road access and traffic control is a vital part of the operation of the site and there are five types of roads, as described in Section 3.4. All roadways will be designed and constructed to handle the expected traffic volume at the site. The roadways will be maintained in good condition and to ensure all-weather access.

Signage and barricades will be provided to ensure that the traffic flow is efficient and minimises the potential for conflict. A wheel wash is located prior to the site exit to minimise tracking of mud and grime onto the site entrance and approach roadways.

The layout of traffic control infrastructure is shown in the traffic management plan which is included in the *Banksia Road Landfill Site Masterplan*. This plan is also shown in *Appendix A – Site Plans.*

4.8 Site Rehabilitation

Best practice design and procedures for rehabilitation of the site are detailed in the *Banksia Road Landfill Rehabilitation and Closure Plan*, which includes:

- Potential after-use of the site, taking into consideration current and likely future land use surrounding the site.
- Operational requirements, to ensure that the capping is designed to suit the intended after-use.
- Surface contours, before and after settlement.
- Specifications and materials to be used in the final cap.
- Installation and preservation of environmental monitoring systems.

Progressive rehabilitation of the completed disposal cells will occur where practicable. Where cells cannot be fully rehabilitated due to the layout of the site and the sequence of filling, temporary intermediate capping will be installed.

4.9 Closure and Aftercare

The aftercare period is until the waste has sufficiently decomposed or stabilised such that the site no longer presents a risk to the environment. The aftercare period is expected to be a minimum of 30 years following closure of the facility. The closure of the site will be facilitated by the progressive capping and rehabilitation of the landfill cells. Aftercare includes the ongoing management and monitoring of the landfill site through the aftercare period. The objectives of the closure and aftercare of the site are to:

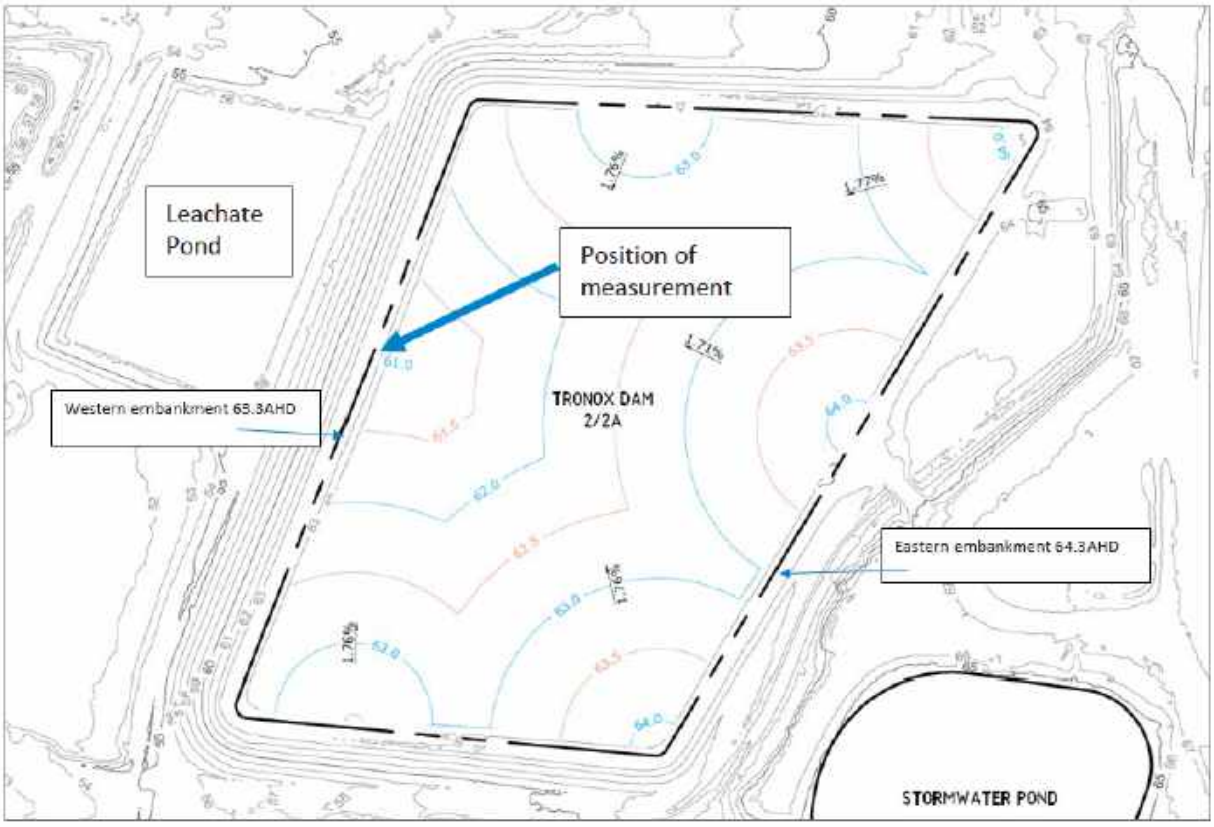
- Ensure that the site is maintained to continue to be non-polluting and prevent environmental harm following site closure.
- Facilitate the proposed post closure uses of the site.

The requirements for aftercare of the site to achieve the above objectives are detailed in the *Banksia Road Landfill Rehabilitation and Closure Plan*, which includes the following information:

- The proposed synthetic cap and phytocap designs (noting the final cap design is yet to be selected)
- Staging of the final capping and final landform contours
- Post-closure monitoring and maintenance requirements including:
    - Groundwater monitoring
    - Landfill gas monitoring
    - Settlement and subsidence monitoring
    - Landfill cap free drainage capability
    - Leachate generation and evaporation rates
    - Vegetation health and coverage
    - Separation distance maintenance
- Potential post closure uses of the site.

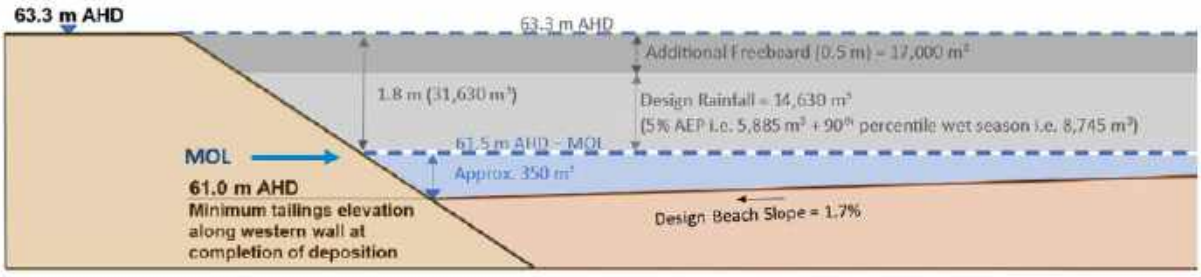
4.10 Tailings Disposal Site (TDS) Cell 2 Environmental Action Plan

When TDS cell two fill reaches Maximum Operating Level (MOL) the TDS cell 2 Environmental Action Plan (EAP) is to be enacted. Below Diagram 1 details where measurement is to be taken from, given a background of top of waste profile within the cell. Measurement is to be a visual measuring device down the batter.



- Diagram 1: Measurement Locations

The below Diagram 2 details the MOL as a cross section at the position of measurement, per the basis of design (not to scale).



- Diagram 2: Position of Measurement

Where the MOL is exceeded, the following actions must take place,

1. Discontinue receiving inbound volume immediately
2. Work with Customer to maximise outbound volume of leachate
3. Pump volume from TDS cell into leachate cell to a maximum 1m freeboard
4. Forecast weather dependant – assess taking volume offsite to water treatment facility

Note: Leachate pond to be managed to 1.5m freeboard (versus licensed 1m freeboard) creating ~5000m3 capacity for point 3.

5. Environmental Management

5.1 Overview

The purpose of the environmental management program is to set out the control measures that will be undertaken to ensure compliance with the site regulatory requirements and manage risk to the environment.

- Stormwater and erosion
- Leachate and groundwater protection
- Traffic
- Landfill gas
- Odour
- Dust
- Litter
- Vermin
- Noise
- Visual impact
- Fire risk
- Community information
- Complaints register
- Annual reporting
- Notification

General features and procedures for each management activity are discussed below.

5.2 Stormwater and Erosion

The objectives of the stormwater and erosion management program is to:

- Control stormwater and minimise erosion to prevent the release of sediment laden water from the site
- Control surface water to prevent run-on into the active portion of the landfill to minimise the generation of leachate.
- Prevent the release of any stormwater generated within the site from discharging beyond the site boundary.

Section 3 provides details on the surface water management infrastructure at the site. All stormwater at the site is captured by the surface water management infrastructure and all water coming into contact with waste is directed to the leachate management system. All site personnel are trained to ensure they understand the need to exclude stormwater from the active area and prevent leachate ingress into the surface water management system. Surface water management infrastructure is regularly inspected and maintained, consisting of regular repairs to the infrastructure and removal of accumulated silt. This regular monitoring and maintenance will continue into the post-closure phase and is discussed in the *Banksia Road Landfill Rehabilitation and Closure Plan,* Cleanaway, February 2021.

5.3 Leachate and Groundwater Protection

The objective of the leachate and groundwater protection program is to:

- Minimise the generation of leachate
- Manage all leachate that is generated to protect groundwater resources at the site

The leachate and groundwater protection system is discussed in Section 3 and includes:

- Stormwater management system to prevent stormwater impacting waste and becoming leachate.
- Landfill liner system to serve as a barrier to prevent leachate from coming into direct contact with groundwater.
- Leachate extraction system and leachate ponds.

This infrastructure is regularly inspected and maintained to ensure that the leachate management system remains functional. All site personnel will be made aware of the leachate and groundwater protection program, and key personnel are trained in its operation.

Groundwater Monitoring

The objectives of the monitoring program are to:

- ensure Cleanaway remain compliant with the groundwater monitoring requirements as detailed in the Licence
- identify any impacts the landfill may be causing to the underlying aquifers.

The sampling and analysis program undertaken with reference to the following standards and guidance documents:

- Australian Standard (1998) 5667.11 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwaters (AS 5667.11:1998)
- Australian Standard (1998) 5667.1 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998)

Groundwater monitoring is undertaken biannually, with events undertaken a minimum of 5 months apart at the site in accordance with the Licence. A network of groundwater monitoring wells is located at the site, which will be progressively expanded as the landfill footprint increases. The current monitoring locations are shown in the monitoring location plan in *Appendix A – Site Plans.* Should impact to groundwater be detected, DWER will be notified and remedial measures investigated. For a full list of the analytes monitored refer to the site licence.

5.4 Traffic

The onsite traffic management plan is detailed in the *Banksia Road Landfill Site Masterplan.* The landfill will apply the following to assist local community with off-site traffic which may be attending site for disposal:

- Direction for customers to only enter off Ferguson Road, via Depiazzi Road and through Banksia Road
- Deterrence of the use of gravel roads, including Pannizzi Road and south of landfill Banksia Road
- Litter collection along verge of Banksia Road to Pannizzi Road
- Promotion and enforcement of customer loads being covered to prevent waste escaping on route
- Promotion and reporting of speed and any other hazardous driving activity
- Established opening and closing hours, including the use of a locked entry gate
- Engagement with all customers in their investigations of any incidents on route to or from the landfill

A detailed traffic management plan can be found in the *Banksia Road Landfill Site Masterplan,* Cleanaway, October 2020. This plan is also included in *Appendix A – Site Plans.*

5.5 Landfill Gas

The objectives of the landfill gas management program are to:

- Minimise fugitive emissions from the site
- Minimise odour emissions due to landfill gas.
- Prevent landfill gas migration to on and off-site receptors

Landfill gas is managed by a variety of controls at the site which include:

- Engineered lining systems in all cells to prevent the migration of landfill gas
- Regular final capping of all landfill cells to prevent landfill gas fugitive emissions
- The operation of an active landfill gas recovery system as discussed in Section 3.9.

The landfill gas recovery system is discussed in Section 3.9 and includes the following major components:

- Permanent vertical extraction wells
- Permanent horizontal extraction wells
- Laterals and headers
- Condensate system
- Blower / flare station

Regular monitoring of the performance of the landfill gas extraction system is undertaken, with continuous remote monitoring of the operational status of the flare maintained. Regular maintenance and balancing of the extraction system are undertaken by a contractor. The operation and maintenance of this system will be continued into the post closure phase. Site personnel are trained in how to recognise the presence of landfill gas and the dangers of landfill gas. Regular inspections are undertaken of capped areas for signs of excessive landfill gas emission such as vegetation dieback

5.6 Odour

The objective of the odour management program is to:

- Prevent nuisances associated with odour from occurring at the site
- Prevent detection of odours off-site.

The closest resident is noted to be over 500 m away. Also, odour has been assessed on numerous occasions by DWER with controls being placed in the Licence to mitigate odorous emissions and control off-site impacts.

A hierarchy of control measures can be implemented to achieve the objectives above. These control measures may include:

- Controlling loads – managing particularly odorous loads by immediate filling and coverage
- Limiting the number of active disposal areas at the site
- Minimising the size of the working face(s)
- Placing, compacting, and covering the waste in a timely manner, including final capping
- Operating and maintaining an active landfill gas management system (Section 5.5)
- Identifying and correcting point sources of odours (i.e. leachate chambers and ponds)
- Depositing waste in thin layers to optimise compaction and applying compaction with appropriate equipment

- Limiting disturbance of previously filled waste
- Not depositing waste into standing water
- Maintaining an odour complaint register.

Odours will be significantly reduced by operating the site in accordance with sanitary landfilling methods and good site management as identified above. Further to the previous section, landfill gas will be managed to prevent any odour impacts.

All site personnel will be made aware of the odour management strategy and key personnel will be trained in methods to reduce odour impacts.

5.7 Dust

The objectives of the dust management program are to:

- Prevent nuisances associated with dust occurring at the site
- Minimise dust emissions arising from the operation of the facility.

A series of controls for dust management have been developed and may include measures such as:

- Weather forecasts will be used to minimise dust generating activities during adverse meteorological conditions. Where wind speed and direction indicate a likelihood of fugitive dust emission, site speed limits will be reduced for Dust Risk Areas
- Vehicles will keep to designated access roads as far as reasonably practicable; vehicles deviating from designated access routes will do so only as required for specific work activities and under appropriate permissions.
- Use of stormwater and leachate (where appropriate) for dust suppression on active and high-risk dust areas
- Waste will be covered with a minimum of 150 mm of Type 1 inert waste or clean fill as soon as practicable after tipping and no later than the end of the working day
- Where waste processing is approved, wastes processed by crushing, shredding or screening will be wet down during processing
- Application of dust suppressant to areas that may generate dust emissions
- Use and maintenance of the wheel wash at the exit of the facility
- Management of landfill operations to minimise dust by:
    - Wetting of material that has the potential to generate dust during landfilling
    - Regular covering of waste throughout the day's operations
    - Minimising drop and tip heights of waste where possible
- Regular final capping and revegetation of landfill cells
- Sealing of some access roadways and regular maintenance of these sealed roadways
- Maintenance of a dust complaints register.

Further detail on the dust management controls can be found in the *Dust Management Plan,* which has been prepared for the site. All site personnel will be made aware of the dust management strategy and key personnel will be trained in methods to reduce dust impacts.

5.8 Litter

The objectives of the litter management program are to:

- Prevent nuisances associated with litter from occurring at the site and confine litter arising from the operation of the landfill within the boundaries of the site
- Prevent contamination of stormwater by windblown litter.

The litter management program may include the following controls:

- Requiring all incoming vehicles to have covered loads. All uncovered loads are to be covered prior to entering the site or rejected.
- Regular compaction and cover of waste, particularly plastic and paper waste that may generate fugitive litter
- Monitoring of climatic conditions (wind direction) and siting the active tipping face direction based on the wind direction.
- Siting the active tipping area away from the edge of the active landfill area where practicable
- Placement of portable litter control screens in accordance with the forecast wind direction forecast each day (as shown in Section 6, Plate 1)
- Installation of large mobile litter screens at strategic locations based on seasonal prevailing winds and the location of the active face (as shown in Section 6, Plate 2).
- Installation of a fence on the southern boundary. This is to be extended as active faces move across the site (as shown in Section 6, Plate 3)
- Regularly assigning staff to collect litter
- Restricting operating hours
- Inspections of the site for litter
- Maintaining a litter complaint register.

All site personnel will be made aware of the litter management strategy and key personnel will be trained in methods to reduce litter impacts

5.9 Vermin, Pests and Noxious Weeds

The objective of the vermin, pests and noxious weeds management program is to prevent nuisances associated with vermin from occurring at the site and to control pests and noxious weeds.

Measures implemented for vermin, pest and noxious weed control include:

- Placing waste in thin layers and regularly compacting and covering the waste throughout the day
- Limiting the number of active disposal areas at the site
- Minimising the size of the working face(s)
- Placing, compacting, and covering the waste in a timely manner
- Eliminating or minimising areas of standing water
- Using bird scarers and deterrents
- Maintaining a vermin complaint register
- The use of insecticides and pesticides as a final option where required.
- Noxious weed eradication as required, typically biannually.

It is unlikely that any single control measure will be sufficient to control vermin, pests and noxious weeds and a set of control measures will be implemented, as may be required, for each situation and season. All site

personnel will be made aware of the vermin management strategy and key personnel will be trained in methods to reduce bird impacts. Insecticides and pesticides are carefully managed to prevent these substances from entering the stormwater management system.

5.10 Noise

The objectives of the noise management program are to:

- Maintain compliance with the *Environmental Protection (Noise) Regulations 1997.*
- Have regard for residents located adjacent to the facility through the implementation of a range of control measure to mitigate off-site impacts

The noise control strategy includes the following control measures:

- Regular maintenance of equipment
- Installation of broadband reversing alarms on vehicles regularly used on site
- Direction of heavy vehicles, where practicable, away from the southern portion of Banksia Road where residences are located
- Creation and maintenance of buffer zones around the site boundary
- Use of noise barriers where possible
- Restricting operating hours
- Maintenance of a noise complaint register.

Control measures will be implemented, as may be required, for each situation and season. All site personnel will be made aware of the noise management strategy and key personnel will be trained in methods to reduce noise impacts.

5.11 Fire Risk

The objective the fire management program is to prevent fires from occurring at the site and to efficiently extinguish any fires that should occur. The fire risk at the site arises from:

- Chemical reaction caused by oxidisers or reactive agents
- Ignition from hot sparks, matches or cigarettes
- Spontaneous combustion of waste or organic materials.
- Wildfire from off-site entering the site.

A fire control procedure has been prepared for the site detailing the process to prevent fires starting and to extinguish fires if they do occur. The fire control procedure includes controls such as:

- Fire and hotspot response procedures
- Hot load response protocol
- Direction for fire services should they need to attend the site.

Infrastructure is provided on site for controlling fires should they occur, including hydrants for filling of water carts or fire appliances at the two stormwater dams, a water bore to supply fire water and boundary sprinkler systems. For further detail refer to the *Emergency Management Plan, Fire Control Procedure*.

5.12 Community Information

The objective of the community information program is to disseminate information regarding the site in a timely and consistent manner. The community information program will include:

- Providing information regarding the site on the company's website www.cleanaway.com.au
- Engaging with the Dardanup Landfill community reference group to facilitate two-way collaborative discussions
- Participating in community forums and public hearings regarding the site
- Conducting site tours for community and school groups.

The Dardanup Landfill community reference group (DLCRG) is the primary forum for community engagement. The community reference group aims to:

- Provide a genuine opportunity for community members to have a voice on relevant matters of concern
- Provide regular updates on landfill operations including remediation controls
- Foster community understanding and confidence in the operation of the landfill and compliance with licence conditions
- Develop broad understanding of Cleanaway's current and future priorities regarding the ongoing operation of the site.

Cleanaway has committed to work with the DLCRG to ensure that the community's concerns and aspirations are considered in decisions made.

All site personnel will be made aware of the community information program and key personnel will be trained in its application.

5.13 Complaints Register

The objective of the Complaints Register is to maintain a record of complaints that may be received regarding the operation of the site. The Complaints Register is maintained through Cleanaway's complaints management system. This system records:

- Category of complaint including stormwater and erosion, leachate and groundwater protection, landfill gas, traffic, odour, dust, litter, birds, noise, visual impact, fire risk and community information
- The number of complaints received for each category
- Any action taken in response to the complaint.

Further information regarding the management of complaints is provided in the Licence.

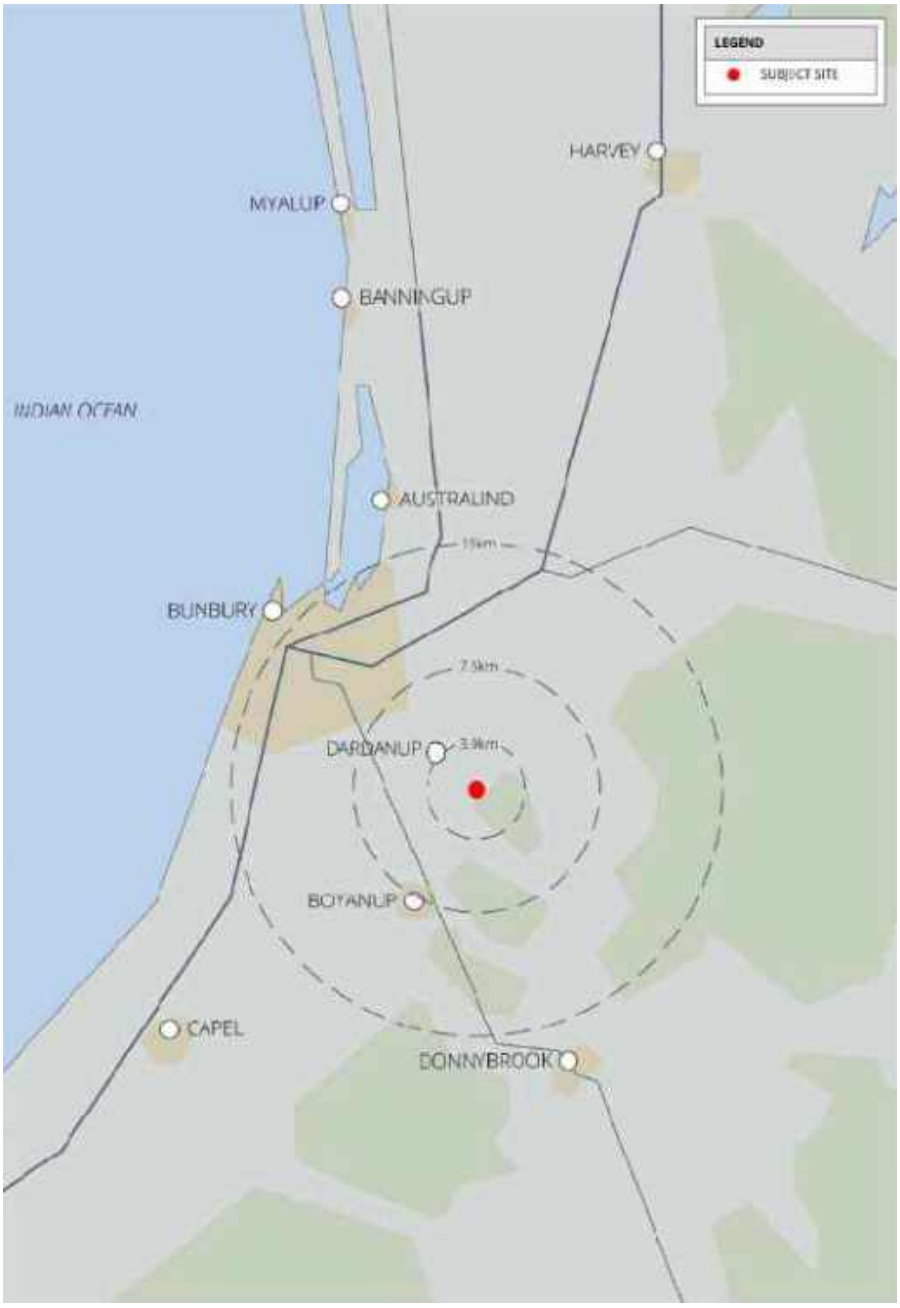
5.14 Annual Reporting

Cleanaway must submit an Annual Environmental Report to DWER within 90 days of the Licence anniversary date. This report contains information including:

- Waste disposal areas
- Information on the landfill gas collection and management system
- Volumes of waste received
- Monitoring of drill muds, landfill gas and groundwater
- A summary of the complaints received in the annual period.

6. Figures

2.1 Site Location Map



2.2 Site Plan

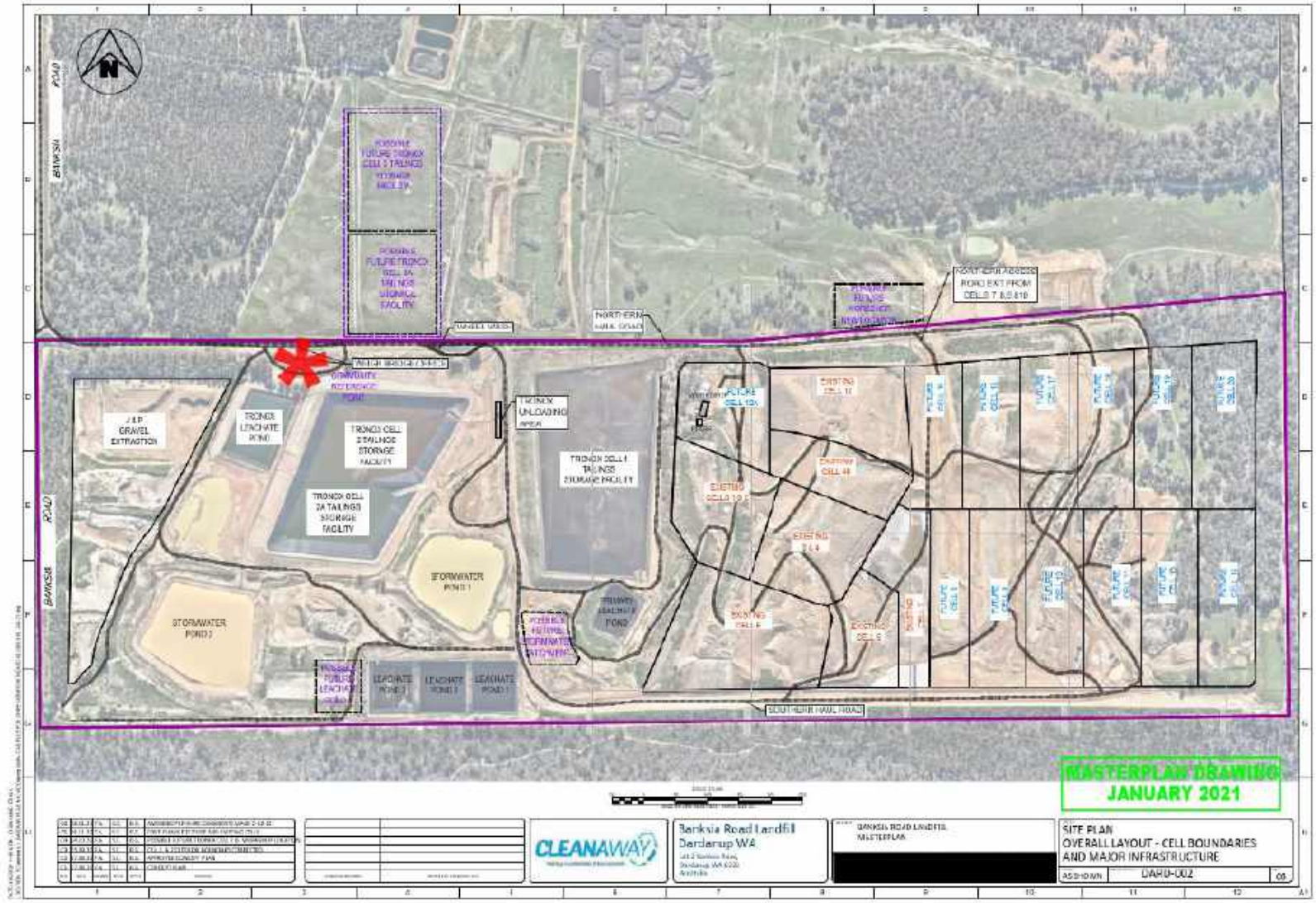

N
BANKSIA ROAD
NORTHERN HAUL ROAD
SOUTHERN HAUL ROAD
J & P GRAVEL EXTRACTION
TRONOX LEACHATE POND
TRONOX CELL 2A TAILINGS STORAGE FACILITY
TRONOX CELL 1 TAILINGS STORAGE FACILITY
TRONOX UNLOADING AREA
STORMWATER POND 2
STORMWATER POND 1
LEACHATE POND 1
LEACHATE POND 2
LEACHATE POND 3
EXISTING CELL 10
EXISTING CELL 9
EXISTING CELL 8
EXISTING CELL 7
EXISTING CELL 6
EXISTING CELL 5
EXISTING CELL 4
FUTURE CELL 10
FUTURE CELL 11
FUTURE CELL 12
FUTURE CELL 13
FUTURE CELL 14
FUTURE CELL 15
FUTURE CELL 16
MASTERPLAN DRAWING
JANUARY 2021
CLEANAWAY
Banksia Road Landfill
Dardanup WA
SITE PLAN
OVERALL LAYOUT - CELL BOUNDARIES
AND MAJOR INFRASTRUCTURE
DWG-002
05

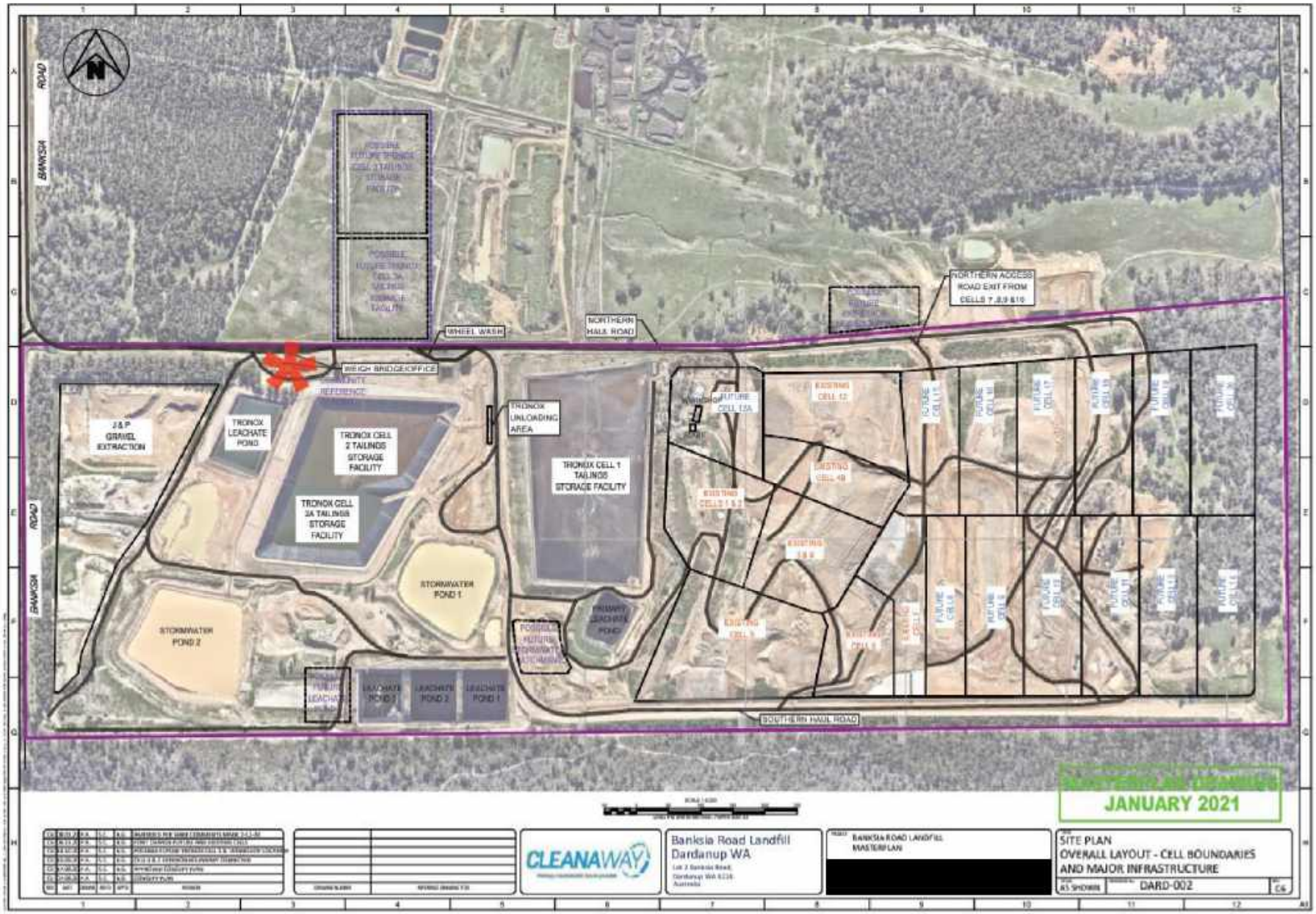
Plate 1: Portable Net Panels

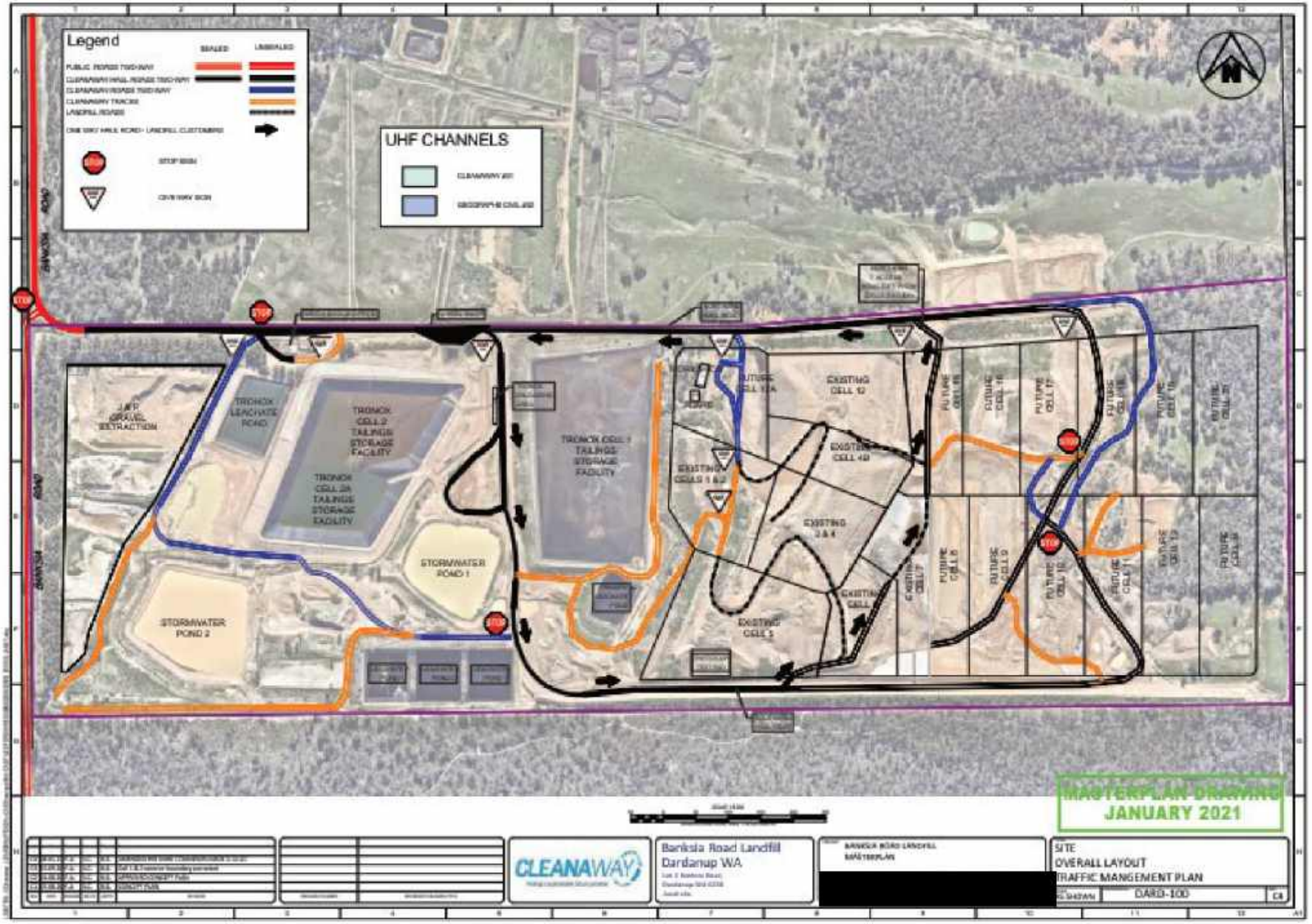
Plate 2: Mobile Litter Screen

Plate 3: Boundary Litter Fence

7. Appendices

Appendix A – Site Plans


BANKSIA ROAD
WHEEL WASH
NORTHERN HAUL ROAD
NORTHERN ACCESS ROAD EXIT FROM CELLS 7,8,9 &10
WEIGH BRIDGE/OFFICE
J & P GRAVEL EXTRACTION
TRONOX LEACHATE POND
TRONOX CELL 2 TAILINGS STORAGE FACILITY
TRONOX CELL 2A TAILINGS STORAGE FACILITY
TRONOX UNLOADING AREA
TRONOX CELL 1 TAILINGS STORAGE FACILITY
STORMWATER POND 1
STORMWATER POND 2
LEACHATE POND 3
LEACHATE POND 2
LEACHATE POND 1
SOUTHERN HAUL ROAD
FUTURE CELL 12A
EXISTING CELL 12
EXISTING CELL 10
EXISTING CELLS 1 & 2
EXISTING CELL 3
EXISTING CELL 4
EXISTING CELL 5
JANUARY 2021
CLEANAWAY
Banksia Road Landfill
Dardanup WA
BANKSIA ROAD LANDFILL MASTERPLAN
SITE PLAN
OVERALL LAYOUT - CELL BOUNDARIES AND MAJOR INFRASTRUCTURE
DARD-002
C6


Legend
UHF CHANNELS
TRONOX CELL 2A TAILINGS STORAGE FACILITY
TRONOX CELL 2 TAILINGS STORAGE FACILITY
TRONOX CELL 1 TAILINGS STORAGE FACILITY
STORMWATER POND 1
STORMWATER POND 2
EXISTING CELL 12
EXISTING CELL 4B
EXISTING 3 & 4
EXISTING CELL 5
MASTERPLAN DRAWING
JANUARY 2021
CLEANAWAY
Banksia Road Landfill
Dardanup WA
SITE
OVERALL LAYOUT
TRAFFIC MANAGEMENT PLAN
DARD-100


388500
387000
387500
388000
6301000
6300500
6300000
CP1
PSD1
PUP1
LEP1
LEP2
LEP3
GW1D
GW1S
GW2D
GW2S
GW3D
GW3S
SE1D
SE1S
SE2D
SE2S
SE3D
SE3S
SE4D
SE4S
SE5D
SE5S
SE6D
SE6S
SE7D
SE7S
SE8D
SE8S
SE9D
SE9S
SE10D
SE10S
Legend
Site Boundary
Lot Boundaries
Surface Water Pond
Monitoring wells (installed 2018)
Monitoring wells (installed pre-2018)
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
360
0
100
200
300
N
Metres
1:10,000@ A4
LOCALITY MAP
GELORUP
GEOGRAPHE BAY
CAPEL
BUSSELTON
PROJECT ID
3823
DATE
17/02/2021
HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50
[redacted]
Cleanaway Solid Waste Pty Ltd

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