Banksia Road Landfill

Cleanaway Solid Waste Pty Ltd

Dust Management Plan

JBS&G 61783 | 142,832 (Rev 6.2)

17 March 2025

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Document control

Document Status

Rev No.	Author	Reviewer	Approved for Issue			Version
		Name	Name	Signature	Date	
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0				On file	16/01/2020	Final draft document issued for Cleanaway and Shire of Dardanup review.
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5				On file	10/03/2021	Document updated to include Shire of Dardanup CEO comments.
6	[redacted]			On file	09/03/2022	Document updated to: • Include new Extractive Industries Licence area; • Include new construction areas (stormwater retention basins and drains); • Reflect end of instrumental monitoring; • Consider changes in revised DWER licence.
6.1	[redacted]				29/07/2024	Figure 7.1: Dust risk area map updated
6.2					11/03/2025	Figure 7.1: Dust risk area map updated

Definitions and abbreviations

Term	Definition
Ambient air	The external air environment, it does not include the air environment inside buildings or structures.
DMP	Dust management plan.
Dust	The generic term used to describe solid airborne particles generated and dispersed into the air by processes such as handling, crushing and grinding of organic or inorganic materials such as rock, ore, metal, coal, wood or grain and stockpiling of materials and windblown dust.
Dust event	The occurrence of visible fugitive dust from a source or activity at the site that exits a boundary of the site for a duration of greater than one (1) minute.
Dust generating development	Means development referred to in clause 3.1 of the Shire of Dardanup's 2011 Dust Control Local Law.
Dust Risk Areas	The areas highlighted as having moderate to high risk of dust generating potential as shown on Figure 7.1
DWER	Department of Water and Environmental Regulation.
EIL	Extractive Industries Licence
EPA	Environmental Protection Authority.
EP Act	*Environmental Protection Act 1986.*
Fugitive dust	Dust which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent openings.
NEPM	National Environmental Protection (Ambient Air Quality) Measure 2015.
PM_{10}	Dust particles/particulate matter with an equivalent aerodynamic diameter of up to 10 micrometres.
$PM_{2.5}$	Dust particles/particulate matter with an equivalent aerodynamic diameter of up to 2.5 micrometres.
QA/QC	Quality assurance/quality control
Sensitive receptor	Individuals/communities/components of the environment which could be adversely affected by dust emissions, such as people in dwellings, schools, hospitals, nursing homes, childcare facilities, offices, public recreation areas that exist now and in the future and protected wetlands. Some individuals may be more susceptible to adverse air quality, such as, children, the elderly and people with pre-existing medical conditions such as asthma or heart disease.
Total suspended particles (TSP)	All particles entrained/suspended in the atmosphere and includes the fine, respirable particles (PM_{10} and $PM_{2.5}$) and larger size particles that may settle out of the air causing nuisance impacts, usually measured as those particles having an equivalent aerodynamic diameter of 50 micrometres or less.

1. Introduction

Cleanaway Solid Waste Pty Ltd (Cleanaway) operates the Banksia Road Waste Landfill (the site) located at Lot 2 on Plan 65861, Banksia Road, Crooked Brook in the Shire of Dardanup approximately 10 km southeast of the City of Bunbury and 3.8 km southeast of the town of Dardanup (Figure 1.1).

The use of the land as a waste disposal facility has been determined by the Shire of Dardanup (the Shire) to constitute 'dust generating development'. Therefore, this dust management plan (DMP) has been prepared to meet obligations under the Shire's Dust Control Local Law 2011 (the Local Law).

Cleanaway shares the site with an extractive industry operation operated by J & P Corporation, which is located on the western end of Lot 2 Banksia Road, Crooked Brook (Figure 4.1). J & P Corporation has developed a separate DMP for its activities under the Shire's Local Law (Strategen-JBS&G 2022).

1.1 Objective

The objective of this DMP is to provide a framework for the management and mitigation of dust from the activities and operations conducted at the site to minimise the risk of dust emissions crossing the site boundary. The DMP consists of the following:

- introduction outlining site background, context and purpose of the DMP
- a description of the existing environmental setting, regulatory obligations, site characteristics and significant environmental aspects to be managed
- details of the proposed dust management measures.

The purpose of this plan is to prevent dust-related impacts, including amenity impacts, on workers, surrounding residences and the environment from activities associated with the operation of the Site.

1.2 Site background

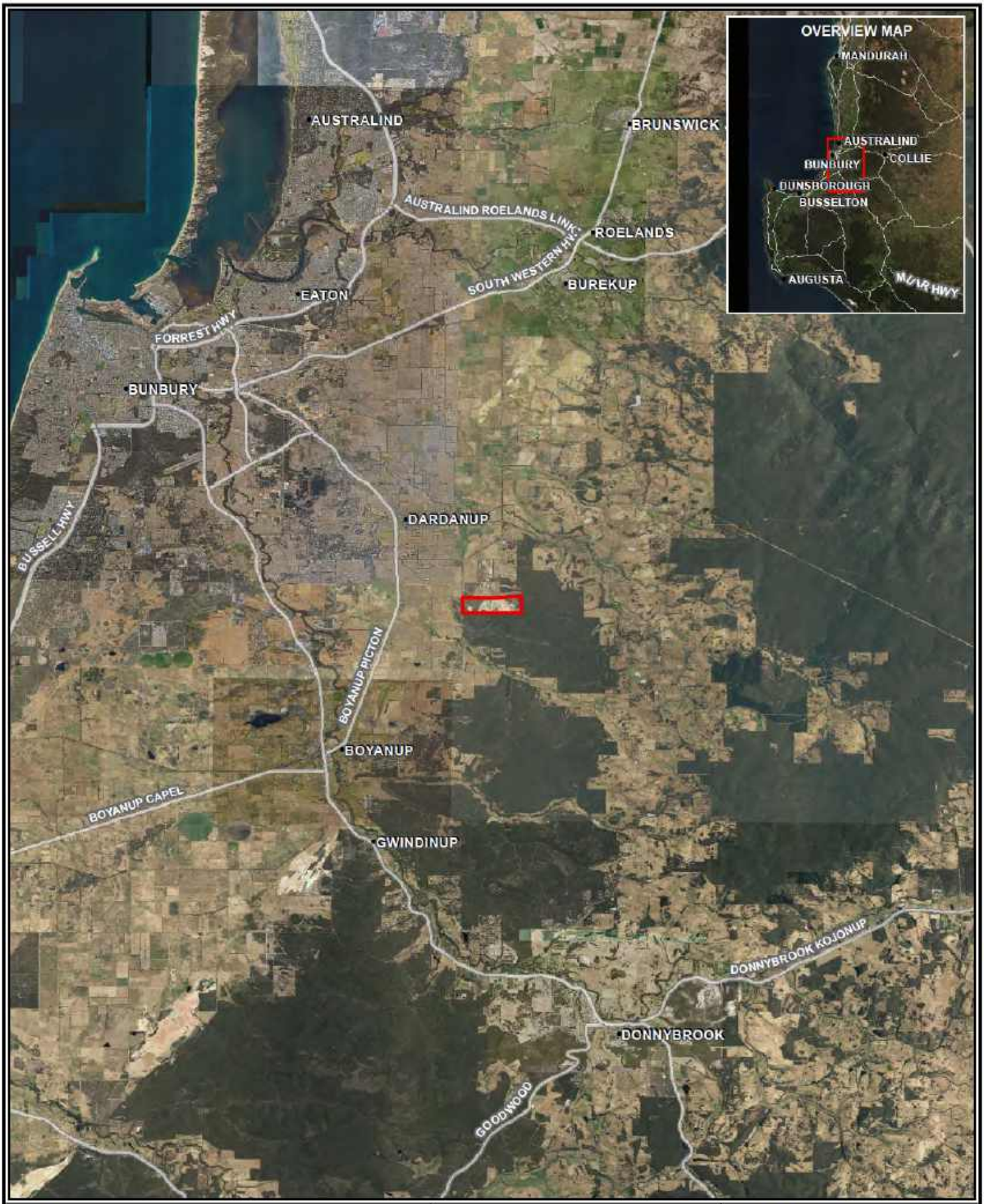
The site is a putrescible landfill and liquid waste facility operated under *Environmental Protection Act 1986* (EP Act) Licence L8904/2015/1 (the licence) granted by the Department of Water and Environmental Regulation (DWER). The site accepts general (household and commercial) waste and tailings[1].

1.3 Stakeholder consultation

This DMP has been developed in consultation with relevant stakeholders, including the Shire of Dardanup and DWER; and has also been advertised to the public and subject to third-party peer review (refer to Document Control page).

The DMP will continue to be updated in consultation with relevant stakeholders where appropriate in accordance with the document review schedule described in Section 10.

[1] Cleanaway is currently authorised to accept and store tailings from mineral sands processing within defined cells at the site.



Legend:

- Premises boundary
- Suburb boundary
- Roads (MRWA)

Scale 1:200,000 at A4 (0, 2.5, 5 Kilometres)		**Banksia Road Landfill** **Crooked Brook, WA 6236**
Coord. Sys. GCS GDA 1994		**SITE LOCATION**
Job No: 58071		
Client: Cleanaway		**FIGURE 1.1**
Version: A	Date: 31-Jul-2020	strategen JBS&G
Drawn By: [redacted]	Checked By: JB	

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Image Reference: SLIP Public Services Locate 2020.

2. Environmental setting

The environmental setting and proximity of surrounding environmental features and nearby sensitive receptors to the site are shown in Figure 2.1.

2.1 Existing land use

The 121 ha site is zoned 'General Farming' under Shire of Dardanup Town Planning Scheme No. 3. The site is privately owned and leased by Cleanaway. The site has been operated by Cleanaway since the landfill was first granted approval in 1999.

A portion of the western part of Lot 2 Banksia Road (approximately 4 ha) is not under control of Cleanaway and is currently used by J & P Corporation for sand extraction (see Figure 4.1). DWER has confirmed that this activity is not a prescribed premises category specified in Schedule 1 of the *Environmental Protection Regulations 1987* and is not regulated by the department under the works approvals and licensing provisions of the *Environmental Protection Act 1986* (EP Act).

2.2 Surrounding land use

Land uses surrounding Lot 2 include rural properties, waste management facilities and conservation areas. Surrounding land uses include:

- North: Dardanup Landfill Site (closed)
- East: State Forest (Regional Open Space)
- South: State Forest (Regional Open Space)
- West: Banksia Road and rural properties.

Waste management facilities other than Banksia Road Landfill Facility are located approximately 400 m north of the site and include the Bunbury Harvey Regional Council Banksia Road Organics Processing Facility, the Shire of Dardanup Waste Transfer Station and a Water Corporation wastewater treatment plant.

Table 2.1 and Table 2.2 below provide a summary of the potential human and environmental receptors that may be impacted as a result of dust-generating activities at the site.

Table 2.1: Sensitive human receptors

Human receptors	Distance from site
Closest residential receptors	• 0.5 km south of the southwest corner of the site boundary, separated by the Dardanup Conservation Park and Boyanup State Forest • 0.9 km due west of the site boundary • 1 km west southwest of the southwest corner of the site boundary • 1.5 km due south of the site boundary, separated by the Dardanup Conservation Park and Boyanup State Forest • 1.5 km northwest of the northwest corner of the site boundary • 1.5 km northeast of the northeast corner of the site boundary separated by the Dardanup Conservation Park and Boyanup State Forest • 1.75 km east northeast from the eastern boundary of the site boundary separated by the Dardanup Conservation Park and Boyanup State Forest.

Table 2.2: Sensitive environmental receptors

Environmental receptors	Distance from site
Dardanup Conservation Park and Boyanup State Forest	Immediately adjacent south and east of the site boundary.
Threatened Ecological Communities	Four priority Threatened Ecological Communities are present within the adjacent Dardanup Conservation Park.
Geomorphic wetland: Multiple use Palusplain and Dampland (flat, seasonally waterlogged)	Approximately 0.4 km southwest through northwest of the site boundary.
Crooked Brook (including Registered Aboriginal Heritage Places)	Approximately 1.1 km south/southwest of the site boundary flowing in a generally east to west direction. A minor watercourse located approximately 0.75 km south of the site boundary flows into Crooked Brook.

2.3 Physical environment

2.3.1 Climate and meteorology

The Southwest of WA experiences a Mediterranean type of climate with cool, wet winters and hot, dry summers, with the majority of the rain falling in the winter. The nearest Bureau of Meteorology (BoM) climate station, which records wind speed and direction is Bunbury (Site number: 9965), located approximately 14 km to the northwest of the site.

The average maximum temperatures (1995-2018) for Bunbury range from 17.3°C in July to 30.0°C in February. The average minimum temperatures range from 7.1°C in July to 15.9°C in February.

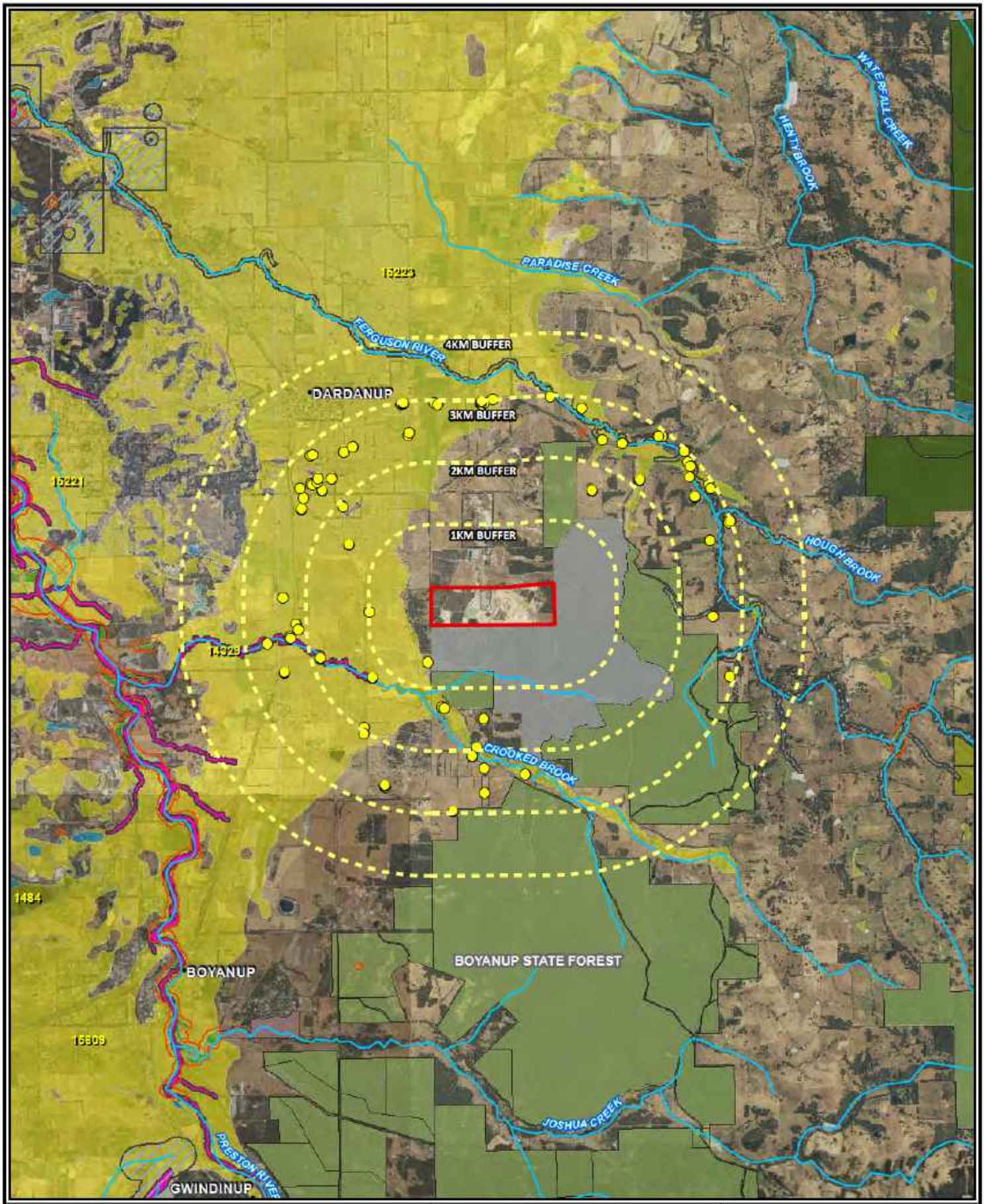
The majority of rainfall is received between April and October. Rainfall averages 726.1 mm/year and mean monthly rainfall varies from 7.2 mm in February to 142.5 mm in July.

At the Bunbury BOM station, the average morning (9 am) wind speed reported during summer is 4.3 m/s, prevailing predominately from the east and southeast. Wind speed typically increases in the afternoon (3 pm) with an average wind speed 5.6 m/s reported, which prevails from a westerly direction. During winter, winds abate to an average of 3.5 m/s during the morning prevailing from the east and northeast. Afternoon winds increase to an average of 5.1 m/s during winter and range in direction from the west, northwest and north.

In order to characterise the local wind influences at the site, monitoring of the meteorology on-site commenced at the end of June 2019. Monthly wind roses to date are contained in Appendix A.

2.3.2 Topography

The site is situated along the boundary between the Swan Coastal Plain and the western facing slope of the Whicher Scarp. Due to its location on the scarp, the ground surface falls from approximately 125 mAHD in the southeast of the site to 45 mAHD at the western boundary. The natural ground surface has been modified due to landfilling activities.



Premises boundary
1km interval buffers

Aboriginal Heritage Places (DAA-001)
- Registered Site
- Other Heritage Place

Geomorphic Wetlands (DBCA)
- Conservation
- Resource Enhancement
- Multiple Use
- Watercourses

Environmentally sensitive areas (DWER)

Legislated Lands and Waters (DBCA)
- National Park
- Section 34A Freehold
- Section 5(1)(h) Reserve
- Nature Reserve
- State Forest
- Other Reserves

Sensitive receptor - residence

Scale 1:80,000 at A4 (0, 1, 2 Kilometres)

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 58071

Client: Cleanaway

Version: A | Date: 23-Jul-2020

Drawn By: [redacted] | Checked By: JB

Banksia Road Landfill
Crooked Brook, WA 6236

ENVIRONMENTAL SETTING AND SENSITIVE RECEPTORS

FIGURE 2.1

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Image Reference: SLIP Public Services Locate 2020.

3. Regulatory Framework

3.1 Environmental Protection Act 1986

The site is regulated by DWER under Part V of the EP Act. Cleanaway holds Licence L8904/2015/1 for prescribed premises categories 61 and 64, as shown in Table 3.1.

Table 3.1: Current prescribed premises categories

Category	Description	Category production or design capacity	Premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore: premise on which: (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	50,000 tonnes or more per year	350,000 tonnes per annual period
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	100 tonnes or more per year	3,000 tonnes per year
64	Class II or III putrescible landfill site: premises on which waste (as determined by reference to the waste type set out in the document entitled "Landfill Waste Classification and Waste Definitions 1996" is accepted for burial.	20 tonnes or more per year	350,000 tonnes per year

The licence is prescriptive of the control of fugitive dust emissions (conditions 22 to 28) and the DMP includes management actions consistent with the licence conditions related to dust, as indicated in Section 7.

3.2 National Environmental Protection (Ambient Air Quality) Measure

The *National Environment Protection Council (NEPC) (Commonwealth) Act 1994* established the National Environmental Protection Council (NEPC) which determines and evaluates National Environment Protection Measures (NEPMs) for the nation. The *National Environment Protection Council (Western Australia) Act 1996* is mirror legislation of the commonwealth act and implements the NEPMs in Western Australia.

Air quality criteria of relevance to this DMP are derived from the *National Environmental Protection (Ambient Air Quality) Measure (NEPM) 2021* (NEPC 2021). The NEPM provides air quality standards applicable to urban airsheds, including criteria for particles such as PM_{10}. In the absence of guidance specifically for rural settings, the ambient air quality NEPM is adopted.

3.3 Shire Local Laws

The site is required to comply with the Shire of Dardanup Dust Control Local Law 2011 (the Local Law). The Local Law requires a dust management plan to be accepted by the local government and operations to be conducted within any terms and conditions to which the accepted dust management plan is subject.

3.4 Separation guidance

Environmental Protection Authority (EPA) Guidance Statement No. 3 (GS3) (EPA 2005) provides advice on the use of generic separation distances for a range of industrial land uses. In determining the separation distances emissions – including gaseous and particulate emissions, noise, dust and odour – that may affect the amenity of nearby sensitive land uses were considered. Separation distances are not intended to replace actions to mitigate emissions and offsite impacts.

Recommended separation distances for category 64 putrescible landfill sites (Class II & III) is 500 m for sensitive uses (subdivisions), 150 m for single residences with an internal buffer of 35 m from the site boundary. There are no single residences within 150 m of the site boundary (see Table 2.1).

3.5 Dust management guidelines

The Department of Environment and Conservation (DEC 2011) document, *A guideline for managing the impacts of dust and associated contaminates from land development sites, contaminated sites remediation and other related activities*, is applicable to the dust management bulk handling, stockpiling and disposal of materials activities conducted at the site.

A Draft *Guideline: Dust emissions* has since been released in 2021 for consultation and is pending publication. This DMP will be reviewed when the new guideline is published to ensure it meets the relevant requirements (see Section 10).

4. Site activities

4.1 Normal operations

Activities conducted at the site associated with the operation of the landfill include vehicle movements on sealed and unsealed surfaces and transport, bulk handling, stockpiling and burial of waste. The layout of the site is shown in Figure 4.1.

4.1.1 Hours of operation

The hours of operation for the disposal of solid waste at the site, as agreed with Council currently, are:

- weekdays and weekends: 6.00 am to 6.00 pm
- Public Holidays: open, unless otherwise posted.

4.1.2 Equipment

Equipment used on-site may include, but is not limited to:

- two landfill compactors (greater than 50 tonnes) to compact the waste
- bulldozer to spread and cover the waste and for general earthmoving activities
- two track loaders for cleaning the landfill floor, spreading, processing and covering waste
- front end loader and articulated dump truck for moving cover soils from stockpiles, supplying materials for access roadways and other earthmoving activities
- two excavators to assist in excavating landfill areas and to load aggregate materials and cover soils from stockpiles
- water truck and water cart for dust mitigation and for emergency fire response
- diesel generators for power supply and water pumps for managing stormwater
- street sweeper for use on bitumised haul roads for managing fugitive dust.

4.1.3 Solid waste handling procedures

The working face is the area where solid waste is unloaded from the incoming vehicles, levelled, compacted, and cover material is applied. The site limits the number of working faces in use at any one time – generally, there will only be one active disposal area in operation. However, some circumstances require additional disposal areas to be open-ended (e.g., in response to adverse weather conditions and for receipt of special waste materials).

The size of the working face depends on the number of vehicles that need to be managed and the landfill equipment that is available to place and cover the waste. The area of the working face is kept as small as practical, minimising potential environmental impacts and requirement for cover material.

Trucks can be unloaded from either the top or bottom of the working face. Where possible, trucks are unloaded at the bottom of the working face, which is shielded from wind, unless surface water and muddy conditions during wet weather hinder truck movement and cause mud-tracking issues. Drop/tip heights are also minimised as far as practicable.

The deposited waste is spread in layers no greater than 500 mm thick using a bulldozer, track loader or compactor and then compacted by a compactor, which makes several passes over each layer.

The waste is compacted and covered with inert material or approved alternate materials at the end of each working day. The cover material is also placed in a progressive manner through the day on the side slopes and top deck areas, and an amount is retained for fire control.

4.2 Construction

Construction activities associated with extending the landfill capacity (following grant of the appropriate works approval) involves the establishment of new cells to accommodate waste and rehabilitation of completed cells (refer to Figure 4.1 for cell layout). In addition, Cleanaway will be developing a number of stormwater retention basins and drains in the western portion of the site to improve stormwater management and retention.

Current construction and rehabilitation areas are shown on the dust risk area map (Figure 7.1).

4.2.1 Hours of operation

Construction activities generally occur on:

- weekdays: 7.00 am and 5.00 pm
- Saturday: occasionally as needed, typically 7.00 am to 3.00 pm.

No construction work is carried out on Sundays or Public Holidays.

4.2.2 Equipment

Equipment employed for the earth works required for the construction of new landfill cells includes the following:

- two excavators (45 t and 30 t)
- four dump trucks (40 t)
- one bulldozer
- one front-end loader
- one grader
- one compact track loader.

Typically, up to seven pieces (occasionally eight) of plant are operated for cell construction activities at one time. Due to the smaller scale of work, less equipment will be required for the construction of the proposed stormwater infrastructure. This will typically use one 30 t excavator, one bulldozer, and three dump trucks.

4.2.3 Construction activities

The construction of a new landfill cell entails the excavation of a void and subsequent installation of a plastic liner. Excavation starts at the natural/existing ground surface, progressing down to approximately 18 m to 20 m depth.

Excavated soil is stockpiled as close to the site of excavation as practicable to minimise the impacts of haulage. Historic construction of cells required up to 300,000 m^3 of soil to be excavated taking up to six months to complete. Future cells are planned to be wider requiring more volume to be removed, likely pushing construction time out to up to nine months.

The construction of the stormwater basins and drains will be carried out through the deepening of three existing basins and two drains, and the development of a new basin (Southern Stormwater Basin). The depth of excavation will vary between 2 m to 4 m, with approximately 85,000 m^3 of material being removed over a three year period of staged construction. The excavated material will either be hauled directly to the landfill active tipping face for use as cover material or be stockpiled on site.

4.3 Extractive industries

Cleanaway intends to undertake sand extraction over the eastern footprint of the site, pending the approval of an Extractive Industry Licence application by the Shire (refer to extraction plan in Appendix C). The activity involves the clearing of vegetation and excavation material for reuse in advance of the construction of new landfill cells. The location and layout of the proposed extractive industries construction is shown on Figure 4.1. Note that the proposed extractive industries area is not highlighted as a risk area on the Dust Risk Area Map (Figure 7.1) as the activity is not due to commence in the short term. The map will be updated before the works commence.

4.3.1 Hours of operation

Extraction and construction activities generally occur on:

- Weekdays: 6.00 am and 6.00 pm
- Saturday: occasionally as needed, typically 7.00 am to 3.00 pm.

The duration of works is anticipated to occur over a five year period in accordance with time limited approval provided by the Shire for an extractive industry as per the Shire's *Extractive Industry Local Law (1999)*. No construction work will be carried out on Sundays or Public Holidays.

4.3.2 Equipment

Equipment used on-site during the extractive industries activity include:

- a loader for the purpose of loading each truck
- an articulated dump truck for moving cover soils from stockpiles, suppling materials for access roadways and other earthmoving activities
- a bulldozer for gravel extraction and rehabilitation of each stage
- an excavator for the stockpiling of vegetation, topsoil, sand, rock, and arising clay and gravel onsite
- a 15 KL watercart for dust suppression.

4.3.3 Stages of excavation

The anticipated stages of extraction for materials are to occur in the following manner.

4.3.3.1 Preparatory site works

The site will require preparatory works prior to the development of the extraction area. This will include:

- construction of an appropriate haul road to the extraction site
- the marking of the extraction footprint by a licensed surveyor including the location of all stockpiles and vegetation retention buffers.

4.3.3.2 Extraction stage 1: Clearing vegetation

Clearing of vegetation is to occur using the bulldozer and excavator as required to remove vegetation contained within the extraction footprint.

4.3.3.3 Extraction stage 2: Remove and stockpiling of topsoil

The top 300 mm of topsoil from the extraction footprint will be removed and stockpiled in the location shown on the Excavation Site Plan in Appendix C. Stockpiles will be constructed with a batter of 1:6 to ensure minimal erosion during winter periods. Stockpiled materials will complement the landfill operations at the site.

4.3.3.4 Materials extraction stage 3: Extraction of materials

Material extraction will begin via a front-end loader and stockpiled in the corresponding stockpile location for ease of loading trucks by the loader. As required, the bulldozer will move extracted materials from the edge of the extraction boundary to the centre of the stage, maintaining a 1:6 batter along the extractive licence boundary extent as shown by the plan in Appendix C.

Extracted materials will either be stockpiled on-site as indicated by the plan in Appendix C or immediately used to improve the surfaces of roads and landfill cells within the site.

Extraction will be carried out to a maximum of 6 m below current ground level.

Legend

- Premises boundary
- Landfill cells - existing
- Landfill cells - future
- Extraction stage
- Extractive industry footprint
- J and P Corporation
- Mulched vegetation stockpile
- Top soil stockpile
- Cadastral boundary (LGATE - 002)
- Cristal - sealed road
- Waste - sealed road
- Internal road

Roads (LGATE - 195)

- Minor road

JBS&G

Job No: 67183

Client: Cleanaway Solid Waste Pty Ltd

Version: 6.2 | Date: 17/03/2025

Drawn By: [redacted] | Checked By [redacted]

Scale 1:10,000 at A4

0 100 200
metres

Coord. Sys. GDA2020 MGA Zone 50

Banksia Road Landfill
Crooked Brook, WA 6236

SITE LAYOUT

FIGURE 4.1

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Image Reference: www.nearmap.com© - Imagery Date: 29 January 2025

5. Potential impacts

5.1 Parameters of interest

The operational activities conducted at the site have the potential to result in airborne dust (fugitive dust), including the Total Suspended Particulates (TSP) and PM_{10} fractions, which could impact upon human health and amenity. Impacts to amenity from dust include:

- regular dust events over several weeks leading to a gradual build-up of dust on surfaces
- short period dust events of very high concentrations which cause a rapid build-up of dust on surfaces, or soiling, if dust deposition rates are high.

Dust may impact upon the environment where surface deposition affects vegetation growth.

5.1.1 Particles

PM_{10} is particulate matter of 10 micrometres or less in diameter, which is the fine particle fraction of TSP. PM_{10} includes inhalable particles that are small enough to penetrate the thoracic region of the lungs, where they can have a direct physical (inflammatory) effect and/or be absorbed into the bloodstream. All people are continuously exposed to PM_{10} from naturally occurring and anthropogenic dust emissions in urban and industrial areas.

The TSP fraction comprises particles each having an equivalent aerodynamic diameter of up to nominal 50 micrometres. Upper respiratory tract health effects from TSP inhalation can arise in sensitive individuals; however, the primary issue with TSP emissions relates to impacts on amenity from a visible dust perspective and deposition onto surfaces.

$PM_{2.5}$ is particulate matter of 2.5 micrometres or less in diameter. $PM_{2.5}$ is not considered in this DMP as it is typically associated with combustion emissions. This particle size is expected to form a small fraction of the particulate matter emitted from the site and will be managed in accordance with the management actions defined for the control of PM_{10} emissions.

5.1.2 Contaminated waste

The site is a Class III landfill and is licensed to accept contaminated materials (solids) in accordance with the acceptance criteria for Class III landfills (DWER 2019).

Contaminated wastes are subject to specific management in accordance with conditions of the licence including contaminated waste must be accompanied by documentation (thus identifying hazard to operators) and must only be disposed of by burial to the active landfill area. Following the application of controls, it is expected that species arising from contaminated wastes are not expected to occur in fugitive dust in concentrations that will pose a human health risk.

5.1.3 Radiation

The tailings accepted at the site contain technically enhanced trace levels of naturally occurring radioactive materials thorium and uranium. Radiation risks at the facility are managed under a Radiation Management Plan. The plan was approved in November 2018 by the Radiological Council under Permit number RS77/2018.

Radiation management is governed by the Environmental Health Directorate of the Department of Health, in accordance with the *Radiation Safety Act 1975*. Radiation is therefore not considered further in this DMP.

5.1.4 Asbestos

The DWER licence for the site (L8904/2015/1) prescribes the requirements for handling of asbestos containing waste. Under the licence, asbestos containing waste is handled as Special Waste Type 1 in order to mitigate the potential discharge of asbestos containing material or asbestos fibres.

Asbestos containing materials are managed under the site Asbestos Management Plan and, therefore, are not considered further in this DMP.

5.2 Emissions sources

The dust-generating sources and activities identified the site are described in Table 5.1.

Table 5.1: Potential dust sources and dust-generating activities

3	Description	Dust generation and exposure potential
Wind erosion and dust lift-off from dry waste material, soil stockpiles or unsealed surfaces	As the active landfill cell is filled there may be areas of fine material on the surface. Natural residual soils are stockpiled on-site, and there are large areas of unsealed exposed surfaces.	Airborne dust generated by action of wind on exposed ground, stockpile surfaces, or dry waste material surfaces.
Vehicles movements	Heavy plant/earthwork vehicles, trucks and light vehicles will be traversing the site.	Vehicle movements on paved and unpaved roads could suspend fine particles in air. Vehicles exiting site can track material out onto the public road which could become airborne once dried out.
Vehicle unloading	Emptying of waste trucks at active landfill working face by tipping.	Dust generation during tipping of waste from trucks either from fine waste material from within truck or fine material disturbed from receiving surface.
Heavy plant activity spreading and compacting waste in the active landfill area	In the process of spreading, combining and compacting waste materials, heavy plant may traverse over dry soil or dry waste material.	Dust generated by soil or dry fine waste material disturbance during dozer movement. Dust generated by action of wind over exposed dry ground or dry fine waste material.
Extractive industry activities	Extractive industry operation requiring vegetation clearing, topsoil removal and storage, haulage and stockpiling of soil	Dust generation during the clearing of vegetation and removal of topsoil. Dust generation during excavation and soil handling is limited due to moisture content. Vehicle movements associated with extraction.
Construction activities	Landfill cell and stormwater drainage infrastructure construction requiring excavation, haulage and stockpiling of soil.	Dust generation during excavation and soil handling is limited due to moisture content. Vehicle movements associated with construction.

5.3 Relevant air quality criteria

5.3.1 TSP

As discussed previously, health effects associated with TSP mainly arise from the PM_{10} fraction. Given this, any particulate monitoring results would be compared to air quality standards for PM_{10} (see Section 5.3.2).

5.3.2 PM_{10}

The standards in the ambient air quality NEPM will be adopted as a basis against which to compare monitoring results for particulates. The air quality standards are applicable to urban airsheds, and include criteria for particles as PM_{10} at 50 $\mu g/m^3$ on a 24-hr averaging period, and an annual limit of 25 $\mu g/m^3$ derived from 24-hr measurements across a year (NEPC 2021).

6. Dust risk assessment

A dust risk assessment/classification was conducted in accordance with the framework provided in the DEC (2011) guideline (Appendix B) to determine the level of dust management and monitoring required for the site as follows.

This risk assessment/classification has considered all activities being carried out on Lot 2 and is consistent with that provided in the DMP for J & P Corporation (Strategen-JBS&G 2022).

Part A Nature of site

Item	Comment	Score
Nuisance potential of soil/waste when disturbed	Dust is largely expected to be windblown uncontaminated crustal particles; therefore, the nuisance potential is considered primarily to amenity. Potential for contaminated dust is low due to specific procedures in place to manage hazardous substances, i.e., asbestos and radiation.	4
Topography and protection provided by undisturbed vegetation	Some parts of the site are less exposed (lower down or within pits); however, the elevated topography of the eastern end of the site means little protection is afforded to exposed surfaces and ground level.	18
Area of site disturbed by the works	More than 10 ha.	9
Type of work being done	Vegetation clearing and bulk earthworks – this is conservative as handling of waste is largely below the level of the surface and construction activities are a minor aspect in comparison to operational waste handling aspects. The waste material being handled generally has lower dust-generating potential than soils.	9
Total part A score		**40**

Part B Proximity of site to other land uses

Item	Commentary	Score
Distance of other land uses from site	The nearest residence is approximately 500 m from the site boundary.	12
Effects of prevailing wind direction (at time of construction) on other land uses	The residential properties are isolated land uses affected by one wind direction.	6
Total Part B score		**18**

Site classification score

The site classification score is the product of the Part A and Part B scores. The total score is used to determine the site classification score as follows:

- Site classification 1 — under 199
- Site classification 2 — 200 to 399
- Site classification 3 — 400 to 799
- Site classification 4 — over 800.

Based on a site classification score of 40 x 18 = 720, the site is considered Classification 3 and medium risk for potential dust impacts. The dust management and monitoring requirements in this DMP have been determined in accordance with those recommended for Classification 3 sites in the DEC (2011) guideline.

7. Dust control measures

The following dust control measures (referenced to the relevant licence conditions where applicable) are implemented at the site as part of normal operations to mitigate dust generation. The control measures aim to achieve a residual level of risk of fugitive dust emission that is as low as reasonably practicable.

7.1 Dust Risk Areas

Dust Risk Areas have been identified by their potential for fugitive dust generation, considering orientation, exposed surfaces, topography and vehicle movements as detailed in the notes below and shown on Figure 7.1. Controls specific to dusk risk areas are described in the sections below.

7.2 General management

General management measures pertaining to fugitive dust mitigation are:

- weather forecasts will be used to minimise dust generating activities during adverse meteorological conditions
- wind speed and direction will be checked throughout the day and used to plan and modulate active landfill operations.
- where wind speed and direction indicate a likelihood of fugitive dust emission, site speed limits will be reduced for Dust Risk Areas (Figure 7.1)
- stormwater dams have capacity and are maintained in order to provide sufficient water for dust suppression
- water collected from Stormwater Pond 1 and Stormwater Pond 2, via a water cart, will be used for dust suppression in the wetting down of the active landfill areas only (licence condition 25 (b))
- leachate, where available, will be used for dust suppression in the wetting down of the active landfill areas only (licence condition 25 (a))
- a 15 kL water cart will be available for application of water for dust suppression and priority will be given to high-risk Dust Risk Areas (Figure 7.1); the use and frequency of the water cart will be determined using wind speed and direction observations, use of trafficable areas and active tipping areas, observations of visible dust and effectiveness of water application
- dust suppressant will be applied to the Dust Risk Areas identified to have potential for fugitive dust-generating including non-vegetated areas, landfill batters and within in the laydown area as identified in the dust risk area map (Figure 7.1), when such areas have the potential to generate fugitive dust (licence condition 27); the frequency of dust suppressant application will be set based on the effectiveness of the applied suppressant and the current risk associated the relevant Dust Risk Area.

7.3 Management of trafficable areas

General management of trafficable areas includes:

- Prior to using the southern haul road for access to/from Cell 8, the licence holder must extend the bitumised southern haul route to the eastern extent of Cell 8 (licence condition 22)
- prior to commencement of and during work activities:
    - a water cart will be used to apply water from primary and secondary stormwater dams to trafficable areas (licence condition 25 (a))

- a street sweeper will be used on the bitumised Main Haul Road and Southern Haul Road

- a wheel wash operates in the northwest of the site and will be used by all operational vehicles prior to exiting the site (licence condition 28); the area between the wheel wash and the public road is sealed
- the area between the wheel wash and the public road will be inspected daily to ensure that the wheel wash is operating effectively, and that mud is not being tracked on to the public roads
- The daily inspection of the wheel wash and the public road will be recorded.

7.4 Operation of vehicles

Vehicle movements across the site may disturb soils and generate dust. The following measures are adopted during all operational activities to prevent excessive dust generation:

- all loads will be contained in sealed or covered vessels prior to acceptance - uncovered vehicles or vessels for which cover is not effective must not proceed beyond the weighbridge; where effective cover cannot be achieved, loads will be rejected in accordance with the site rejected waste procedure
- records will be kept of vehicles that are rejected because effective cover cannot be achieved; and the vehicle owner will be contacted to ensure future loads are adequately covered
- speed restrictions exist within the site – the appropriate speed limit, up to a maximum of 20 km/h (licence condition 24), will be determined by weighbridge staff and will be based on the activities being undertaken, location and site conditions at the time
- 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.

7.5 Landfill areas

- dust emissions from the active tipping area are managed by applying water from Stormwater Pond 1 and Stormwater Pond 2 using the water cart during working hours, or applying leachate via the water cart to the active tipping area (licence condition 25(a))
- wastes with potential to generate fugitive dust will be wet down during disposal and burial at the active tipping area during operational hours (licence condition 26)
- ensure waste is levelled and compacted as soon as practicable after it is discharged and at a minimum by the end of the working day (licence condition 25 (b))
- ensure waste is placed and compacted to ensure all faces are stable and capable of retaining further waste placement or placement of cover or rehabilitation material (licence condition 25(c))
- 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
- as far as practicable, the active landfill area will be positioned away from the edge of the active cell
- as far as practicable, loads will not be tipped oblique to the wind, with dust being more likely to travel further where this is case
- material drop/tip heights will be minimised where possible

- where waste processing is approved, wastes processed by crushing, shredding or screening will be wet down during processing
- exposed soil surfaces and stockpiles in non-active area will be stabilised (e.g., with chemical surfactants) or temporarily covered (e.g., with mulch) prior to permanent re-vegetation or restoration.

7.6 Extractive industry operations

- topsoil mounds will be restricted to a height no greater than 4 m
- stockpiles, where possible, will be limited to the anticipated cubic volume/vehicle movement for cartage on the following operating day
- stockpiles will be configured to accommodate easy access for watering/dust minimisation if required
- stockpiles of topsoil will be subject to suitable stabilisation techniques based on environmental conditions e.g., watering or seeded mulching
- operations will take place when wind conditions determine it to be suitable as far as reasonably practicable
- visual monitoring of dust will be undertaken daily by all personnel, if dust emissions are observed, dust suppression techniques will be implemented immediately, and all operations will cease until the situation is under control
- as sections of the staged extraction progress, the area will be rehabilitated as soon as practical to minimise areas that are high risk of dust dispersal.

7.7 Construction activities

- during construction activities, the contractor will provide an additional water cart, which waters down construction haulage roads and any areas associated with construction as required
- dust generation will be monitored by construction personnel and water cart utilised in the construction area as required.

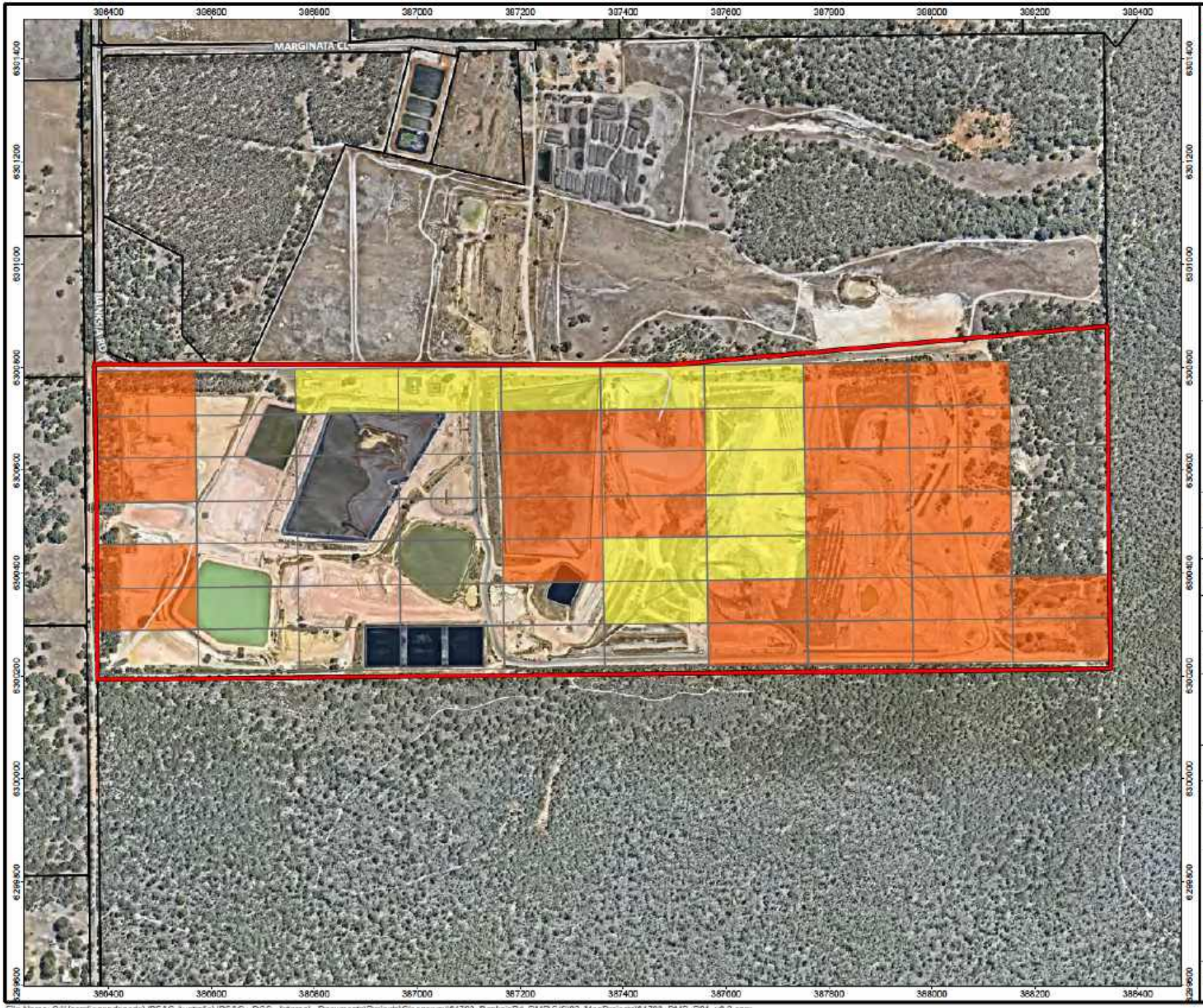
7.8 Administrative controls

- operational personnel will be trained with respect to dust mitigation; training will include mechanisms of the generation of dust emissions, the importance of and responsibility of individuals to implement mitigation measures and reporting of visible dust emissions
- personnel and contractors will be required to report observations of visible dust emissions that appear to cross the boundary of the site, including date, time, location and extent of the visible plume
- fugitive dust emission inspections will be conducted monthly in accordance with a documented site operational procedure; the results of all inspections will be documented and recorded
- Cleanaway will liaise regularly with J & P Corporation to ensure that dust controls are managed in a consistent and coordinated manner.
- an annual assessment of the potential for dust emissions from within the site will be carried out, and proposed controls for high-risk Dust Risk Areas will be detailed

- adjoining landowners and the Shire will be notified in writing at least 48 hours in advance of any activities outside of normal or regular site operations that have the potential to generate dust; records of such notifications will be maintained.

7.9 Incident and complaints management

- fugitive dust events will be raised as an Environmental Incident and an event report entered into the site incident management system with corrective actions identified and allocated
- the following information will be recorded in the site incident management system in relation to complaints received by the site (whether received directly from a complainant or forwarded by the Shire or DWER) about any alleged emissions from the premises:
    - the name and contact details of the complainant (if provided)
    - the time and date of the complaint
    - the complete details of the complaint and any other concerns or other issues raised
    - the complete details and dates of any action taken to investigate or respond to any complaint
    - the effectiveness of any action taken in response to the complaint to reduce or eliminate the risk of future events.



Legend

- Premises boundary
- Dust risk
  - High
  - Moderate
- Cadastral boundary (LGATE - 002)
- Grid
- Roads (LGATE - 195)
  - Minor road

JBS&G

Job No: 67183

Client: Cleanaway Solid Waste Pty Ltd

Version: 6.2 | Date: 17/03/2025

Drawn By: [redacted] | Checked By: [redacted]

Scale 1:10,000 at A4

0 100 200
metres

Coord. Sys. GDA2020 MGA Zone 50

Banksia Road Landfill
Crooked Brook, WA 6236

DUST RISK MAP

FIGURE 7.1

File Name: C:\Users\anandagoda\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Cleanaway\61783_BanksiaRd_DMP\GIS\02_MapProjects\61783_DMP_R01_v6.2.aprx
Image Reference: www.nearmap.com© - Imagery Date: 29 January 2025

8. Dust monitoring

8.1 Visual monitoring

Visual assessments of fugitive dust emissions will be conducted by operational personnel during working hours. A 'dust event' is defined as the occurrence of visible fugitive dust from a source or activity at the site that exits a boundary of the site for a duration of greater than one (1) minute. A windsock will be installed at the site to indicate wind direction and approximate wind strength to aid visual monitoring.

When a 'dust event' is observed and reported on-site, the following corrective actions will be implemented:

- the site operational personnel will review the working methodology of the dust-generating activity and ensure that the appropriate measures listed in the DMP have been implemented
- if the dust event continues following implementation of the above measures, the activity will be controlled, and water will be applied at the source of the dust generation to damp down soils; work will not recommence until the dust event is under control
- spraying of water will be carried out at a frequency sufficient to keep surface soils damp throughout the dust-generating activity without resulting in run-off.

8.2 Summary of dust monitoring

A dust monitoring program was conducted at the site as part of the DMP development. This involved the instrumental monitoring of dust at three locations for six months to establish data regarding existing ambient air quality surrounding the site.

The monitoring program was carried out between 20 November 2020 and 18 May 2021 to encompass the dryer months of the year. This allowed an assessment to be made of the effectiveness of the management of emissions during site operation activities and confirm that off-site impacts are being minimised.

The findings of the monitoring program determined that:

- concentrations at all three locations typically tracked together, representing the trends of particulates in the greater airshed
- The concentrations of particulates typically remained below the 24-hour NEPM PM_{10} criteria of 50 $\mu g/m^3$
- Exceedances of trigger levels set for the duration of the monitoring were largely due to off-site influences, evidenced by elevated concentration detected at all monitoring locations coinciding with known events (e.g., prescribed burns and bushfires) contributing to elevated particulate levels in the regional airshed
- When compared to the other monitoring locations, the NE monitor recorded elevated concentrations during strong north-easterly winds that pass over the body of the site. It was identified that this was possibly due to wind erosion of unsealed surfaces within the site
- The elevated levels at the NE monitor typically remained below 100 $\mu g/m^3$ and did not result in any exceedances of the assessment criteria. However, it was recommended that potential dust sources continue to be investigated for any further opportunities for dust management measures to those already implemented in order to mitigate potential amenity impacts from dust crossing the site boundary in the direction of receptors to the northwest of the site

- Ongoing visual monitoring of dust-generating site activities is imperative, especially during calm conditions when dust could accumulate. It is expected that visual surveillance by site personnel will continue as a primary mechanism for ongoing dust monitoring.

The conclusion from the results of the monitoring program indicated that fugitive dust was being adequately managed at the site.

Assuming that the requirements and controls specified in this DMP continue to be applied and remain appropriate for the dust-generating activates carried out at the site, the risk of impacts from fugitive dust on off-site receptors is expected to be low.

9. Roles and responsibilities

Roles and responsibilities with respect to management of fugitive dust emissions are outlined in Table 9.1 below:

Table 9.1: Site roles and responsibilities

Role	Responsibilities
All personnel	Monitor and report instances of fugitive dust by raising an incident report as required.
Operations Manager	Develop and allocate resources to provide for a level of risk of fugitive dust that is as low as reasonably practicable and conduct and review fugitive dust inspections. Liaise with J & P Corporation and communicate any changes to site activities and coordinate the implementation of effective controls across the entire site. Ensure compliance obligations are met, including annual reporting on the assessment of the potential for dust emissions and proposed controls within the required timeframe. Investigate and document complaints as required.
Leading Hand	Monitor wind speed, direction and incoming and nature of incoming loads throughout the day. Liaise with J & P Corporation and communicate any changes to site activities and coordinate the implementation of effective controls across the entire site. Incorporate appropriate controls into planning and modulation of active landfill operations, including guidance and coaching of personnel and allocation of water cart routes and waste processing activities. Intervene in and modify/stop active landfill operations in response to notification of exceedances of trigger levels in order to prevent triggering and stop any dust event. Investigate complaints as required.
Customer Service Officer	Maintain site complaints register.
Weighbridge Operator	Monitor and control incoming loads and advise Leading Hand of any oncoming loads consisting of soil or fine particulate. Monitor dust concentrations at the monitoring locations throughout the day and respond to any alarms notifying an exceedance of trigger levels by advising UHF channel 31 and Leading Hand. Advise incoming drivers of any reduction in speed limits.
Landfill Operator	Monitor wind speed, direction and contents of tipped loads throughout the day and modulate active landfill operations accordingly. This is to include communication with tippers to ensure appropriate tipping direction. Modify/stop own machine operation and influence carrier activities in response to notification of exceedances of trigger levels in order to prevent triggering and stop any dust event.
Construction and extractive industries contractors	Comply with all onsite dust management requirements as set out in the DMP. Provide a water cart to adequately manage all dust generating activities associated with construction. Monitor dust generation within the construction or extraction areas and prevailing and forecast weather conditions in order to adapt activities to minimise the generation of dust. Modify or cease activities in order to prevent dust events. Work closely with operational site staff to ensure comprehensive dust management across the whole site.

10. Review

This DMP will be subject to, at a minimum, twelve-monthly review to ascertain its relevancy for ongoing site management and allow for continual improvement. Reviews may also be implemented:

- at the direction of the Shire of Dardanup
- as a corrective action resulting from an investigation into dust impacts
- after completion of the annual review
- prior to any significant change to site activities and operations (including commencement of extractive industries works)
- after significant update of the DMP for the J & P Corporation extraction area
- on publication of a new dust emission guideline by DWER.

11. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. JBS&G has also not attempted to determine whether any material matter has been omitted from the data. JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to JBS&G. The making of any assumption does not imply that JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made, including to any third parties, and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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12. References

DEC (2011). *A guideline for managing the impacts of dust and associated contaminates from land development sites, contaminated sites remediation and other related activities.* Department of Environment and Conservation. Perth, Western Australia.

DER (2017). *Guidance Statement: Risk Assessments*. Department of Environment Regulation. Perth, Western Australia.

DWER (2019). *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019).* Retrieved from https://www.der.wa.gov.au/images/documents/our-work/licences-and-works-approvals/WasteDefinitions-revised.pdf.

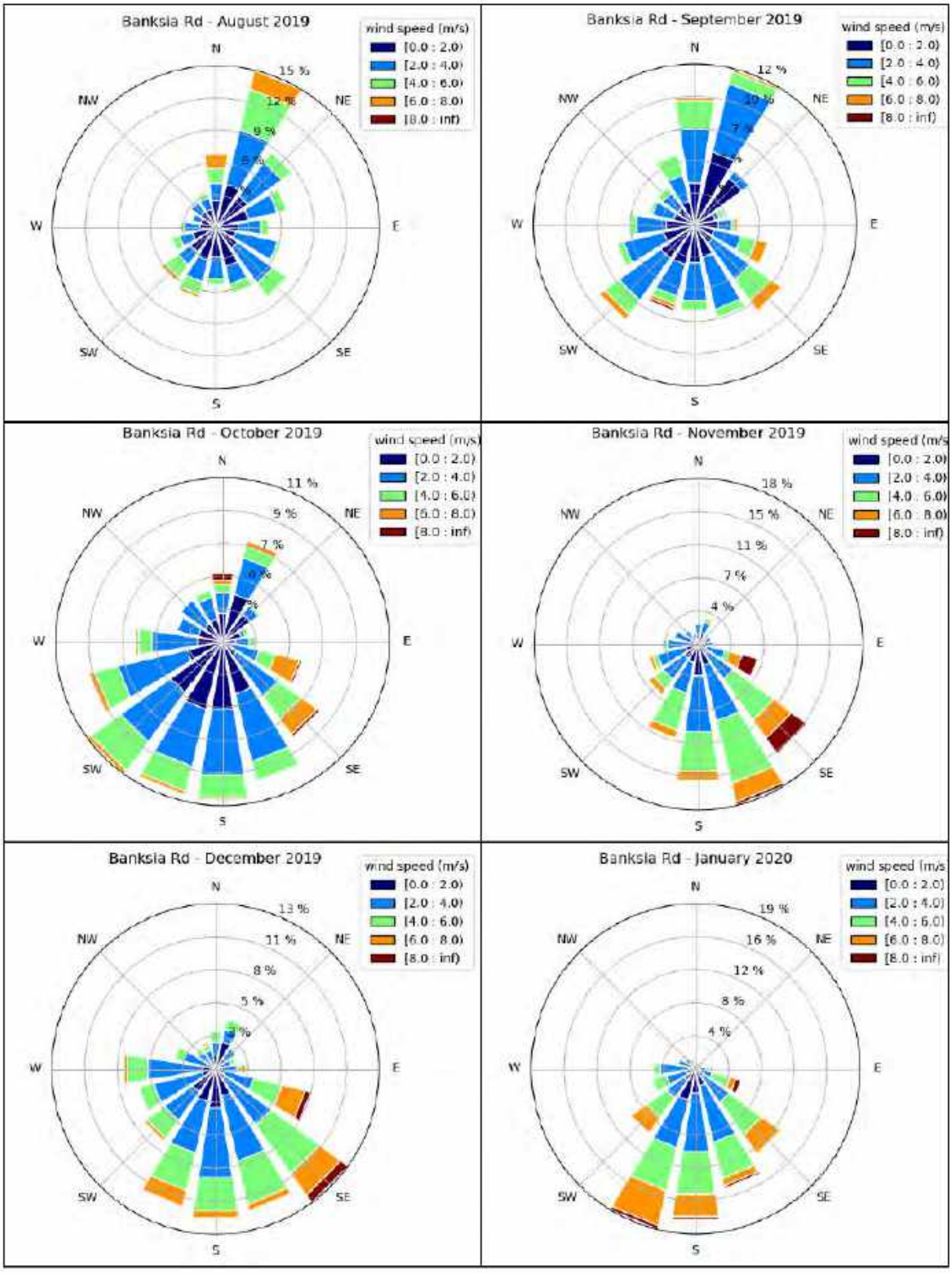
DWER (2021). *Guideline: Dust emissions* (draft). Retrieved from https://consult.dwer.wa.gov.au/regulatory-capability/draft-guideline-on-dust-emissions/.

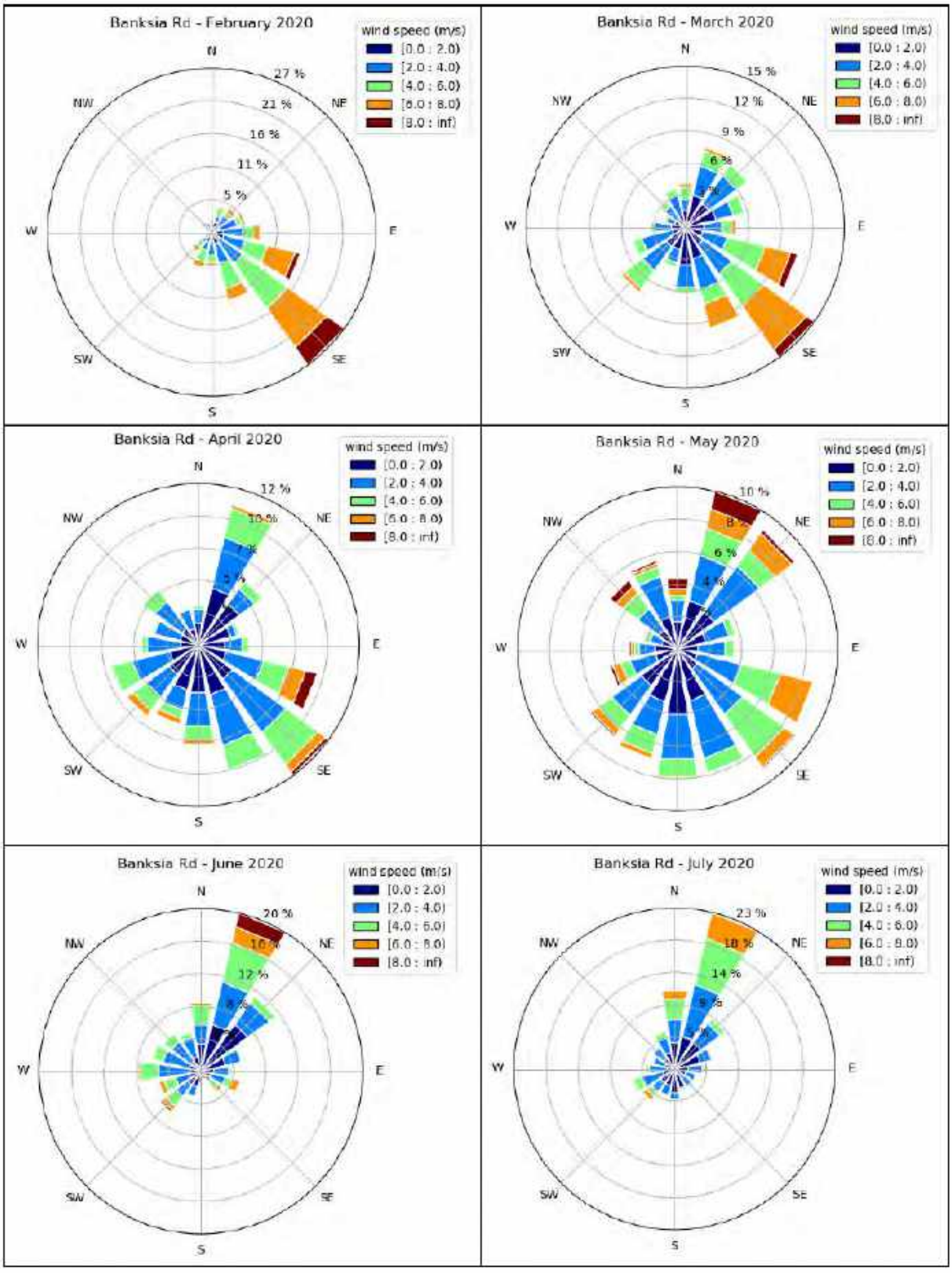
EPA (2005). *Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) Separation Distance between Industrial and Sensitive Land Uses No. 3.* Environmental Protection Authority. Perth, Western Australia.

National Environmental Protection Council (NEPC) (2021). National Environmental Protection (Ambient Air Quality) Measure. Retrieved from https://www.legislation.gov.au/Details/F2021C00475.

Strategen-JBS&G (2022). *Dust Management Plan – Extractive Industry Licence Renewal.* Unpublished report prepared for J & P Corporation by JBS&G Australia Pty Ltd. January 2022. Perth, Western Australia.

Appendix A Wind roses (on-site station)





Appendix B Site risk assessment/classification (DEC 2011)

ADDENDUM

The Department of Environment and Conservation (DEC) released an updated dust guideline in January 2011, "*A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities, January 2011*". An error was identified in Appendix 1 on page 35. This error has since been corrected (See below). This document is the corrected version published in March 2011.

Appendix 1: Site risk assessment/classification for activities generating <u>uncontaminated</u> dust

Sheet 1: Site classification assessment chart

Part A. Nature of site

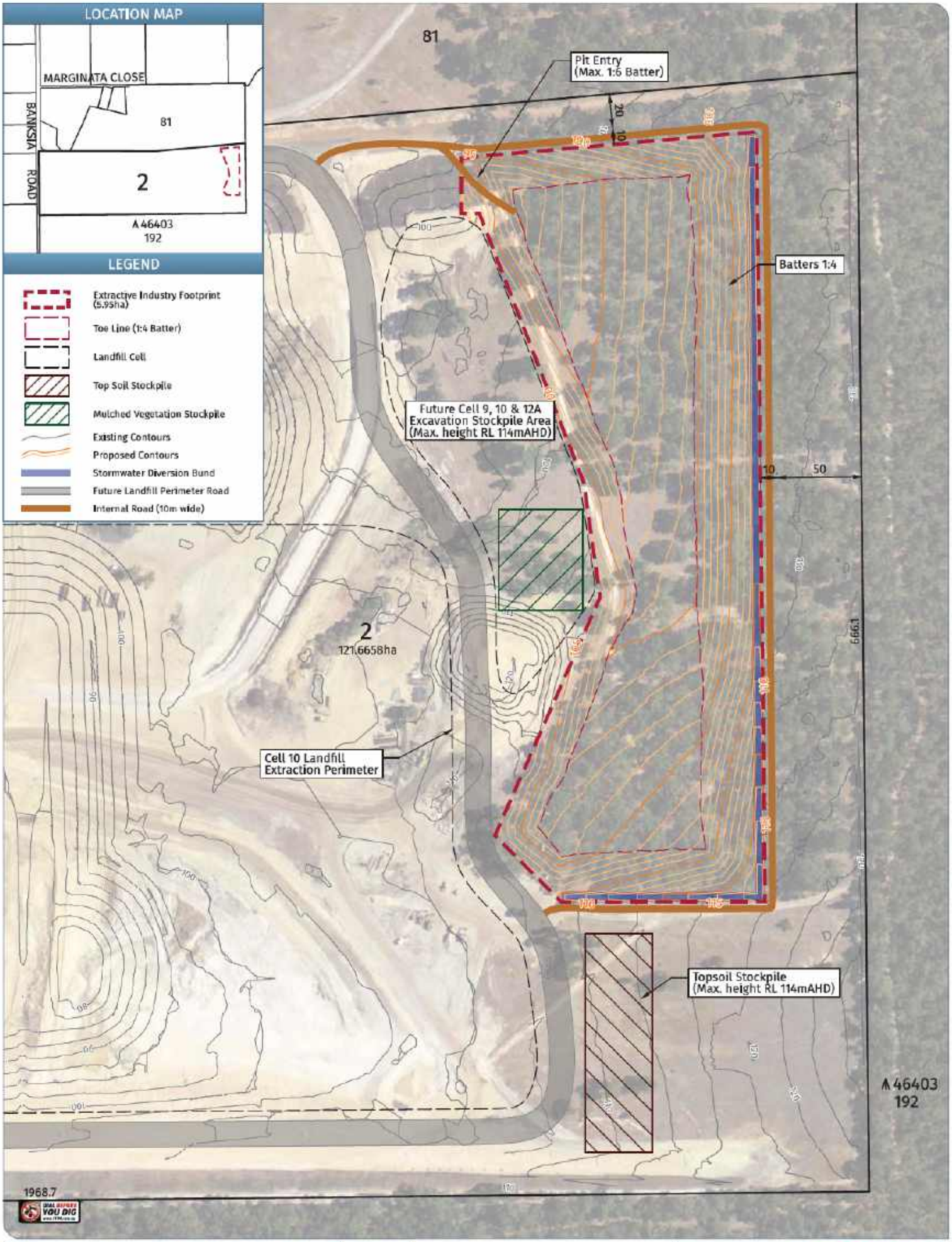
Item	Score options				Allocated score
1. Nuisance potential of soil, when disturbed	Very low……..…..**1**	Low…….....**2**	Medium……..……...**4**	High……..**6**	
2. Topography and protection provided by undisturbed vegetation	Sheltered and screened.....**1**	Medium screening....**6**	Little screening.....**12**	Exposed and wind prone……..**18**	
3. Area of site disturbed by the works	Less than 1ha……..**1**	Between 1 and 5ha..**3**	Between 5 and 10ha.....**6**	More than 10ha…….**9**	
4. Type of work being done	roads or shallow trenches……**1**	roads, drains and medium depth sewers…....**3**	Roads, drains, sewers and partial earthworks……..**6**	Bulk earthworks and deep trenches……...**9**	
				TOTAL score for Part A	

Part B. Proximity of site to other land uses

Item	Score options				Allocated score
1. D istance of other land uses from site	More than 1km…….**1**	Between 1km and 500m…….....**6**	Between 100m and 500m……..**12**	Less than 100m..…..**18**	
2. Effect of prevailing wind direction (at time of construction) on other land uses	Not affected……..…..**1**	Isolated land uses affected by one wind direction……..…..**6**	Dense land uses affected by one wind direction……..**9**	Dense/sensitive land uses highly affected by prevailing winds……**12**	
				TOTAL score for Part B	

SITE CLASSIFICATION SCORE (A X B) =

Appendix C Excavation Site Plan



EXCAVATION SITE PLAN

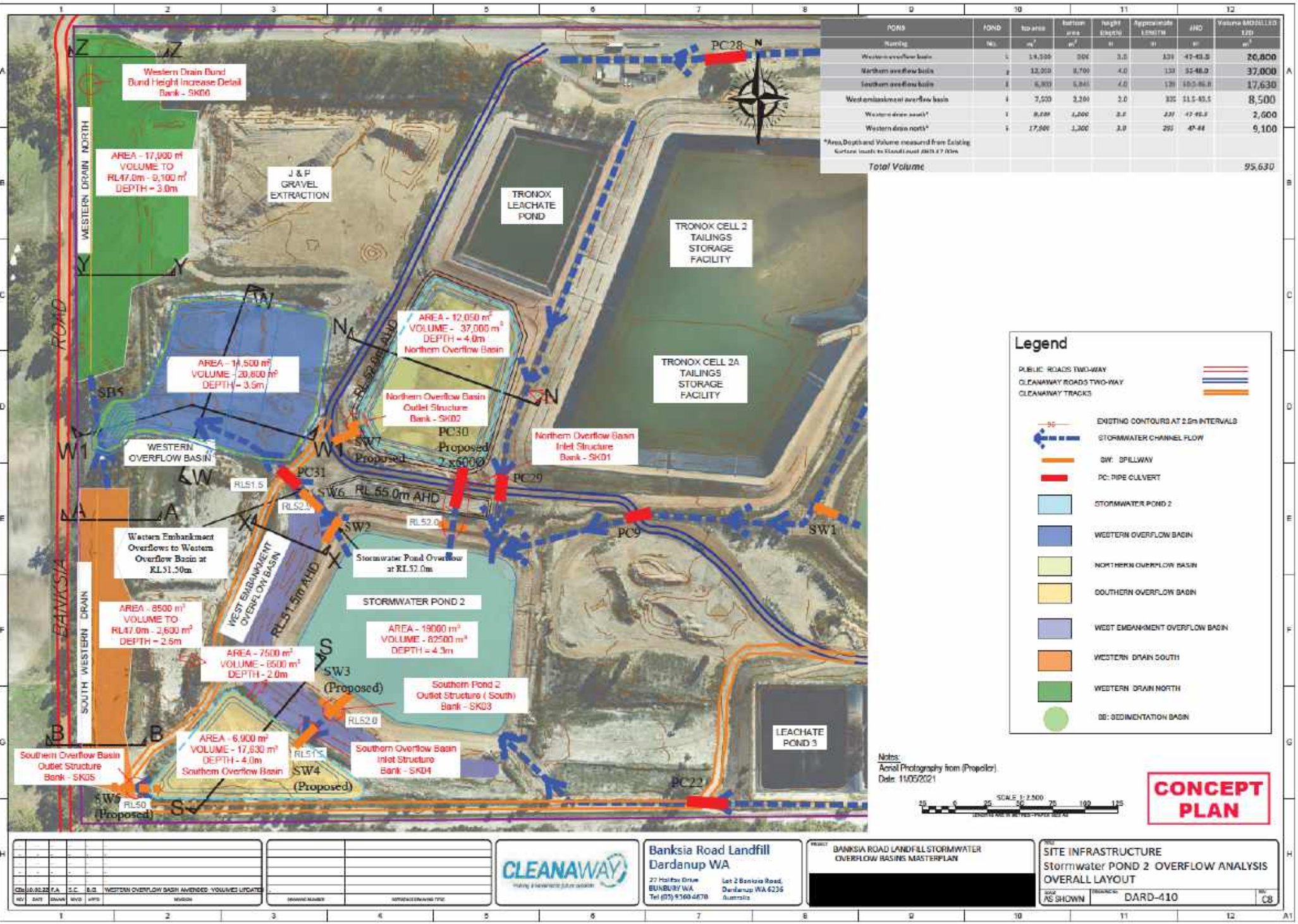
Lot 2 on Diagram 65891 Banksia Road, CROOKED BROOK

Plan No. | 2291
Date | 19/0
Drawn | NP

[redacted]

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

Appendix D Stormwater Infrastructure Overall Layout



POND Naming	POND No.	Surface area m²	Bottom area m²	Height (depth) m	Approximate LENGTH m	AHD m	Volume MODELLED (2D) m³
Western overflow basin	1	14,500	800	3.5	320	47-48.5	20,800
Northern overflow basin	2	12,050	8,700	4.0	130	52-48.0	37,000
Southern overflow basin	3	6,900	5,845	4.0	120	50.5-46.5	17,630
West emissionment overflow basin	4	7,500	3,200	2.0	320	51.5-49.5	8,500
Western drain south*	5	8,500	1,200	2.5	320	47-44.5	2,600
Western drain north*	6	17,000	1,200	3.0	200	47-44	9,100
*Area, Depth and Volume measured from Existing Surface levels to Flood Level RL47.0m							
Total Volume							*95,630*

Legend

- PUBLIC ROADS TWO-WAY
- CLEANAWAY ROADS TWO-WAY
- CLEANAWAY TRACKS
- EXISTING CONTOURS AT 2.0m INTERVALS
- STORMWATER CHANNEL FLOW
- SW: SPILLWAY
- PC: PIPE CULVERT
- STORMWATER POND 2
- WESTERN OVERFLOW BASIN
- NORTHERN OVERFLOW BASIN
- SOUTHERN OVERFLOW BASIN
- WEST EMBANKMENT OVERFLOW BASIN
- WESTERN DRAIN SOUTH
- WESTERN DRAIN NORTH
- SB: SEDIMENTATION BASIN

Notes:
Aerial Photography from (Propeller)
Date: 11/05/2021

SCALE 1: 2,500

CONCEPT PLAN

NO	DATE	DRAWN	M.V.O	APP'D	REVISION
C0a	10.02.22	F.A.	S.C.	B.G.	WESTERN OVERFLOW BASIN AMENDED - VOLUMES UPDATED

CLEANAWAY

Banksia Road Landfill
Dardanup WA

27 Halifax Drive
BUNBURY WA
Tel (08) 9780 4670

Lot 2 Banksia Road,
Dardanup WA 6236
Australia

PROJECT: BANKSIA ROAD LANDFILL STORMWATER OVERFLOW BASINS MASTERPLAN

TITLE: SITE INFRASTRUCTURE
Stormwater POND 2 OVERFLOW ANALYSIS
OVERALL LAYOUT

SCALE: AS SHOWN | DRAWING No.: DARD-410 | REV.: C8