



SERS
Site Environmental and
Remediation Services

15th March 2024

Our Ref: 004-27_Muchea WA_FIR_15032024

Department of Water and Environmental Regulation
Locked Bag 10
Joondalup DC
Joondalup WA 6919

RE: REQUEST FOR FURTHER INFORMATION - MUCHEA WORKS APPROVAL

To Whom it may concern,

Site Environmental and Remediation Services (SERS) submitted a works approval application on behalf of Brajkovich Landfill and Recycling (Muchea) Pty Ltd, which was received by the Department of Water and Environmental Regulation on the 28th of November 2023.

SERS received a request for further information from the DWER on the 5th of March 2024. This letter has been developed to provide the information required by the DWER to continue assessing the works approval application.

The further information required was inclusive of the following:

- Clarification regarding the extraction and utilisation of groundwater, as well as the importation of water for the purpose of dust suppression (when required).
- Revised site map, incorporating the designated surface water management zone's location (**Attachment 1**).
- Copy of revised Dust Management Plan (section 5.4) (**Attachment 2**)
- Clarification on preparation of existing pit on site for landfilling
- Details on the landfill base (mbgl) and proposed finished levels.





Relevant part of application form	Information requirement	Rationale
Part 6.5- Water licences and permits (Rights)	This section of the form has not been completed.	<p>It is mentioned in Section 5.4 of the Dust Monitoring Program provided with the application that water to be used for dust suppression on the site is supplied by the groundwater extraction bore at the west of the site.</p> <p>However, DWERs mapping system does not show any groundwater licences to the west of the site. As the premises is located within a RIWI Act proclaimed groundwater area (Gingin Groundwater Area), a groundwater licence to take water is required.</p>



Applicant's response:

The DWER groundwater database confirms that there are no existing groundwater bores on the site. Consequently, all operations, such as dust suppression, will rely on storm water collected during wet season and/or water will be sourced externally when necessary.

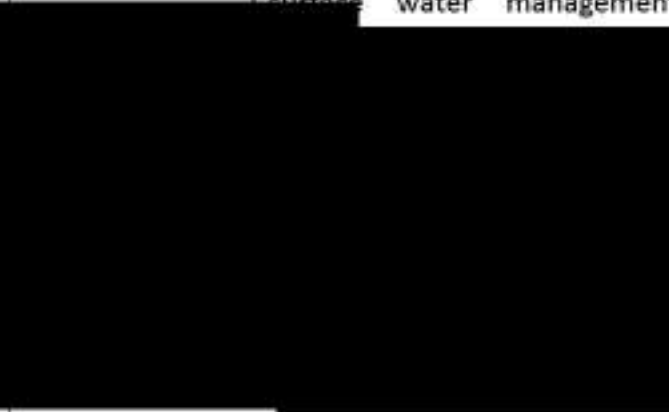
Two sumps are proposed to manage stormwater from the clay extraction area during the wet season. Sump 1 (see **Attachment 1**) will be situated adjacent to the northern boundary of the site to collect water from area 1 (see **Attachment 1**). Meanwhile, Sump 2 will serve as a temporary sump, relocating within the south eastern area of the site as dictated by clay extraction activities.

The sumps will receive water runoff through the open storm water channels. The prescribed sumps on the site will be clay lined sumps which will contain water to be used for dust suppression and other activities on site.

Refer to **Attachment 2** for revised Dust Management Plan.

Part 3.4 – Attachment 2: Premises map(s)	A map of the layout of the proposed surface water management system has not been included.	This information is required for DWER to gain a better understanding of the surface water management system proposed for the premises, assess its suitability, and ensure that it is
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	<p>You are required to provide a premises map which also includes the location of any channels, bunds or holding ponds proposed as part of the surface water management</p>	<p>contained within the prescribed premises boundary.</p>
		<p>route, landfill cell, sumps to ration area and tipping face.</p> <p>water from clay extraction area during the wet season. Sump 1 (see Attachment 1) will be situated adjacent to the northern boundary of the site to collect water from area 1 (see Attachment 1). Meanwhile, Sump 2 will serve as a temporary sump, relocating within the south eastern area of the site as dictated by clay extraction activities.</p> <p>The design of the catchment area for both sumps will ensure that runoff water during the wet season is directed appropriately to each respective sump.</p>

<p>Part 4.2- Proposed activities</p>	<p>No construction activities have been proposed.</p> <p>However, DWER expects that there will be some preparation works for landfill cells (Supporting information mentions a landfill "liner" from clay material). Construction works may also be required for the surface water management system mentioned in the Works Application Class 1 Landfill Supporting Document provided with the application. Please provide the following:</p>	<p>The supporting information mentions that the surface water management system will be assessed in the initial stages of landfill development. However, for the construction of any channels or ponds to be authorised under the works approval, their construction details are required as part of the application. The supporting document (Section 5.2.6) provided with the application states the following: "The phases comprise cells of varying volume, dependant on finished heights. Phase 1 cell is expected to be built up to approximately 10m above the base level of approximately 30m</p>
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1. Plans and technical specifications for any channels, ponds or other surface water management infrastructure proposed to be constructed on site.

AHD (following removal of topsoil if present). Phase 2 cell is expected to be built up to approximately 10m above the base level of approximately 28m AHD (following the removal of topsoil and overburden). Phase 3 cells are expected to be built up to approximately 10m above the base level of approximately 26m AHD (following removal of topsoil and overburden)”. However, the site’s topographical contours range from 130m AHD to 150m AHD, suggesting that there may be an error in the AHD levels in the above information provided.

Applicant’s response:

The location has been utilised by BGC for clay extraction. Brajkovich Landfill and Recycling (Muchea) Pty Ltd will initiate landfill operations once BGC reaches exhaustion. Given the landfilling material’s nature, no preparation or construction of pit is necessary. However, existing two sumps will be designed to collect water runoff from Area 1 and Area 2 (see Attachment 1) during rainfall events. Water from sumps will be then utilized for site activities such as dust suppression.

All four phases of landfilling comprise of cells of varying volume, dependent on finished height. Phase 1 cell is projected to reach an elevation of approximately 150 mAHD, with the base level set around 140 mAHD. Phase 2 cell is expected to be built up to approximately 154 mAHD, based on a base level of around 144 mAHD. Phase 3 cells are anticipated to be raised to approximately 156 mAHD, given the base level is approximately 146 mAHD. Lastly, Phase 4 cells are planned to rise to roughly 146 mAHD, relative to a base level of approximately 136 mAHD.

Concerning Phase 1, the base of the landfill varies from a depth of 10 meters at the front to 20 meters at the rear, relative to the ground level of 140 mAHD. Refer to **Attachment 3** for detailed topographical information of the site.

Due to the inert nature of landfill material, it is anticipated that the risk associated with the landfilling activity is very low. Moreover, management techniques and mitigation measures provided in the management plan will serve to further reduce the risk of contamination.



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State Environmental and
Remediation Services



I trust the above and attached provide clarification on the further information as requested by DWER, for any queries please do not hesitate to contact me

Kind regards,





SERS

Site Environmental and
Remediation Services



Attachment 1. Revised Infrastructure and Operation layout map



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FIGURE 9. Infrastructure & Operations Layout



CLIENT: Bradjovich Landfill & Recycling (Mueha)
Pty Ltd

PROJECT: Lot 9001 (88) Caladenia Close- Works
Approval

Tel: +61 (08) 9220 2000
<http://www.sers.net.au>

PROJECT No: 004-27 BASEMAP: Near Maps

LEGENDS:

Site Boundary

Sumps

Site Access route

Sorting Area

Administration Area

Existing Overburden Stockpile

Tipping Face

Landfill Cell 1

Bunds

Area 1

Area 2



SCALE: NTS

ISSUE: FINAL

DESIGN/DRAWN: BK

DATE: March 2024

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Attachment 2. Revised Dust Management Plan (Section 5.4)



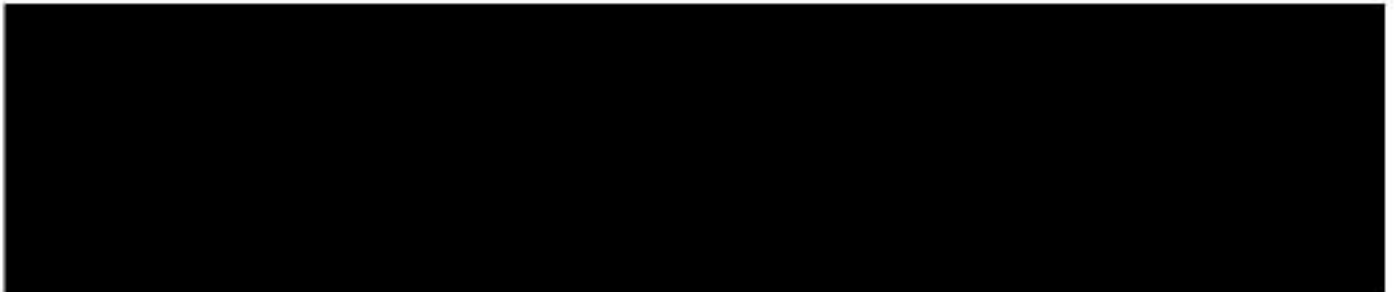


SERS
Site Environmental and
Remediation Services

Dust Management Plan

Lot 9001 (88) Caladenia Close, Lower Chittering

Western Australia 6084



Document Control Sheet

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Contents

1. Introduction	5
1.1 Definition.....	5
1.2 Purpose and scope	5
1.3 Objectives	6
1.4 Legislation	6
Table 1. Relevant Legislation and Guidelines	6
EPA Guidance Note 18 - Prevention of air quality impacts from land development sites (2000)	7
2. Impacts of dust on health.....	8
3. Site Background	9
3.1 Site History	9
3.2 Current site conditions.....	9
3.3 Nearby sensitive receptors.....	9
3.4 Surrounding land uses	9
3.5 Geology and particle size distribution	9
3.6 Contamination Status.....	10
4. Meteorological conditions.....	11
4.1 Morning.....	12
4.2 Afternoon	12
5. Dust-generating Activities	14
Table 3. Dust-generating activities and predicted levels of associated risk.....	14
5.1.1 Measures to enact should dust be observed crossing site boundaries:	16
5.2 Suppression of nuisance dust at the source	16
5.3 Proposed measures.....	16
5.3.1 Measures to enact should dust be observed crossing the site boundaries	18
Proposed standard measures:.....	18
5.3.2 Proposed further measures:	18
5.4 Water sources	19
5.4.1 Application points	19
5.5 Other sources of dust in the locality	19
6. Risk assessment	20
6.1 Ambient dust levels	20
6.2 Risk Assessment of Threatened Species found within 2km of the site	21
6.3 Potential impacts of airborne dust on human receptors	21
6.4 Possible effects – air quality.....	21
6.4.1 Odour	22
6.4.2 Monitoring	22

6.4.3 Monitoring Policy	22
PM10 measurements	22
Table 5. NEPM standards and goals.	23
6.4.4 Performance criteria and monitoring methods	23
Number and location of monitoring sites	23
Deposited dust	23
7. Feedback policy	24
7.1 Stakeholder consultation.....	24
7.2 Roles and responsibilities	24
8. Conclusion.....	25
Figures.....	26
Appendix A – Table of Sensitive Receptors within 2km.....	27
Appendix B – Contaminated Land Search.....	28
Appendix C – Historical Contours	29
Appendix D – Dust Management Site Inspection Checklist.....	30
Appendix E – Complaints Form.....	31

1. Introduction

Site Environmental and Remediation Services (SERS) have been engaged by Brajkovich Landfill & Recycling Pty Ltd to develop a Dust Management Plan for the proposed C&D landfill located at Lot 9001 (88) Caladenia Close, Lower Chittering WA 6084 (hereafter referred to as 'the site'). The site location and boundary are attached in **Figure 1**. The plan has been collated to identify dust causing activities, the health impacts and mitigation protocols. Dust-sensitive receptors are present surrounding the site, in the form of residential premises.

Landfill operations have the potential to generate dust in the following ways:

- Movements of heavy vehicles on haul roads
- Tipping C&D material
- Loading rubble
- Filling rubble

Movement of materials, disturbance of stockpile surfaces has the potential to contribute to dust emissions, potentially impacting human health, air pollution, and the amenity value of the site if not effectively managed. As such, management is proposed in line with the EP Act 1986 Section 49, the Regulations 1987 Schedule 1 Categories 13, 61A, 62, 63), along with Shire of Chittering and Bylaws.

1.1 Definition

Dust is any particle suspended within the atmosphere. Particles can range in size from as small as a few nanometres to 100 microns (μm) and can become airborne through the action of wind turbulence, by mechanical disturbance of fine materials, or through the release of particulate-rich gaseous emissions. Emissions from operating machinery not included as greenhouse gases can also be classed as dust particulates.

Dust is measured using a variety of methods, the most common being Total Suspended Particulates (TSP), which measure up to $50\mu\text{m}$ in size, and PM_{10} or $\text{PM}_{2.5}$ (particulate matter less than $10\mu\text{m}$ or $2.5\mu\text{m}$ in size, respectively) (DEC 2011).

1.2 Purpose and scope

The purpose of the plan is to provide the best management strategies for dust control within site boundaries to prevent dust control from being necessary outside site boundaries. This DMP also identifies key issues and areas of concern and proposes to implement appropriate control measures.

1.3 Objectives

The objectives of the DMP are to protect human health and minimise adverse impacts on environmental health and amenity by ensuring that dust arising from processing activities is curtailed, achieving benchmarks for dust deposition levels and concentrations of suspended particulate matter. Management strategies have been selected specifically to the site in question to address the above priorities. National Standards have been selected as performance criteria used to monitor performance.

Objectives for the management of air quality on-site are thus comprised of the following:

- Prevent landfill dust emissions and implement control measures
- Fire prevention, undertake no deliberate burning, gain control of bushfires
- Prevent dust emissions during site closure operation.

1.4 Legislation

The lessee of the site is to ensure that its employees and contractors comply with all relevant Commonwealth and State legislation that applies to the operation of the landfill facility. Legislation, Policy, and Guidelines relevant to the Dust Management Plan can be viewed in **Table 1**.

Table 1. Relevant Legislation and Guidelines

Environmental Protection Act 1986 - Parts II, III, IV, and V
Environmental Protection Regulations 1987
Environmental Protection (Unauthorised Discharge) Regulations 2004
Environmental Protection Authority Guidance Statements 3 - Assessment of Environmental Factors - Separation distances between industrial and sensitive land uses 2005 18 - Assessment of Environmental Factors - Prevention of air quality impacts from land development sites 2000 33 - Assessment of Environmental Factors - Environmental Guidance for Planning and Development 2005
Department of Environment and Conservation -A guideline for the development and implementation of a dust management program 2008
Department of Environment and Conservation - A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites, remediation, and other related activities 2011

National Environment Protection Council (Western Australia) Act 1996
National Environment Protection (Ambient Air Quality)
Measure 2003 Health Act 1911
Local Government Act 1995
Work Health and Safety Act 2020
Work Health and Safety Regulations 2022
Contaminated Sites Act 2003
Health (Asbestos) Regulations 1992
National Pollutant Inventory NEPM

EPA Guidance Note 3 - Separation Distances between Industrial and Sensitive Land Uses (2005)

Specifically addresses generic separation distances between industrial and sensitive land uses to avoid conflict between these land uses, taking into account protection of the environment under the EP Act 1986, in particular protecting sensitive land uses from impacts on amenity from industrial operations, emissions and infrastructure that are deemed unacceptable.

Separation Distances referred to in the State Industrial Buffer Policy 1997 are provided, along with the types of emissions associated with that particular industrial land use.

EPA Guidance Note 18 - Prevention of air quality impacts from land development sites (2000)

Specifically addresses the prevention of impacts on air quality from dust and smoke generated on land development sites.

2. Impacts of dust on health

Particles with an aerodynamic diameter of less than $50\mu\text{m}$ (usually referred to as TSP) are typically associated with adverse aesthetic effects rather than health effects. This is because they are trapped in the upper respiratory tract (just behind the nose and mouth) when inhaled. These larger particles are called inhalable particles and comprise visible dust following settling on surfaces, causing soiling and discolouration. They may, however, be associated with irritation of the mucosal membranes (eyes, nose, and throat) and if contaminated may pose an increased health risk through ingestion.

Human health effects of dust tend to be associated with particles with an aerodynamic diameter of $10\mu\text{m}$ or less ($<10\mu\text{m}$). These smaller particles tend to remain suspended in the air for long periods and can penetrate into the lungs.

The PM_{10} fraction (coarse fraction) is termed 'thoracic particles' of 'inhalable dust'. These particles are inhaled into the upper part of the airways and lungs. $\text{PM}_{2.5}$ particles are inhaled more deeply and lodge in the gas exchange region (alveolar region) of the human lung and are termed 'respirable dust'. Further, if contaminated, these fine particles may pose a further health risk through the absorption of the chemicals on the particles in the bloodstream. Sensitive groups such as people with lung or heart diseases, children, and older adults are the most likely to be affected by particle pollution exposure.

However, even healthy people may experience temporary symptoms from exposure to elevated levels of particle pollution.

3. Site Background

3.1 Site History

Previous clay resources were extracted from the site. This operation has been active since 1993 resulting in a vast amount of the site being cleared. This extraction operation began on the northern boundary of the site and has now progressed to the central area of the site. The adjacent site where the extraction began has now been repurposed into a landfill.

It is proposed that the materials accepted for landfill be construction and demolition (C&D) waste, sourced from the local and Perth metropolitan areas. This C&D waste will be materials from the C&D of buildings, pavement, roads, and other structures that are unable to be recycled. The materials will include concrete, brick, rubble, asphalt, metals, timber, wallboard, glass, plastics, soil, and other building materials. It is proposed these materials will be transported to site, visually inspected for non-conforming waste, and the conforming waste directly deposited into the landfill.

3.2 Current site conditions

Current site conditions consist of an active sand extraction pit surrounded by some remnant native vegetation and some re-growth and re-planted native vegetation. Receptors are located to the north, east and south of the property beyond bare land that backs on to the properties. The edges of the pit are currently approximately 15 meters deep, but the edges are protected by bunds and vegetation approximately 70% of the way around the edges.

3.3 Nearby sensitive receptors

The nearby sensitive receptors are rural residents (within the 2km buffer), however, the closest receptor is approximately 700m from the site. A table of sensitive all sensitive receptors are attached in **Appendix A**.

3.4 Surrounding land uses

The property is in a rural area in which some lots are put to residential use, some to extractive, and some to animal husbandry.

3.5 Geology and particle size distribution

Lotsearch, via the Atlas of Australian Soil, identified the soil across the whole site to be a Chromosol. Chromosols are described as follows "Broad valleys and undulating interfluvial areas with some discontinuous breakaways and occasional mesas; lateritic materials mantle the area: chief soils are sandy acidic yellow mottled soils, (Dy5.81) containing much ironstone gravel in the A horizons, and (Dy5.84), both forming a complex pattern with each other and with lateritic sandy gravels (KS-Uc2.12). Associated are leached sands (Uc2.21) underlain by lateritic gravels

and mottled clays that occur at a progressively greater depth down a slope."

It should be noted that disturbance of natural soils has not been the cause of any complaints about the site throughout the history of its operation. As such, it is more likely to be the composition of the materials brought on-site that will contribute to the generation of dust at the site.

3.6 Contamination Status

Current and historical land use has been grazing and sand extraction.

There are no available records of a leak or spill occurring at the site, and no indication from historical aerial photography, thus the site is assumed to not be contaminated.

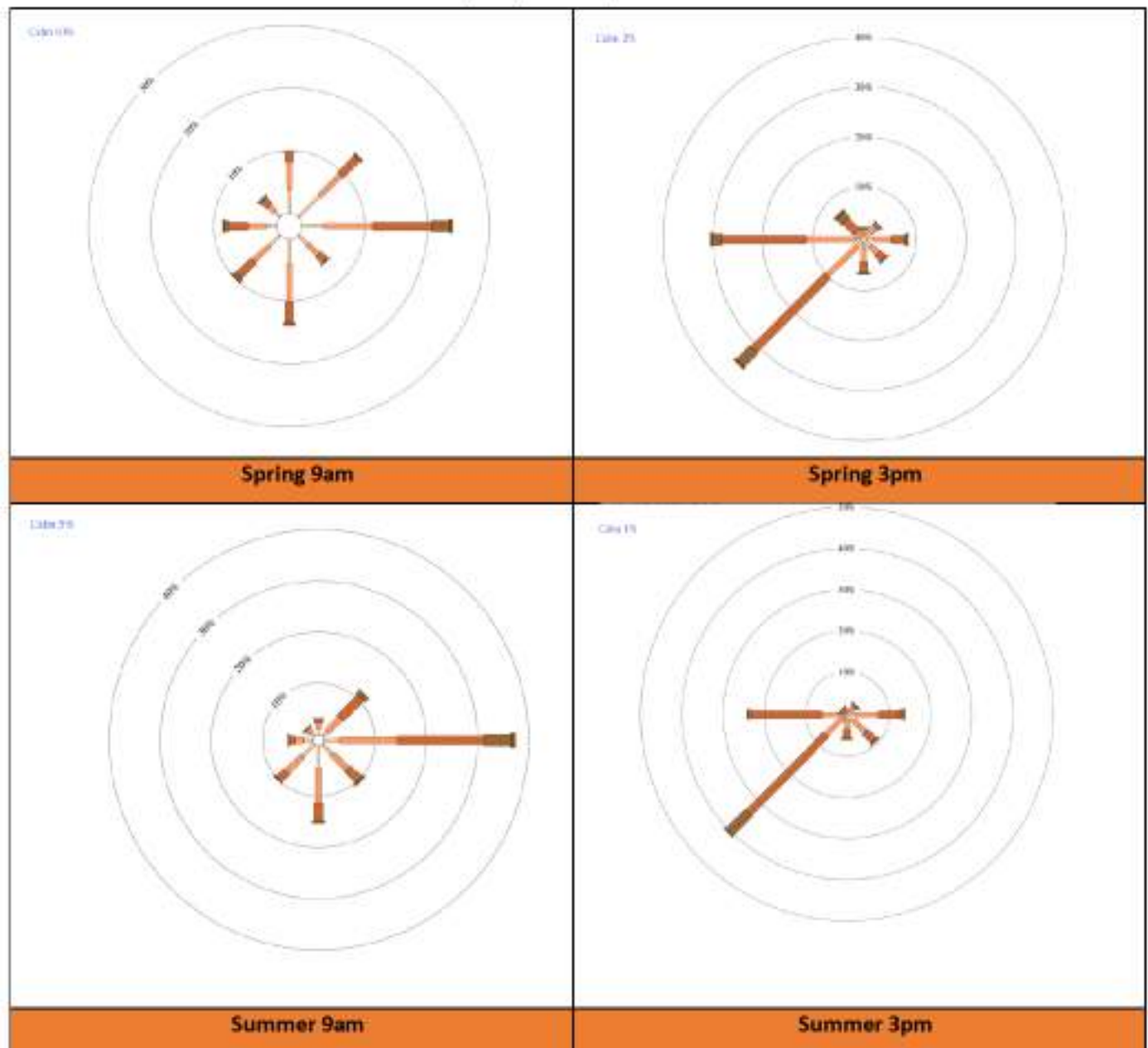
The site is not registered on the Contaminated Sites Database, indicating it does not have a classification of Contaminated - restricted use, or, remediated for restricted use, or, Contaminated - remediation required. A contaminated land search is attached in **Appendix B**.

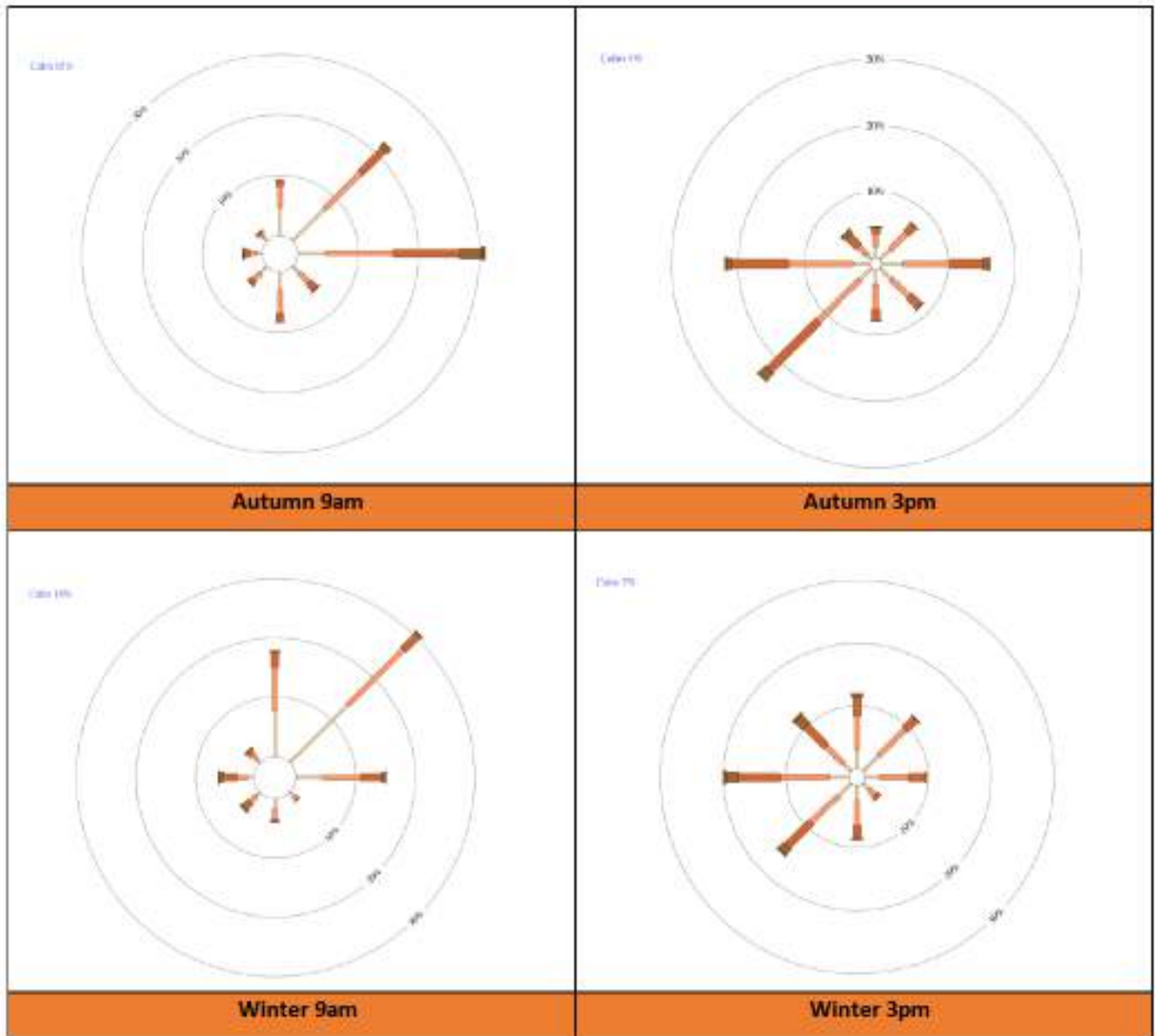
4. Meteorological conditions

The site experiences meteorological conditions like those recorded in Perth, with the same wind patterns. Wind roses showing prevailing conditions at both 9am and 3pm are displayed in Table 2.

The nearest high point is approximately one hundred and forty metres AHD to the northeast of the proposed landfill/ excavation area. Contours of the area surrounding the site are provided in Figure 2 with 1958 and 1977 contours provided in Appendix C. The surrounding area is not sufficiently built up that local wind conditions would not reflect regional wind conditions.

Table 2. Winter Roses – data recorded at Perth Airport (BOM 2022)





4.1 Morning

Prevailing winds in the morning are from an easterly to north-easterly direction.

Any dust generated by landfill operations will be intercepted by bunds, belts of remnant vegetation, and screens of established trees prior to reaching the highway, and by another belt of dense riparian vegetation along Ellen Brook prior to reaching the nearest residential human receptors to the west.

4.2 Afternoon

Prevailing winds in the afternoon are from a south-westerly to westerly direction. There are no obvious dust-generating activities located to the west of the site, thus it is unlikely that the site should receive airborne dust during the afternoons except for that generated by highway traffic.



Wind carrying any dust generated by the landfill would travel uphill, toward the clay extraction activities and pastoral areas of the site. Winds moving from the site to the nearest residential receptors to the east blow only approximately five percent of the time.

5. Dust-generating Activities

The activities listed below have the highest potential to generate dust.

Table 3. Dust-generating activities and predicted levels of associated risk.

Activity	Duration and frequency	Level of impact
Movements of heavy vehicles on haul roads	Likely to occur throughout all hours of operation	Medium
Tipping C&D material	Occurs only upon delivery to the material to the site	Medium
Filling rubble	Occurs throughout all hours of operation	Medium

5.1 Control Measures

Dust can arise at the site from a variety of sources. Fugitive dust arises from surface lift-off from exposed soil surfaces and exposed stockpiles and the movement of heavy vehicles and machinery around unpaved areas of the site causing dust to become airborne. Nuisance dust arises from the operation of the crusher, and the loading and off-loading of rubble. Dust management measures are primarily addressed at the landfill and crushing operations, and secondarily at sand extraction activities as there is no history of complaints received from sand extraction operations, however, there will be no crushing at this facility and these control measures are precautionary.

Dust mitigation measures shall comprise of:

- Frequent passes by the water cart on all roads in use by heavy vehicles and machinery
- Installation of a mobile reticulation system that caters to all areas inaccessible to the water cart i.e., stockpiles
- Speed limited to 10km/h
- Supervision of tipping, loading, and compaction
- Wetting down of waste loads during tipping
- Reducing tipping heights
- Compacting completed areas
- Ensuring vehicles are well maintained to control emissions
- An integrated response to complaints and installation of boundary monitors on the site perimeter if required
- Additional sprinkler use throughout dry and windy conditions

A range of control measures to mitigate dust generation on the site is detailed below.

1	<i>Reticulation check</i>
	The water system and sprinklers are checked daily in summer to ensure it remains fully functional to the inherent operating creation at of dust maximum through efficiency. An example Dust Management/Site Inspection checklist is provided in Appendix D.
2	<i>Employee induction</i>
	Employees are to be made familiar with all dust prevention measures to be implemented on-site. Dust prevention measures appropriate with to all dust forecasted prevention working measures conditions to be implemented on-site at the pre-start toolbox meeting each day.
3	<i>Dissemination of control measures</i>
	Introduced Management Measures to be presented to all employees at pre-start toolbox meetings each morning.
4	<i>Patrol of the site boundaries</i>
	<p>Employees shall maintain is a vigilant routine patrol along the site boundaries to detect possible errant dust. If any site activity is reported to the site supervisor who has the ultimate responsibility of immediate implementation of the management and remediation measures.</p> <p>On-site staff shall actively patrol site boundaries every hour throughout operating hours during periods of hot, dry, weather, and high wind forecasts (roles to be designated at pre-start toolbox meetings). It must be confirmed that all dust-suppression systems are functioning adequately to prevent dust from leaving site boundaries at pre-start toolbox meetings. Should any dust be observed leaving the site, the measures described below must be implemented.</p>
5	<i>Feedback</i>
	<p>Community notification - Notification of works shall be advertised as part of the Works Approval Application process. Notification of works and contact details of the Site Supervisor shall also be provided to neighbouring properties to allow for open communication of feedback.</p> <p>On-site information - Contact details for the Site Supervisor shall be provided at the entrance to the site to allow for open communication of feedback.</p> <p>Register - Information regarding feedback is to be recorded on a Feedback Form as soon as it is received. It should be forwarded to the Site Supervisor for review and action as soon as possible. The Site Supervisor shall respond to every complaint as it is received and enact appropriate remedial action. The complainant shall be duly informed of any remedial action taken and the Site Supervisor shall record the complaint in a Register of Complaints. The register shall be stored on-site always together with copies of the Licence for Prescribed Premises.</p>
6	<i>Storage of documentation</i>

	The Dust Management Plan Register of Complaints is to be stored with Licence for Prescribed Premises and always made available.
7	<i>Consideration of meteorological conditions</i>
	Portable hand-held wind speed and direction tracker employed. Employees are to be observant of conditions and implement dust-prevention measures accordingly. Where wind conditions are forecast above 35 knots (BoM - Perth airport) (disseminated at pre-start toolbox meeting) staff shall post-pone dust-generating activities according to wind speed and on advice from the site supervisor.

5.1.1 Measures to enact should dust be observed crossing site boundaries:

8	<i>Stop work</i>
	<p>Site activities are to cease immediately if dust is observed crossing site boundaries.</p> <p>Should unforeseen conditions arise that cause visible dust to be generated at levels that allow it to be observed approaching or crossing site boundaries, the activities responsible must be immediately identified, all site activities halted, and the Site Supervisor notified. All dust management systems are to be assessed for functionality. If a dust suppression system has failed, it shall be repaired prior to site activities commencing. Only once the cause of dust-suppression systems failure has been identified and rectified should site activities re-start.</p>

5.2 Suppression of nuisance dust at the source

Dust suppression primarily consists of dampening dust-generating material with water or the placement of a cover to stop dust from becoming airborne, whereby it can be transported from the site.

Water to be used for dust suppression within the site is sourced from the on-site sump and holding ponds. In the event of a water shortage for dust suppression, water can be immediately brought onto the site using a tanker truck and hydro-mulch such as Gluon 240 used for broadacre, and stockpile stabilisation will be used for an interim period. An alternative temporary supply to the bore (bores located on nearby properties used to fill water cart) will be established in instances in which the on-site water supply proves insufficient. All site staff will be trained in this contingency plan.

5.3 Proposed measures

Dust is suppressed as much as possible using water at various stages throughout the landfilling process. Visible dust originating on-site must not cross the site boundaries. The creation of visible dust is to be addressed at the source of the dust-generating activity (movement of heavy machinery, crusher, stockpiles) rather than at the site boundaries.

9	Access-ways
	<p>On-site haul roads and access ways are regularly dampened by the watering cart as required when visual checks have identified dust to be rising as a result of vehicle movements. A 10km/h speed limit is implemented on-site, regulated by all Site staff, and enforced by the Site Supervisor.</p>
10	Stockpiles
	<p>Sprinklers continue out of hours to effectively wet down all stockpiles. Stockpiles shall be used to store material prior to its ultimate end use for landfill, cover material, and off-site use. Dust emissions from stockpiles shall also be suppressed by water from a water cart and the mobile sprinkler system, place strategically to cover the entire surface area of the stockpile.</p> <p>Uncovered working stockpiles are to be wet down daily.</p> <p>Static unworked stockpiles are to be covered using hessian, plastic, shade cloth, or hydro-mulch. Hydro-mulch covers shall be maintained as necessary to prevent windblown dust from the stockpiles and from the screen. Hydro-mulching the screen will also improve the aesthetics of the site as well as act as a barrier to escaping dust. Hydro-mulched areas will be regularly monitored with appropriate maintenance as required.</p>
11	Access ways
	<p>Use of designated wet-down haul roads throughout the site.</p> <p>Enforcement of a 10km/h speed limit throughout the site is displayed on a sign at the site entrance. All visitors to the site will be strictly required to comply with the speed limit.</p> <p>Additional watering of roads (at a minimum frequency of three times a day) during dry or windy conditions. Frequency is to be determined according to the weather report at each pre-start toolbox meeting. The Site Supervisor is to dictate further watering requirements should the need arise throughout the day.</p>
12	Off-loading
	<p>Off-loading of C&D waste material at the site will be always supervised by appropriately trained site personnel. Water hoses will be readily available on all tipping loads to negate high-</p>
	<p>risk dust creation. Designated staff will water down the material while being offloaded to suppress dust formation</p>
13	Vehicle exhaust
	<p>All on-site vehicles will not have downward-facing exhausts as these may act to raise dust in dry conditions. All vehicles and equipment will be maintained regularly to ensure minimum emissions.</p>

5.3.1 Measures to enact should must be observed crossing the site boundaries

14	Monitoring
	Real-time monitoring of PM10 is to be implemented if ever dust is observed crossing site boundaries despite all preventative measures in place. Notification of exceedance is to occur via an email alert and text messages to on-site staff should the level exceed 450 µg/m over any 15-minute period.
15	Copolymer
	Application of a biodegradable, liquid copolymer on designated haul roads. Wetting agents and polymer binders can be added to the water for haul road dust suppression to improve the performance of the water in thoroughly wetting the surface and also binding the surface materials together to reduce the likelihood of particles becoming airborne. The addition of these wetting agents and binders decreases both the application frequency and water required. This watering cart also acts as a pumper truck and has a fire hose application fitted which will be utilised for additional dust control.

Prevention of fugitive dust from leaving site boundaries

Where dust has become airborne, it can travel beyond site boundaries where it has the potential to affect receptors sensitive to the accumulation of dust.

Proposed standard measures:

A water cart will be utilised around the site to suppress dust lift-off from site haul roads, a sprinkler system is being utilised for suppression of dust from stockpiles.

5.3.2 Proposed further measures:

16	Windbreaks
	Stockpiles of rubble are positioned as a screen around the crusher, decided according to the direction of prevailing winds and the direction in which any surrounding sensitive receptors are located.
17	On-site positioning of dust-generating equipment
	The greatest potential for dust to leave the site is during the periods of the strongest winds from the north to northeast during the morning. Dust lift-off caused by south to south-west winds during the afternoon will be trapped within the pit by the eastern pit wall. Equipment shall be relocated at wind speeds above 25 knots to provide the largest possible on-site area for any dust generated to settle out prior to reaching site boundaries. Recycling activities shall cease at wind speeds above 35 knots.

Table 4. Dust management measures and consequential reduction in risk level with the implementation

Activity	Duration and frequency	Level of impact without management	Management method	Level of risk with management
Movements of heavy vehicles on haul roads	likely to occur throughout all hours of operation	Medium	Dampening of haul roads using water truck	Low
Tipping uncrushed C&D material	Occurs only upon delivery of material to the site	Medium	Dampening of material using a sprinkler system and targeted reticulation	Low

5.4 Water sources

Sources of water for dust suppression shall be comprised of the storm water retention ponds and the water tank supplied by the external water supplier. Should there be any risk of storm water having become contaminated from on-site spills or leaks, water for dust suppression shall not be sourced from the storm water retention ponds but tankered in from off-site.

5.4.1 Application points

Spray points shall correspond with the location of operations areas and shall ensure coverage over areas inaccessible to the water cart. Sprinklers shall rotate and will be positioned from above to gain the greatest spray coverage and address any rising dust.

5.5 Other sources of dust in the locality

Adjacent to the proposed landfill site is the Muchea Landfill and Recycling Centre, owned by the Shire of Chittering. The operation has the potential to generate dust and the excavation licence has a condition that dust management practices be employed.

6. Risk assessment

6.1 Ambient dust levels

In metropolitan areas, particulate matter is present in the air because of, for example, vehicle exhausts, disturbed surface particles from traffic, construction, and demolition work, grinding and welding works, industrial stack emissions from heavy industry, bush fire smoke, and smoke from domestic fireplaces, among others.

Ambient dust levels can also be measured as Particulate Matter (PM₁₀) - particle sizes of 10µm and below, and Particulate Matter (PM_{2.5}) - particle sizes of 2.5µm and below. These parameters have a more direct correlation between exposure to levels and observed resulting health effects.

Being located adjacent to a major arterial road, levels of airborne particulate matter are expected to be comparatively high.

Ambient air monitoring within the Perth Metropolitan Air Quality Data Map is carried out at two locations which may be considered representative of conditions at the site:

- Caversham
- Rolling Green

Ambient air quality data can also be compared against the ongoing Midland Background Air Quality Study (DEC) and Air Quality in Perth: 1992 -1999 (DEP, 2001). Air quality data collected at Rolling Green was not readily available. TSP values were collected at Caversham between 1993 and 1995. Caversham had the lowest annual mean of the four sites tested (1994 -49.5, 1995 -38.7), however, still exceeded the nearest appropriate criteria (Kwinana EPP Area C standard -90µg/m³) three times.

PM₁₀ values were collected at Caversham between 1993 and 1999. Unlike all other stations at which levels did not vary over this period, levels at Caversham notably declined over the same period {1994 - 24.25, 1995 -19.83, 1996 - 20.75, 1997 -18.89, 1998 -17.12, 1999 -15.88}. Nevertheless, between 1994 and 1999, the maximum 24-hour PM₁₀ levels exceed the Ambient Air Quality NEPM {2003} standard three times (50µg/m³), but not the NEPM limit of 5 days/year.

PM_{2.5} values were monitored between 1994 and 1999. As with PM₁₀, there was a consistent decreasing trend over the above period (1994 -14.81, 1995 -11.51, 1996 -11.99, 1997 -12.03, 1998 - 10.96, 1999 -9.68). No values were recorded above the most appropriate criteria (US EPA standard - 65µg/m³), nor above the draft proposed standard (25µg/m³).

Due to the age of this data and the rapidity with which land use change can affect ambient air quality, as well as increases in population and industrial activity since this time, these values should be taken as indicative only.

6.2 Risk Assessment of Threatened Species found within 2km of the site

It is considered that dust-generating activities on-site cannot be said to contribute to the factors outlined below, and as such, the presence of the species in the area should not prevent site activities from occurring.

Threats to the species identified comprise of:

- Habitat fragmentation and loss
- Removal of nest hollows
- Competition with other species for hollows
- Loss of native food sources
- Invasive species
- Injury or death from the European Honeybee (*Apis mellifera*)
- Poaching and illegal shooting
- Fire

Flora species are threatened by clearing. Whilst clearing has been carried out on-site, the vegetation consists of boundary trees and a patch of vegetation to the west and was highly unlikely to have provided suitable growing conditions for the threatened species.

6.3 Potential impacts of airborne dust on human receptors

Potential impacts on human health have been outlined earlier in this section.

As shown in **Figure 2**, no residences fall within the 150m buffer. It is anticipated that existing buffers in the form of screens of trees or earth bunds as well as dust and asbestos management techniques proposed will sufficiently diminish airborne dust levels such that dust will not leave Lot 9001.

Residents within 1000m of Lot 9001 live in a reasonably dust-prone area. Other localised dust sources include:

- Utility vehicle movement on dusty paddocks in dry weather
- Muchea Council landfill adjacent to the site

The proponent is unaware of any complaints registered in relation to dust emissions from these two sources. Dust levels generated at the site are not estimated to exceed those from the above sources, thus no impact on the surrounding community is anticipated from the proposed on-going sand extraction and landfilling works.

6.4 Possible effects – air quality

The generation of landfill gas shall be prevented by the active sorting and exclusion of biodegradable material that

may be subject to microbial activity under anaerobic conditions such as organic matter of animal or vegetable origin, timber, and other green waste or household waste.

There shall be no burning on site, to prevent the generation of smoke. Vehicle movement shall be restricted to roads accessible by the water cart.

6.4.1 Odour

Due to the inert nature of the proposed landfill materials and unprocessed materials being accepted on-site, there is no perceived reason for offensive odours to occur in quantities at which they might affect either on-site staff within the landfill or off-site receptors either on Lot 9001 or at surrounding properties.

6.4.2 Monitoring

The proposed dust suppression measure is outlined earlier in the document. With the extensive implementation of these measures, there is not expected to be any visual dust leaving the Lot 9001 boundary. Baseline values for PM₁₀ shall be established prior to site works commencing as a point of comparison.

Further monitoring of dust deposition is not proposed unless complaints are received from neighbouring premises at which point it will be considered. Monitoring shall be carried out at strategic points along the site perimeter.

6.4.3 Monitoring Policy

Should a monitoring program be required, it will be conducted in accordance with the methods below:

AS 2922 Ambient Air – Guide for the Siting of Sampling

AS/NZS 3580.1.1:2007 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment.

The most suitable criteria to apply to results are listed below.

PM₁₀ measurements

NEPM (2003) levels for PM₁₀ do not represent levels of nuisance dust but would be used to assess the presence of a potential correlation between dust levels and observed health impacts. Criteria are shown in **Table 5** and will be subject to review following the issue of future editions of the NEPM. PM₁₀ can both be measured using a DustTrak utilising the methods described below.

AS/NZS 3580.9.6:2003 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM10 high volume sampler with size-selective inlet - Gravimetric method

AS 3580.9. 7-1990 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter

– *PM₁₀ dichotomous sampler - Gravimetric method*

AS 3580.9.8-2001 Method for sampling and analysis of ambient air - Determination of suspended particulate matter - PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser

Table 5. NEPM standards and goals

Pollutant	Averaging period	Maximum concentration	Goal within 10 years Maximum allowable exceedances
PM ₁₀	1day	50µ/m ³ over 24 hours	5 days a year

6.4.4 Performance criteria and monitoring methods

Levels of TSP and PM₁₀ will be measured, identifying levels of nuisance dust and the proportion of dust composed of particle size with the greatest impact on human health.

Number and location of monitoring sites

A monitoring site will be selected depending on where dust is observed leaving the site. Monitors can be relocated on site boundaries as necessary. Should dust complaints be received from nearby sensitive receptors, monitors will be placed to measure levels at the receiving point.

Quality assurance/ quality control requirements

Quality assurance of dust monitoring results follows from the annual calibration of PM₁₀ monitors.

Duplicates taken as quality control measures in dust monitoring rarely produce reliable results due to the irregularity of dust clouds.

Deposited dust

Dust deposition measurements may also be applicable if dust is observed off-site at nuisance levels. It can be measured using the method below:

AS/NZS 3580.10.1:2003 Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method.

7. Feedback policy

Any off-site complaints known to the proponent will be taken and addressed immediately. It is the aim of the proponent is to handle all these complaints without delay. Should any complaints be received, the Site Supervisor will act as the liaison between the complainant and the proponent. Contact will be made with the complainant and investigations will occur into the nature and cause of the complaint and a corrective action solution devised to mitigate a future similar occurrence. A Complaints Register will be compiled by the Site Supervisor incorporating all future known complaints from this site, a complaints form is attached as **Appendix E**.

7.1 Stakeholder consultation

Neighbouring residents will be notified prior to the commencement of activities. In addition, contact details for the Site Supervisor will be provided to them and can also be found on signage erected at the entrance to the site.

7.2 Roles and responsibilities

All on-site haul roads and access ways will be maintained by the proponent. Dust management measures will be employed by all site employees during all hours of work. It is the duty of every staff member to prevent and/or reduce dust generation from on-site practices.

8. Conclusion

Whilst proposed activities have the potential to generate dust, this potential can be minimised using the management measures outlined. Every effort will be made to ensure that proposed works enhance rather than detract from the value of the surrounding area.


Figures

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LEGENDS

-  88 Caladenia Close, Lower Chittering
-  Proposed Landfill Area
-  Site Boundary- Caladenia Close



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TITLE Figure 1. General Site Location

PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering WA 6084-
Landfill Application

PROJECT CODE
004-27

DESIGN/DRAW
BK

CHECKED BY
MC

VERSION
01

DATE
13/06/2023

PREPARED BY


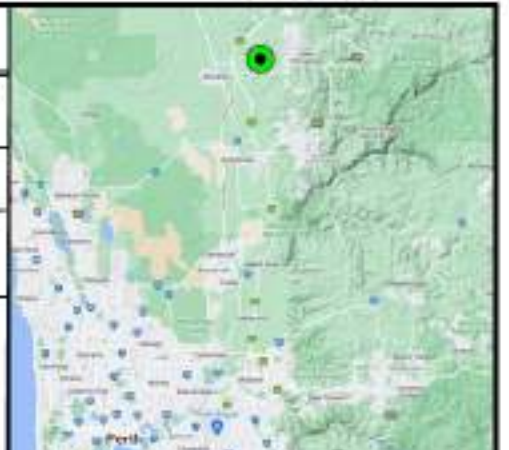


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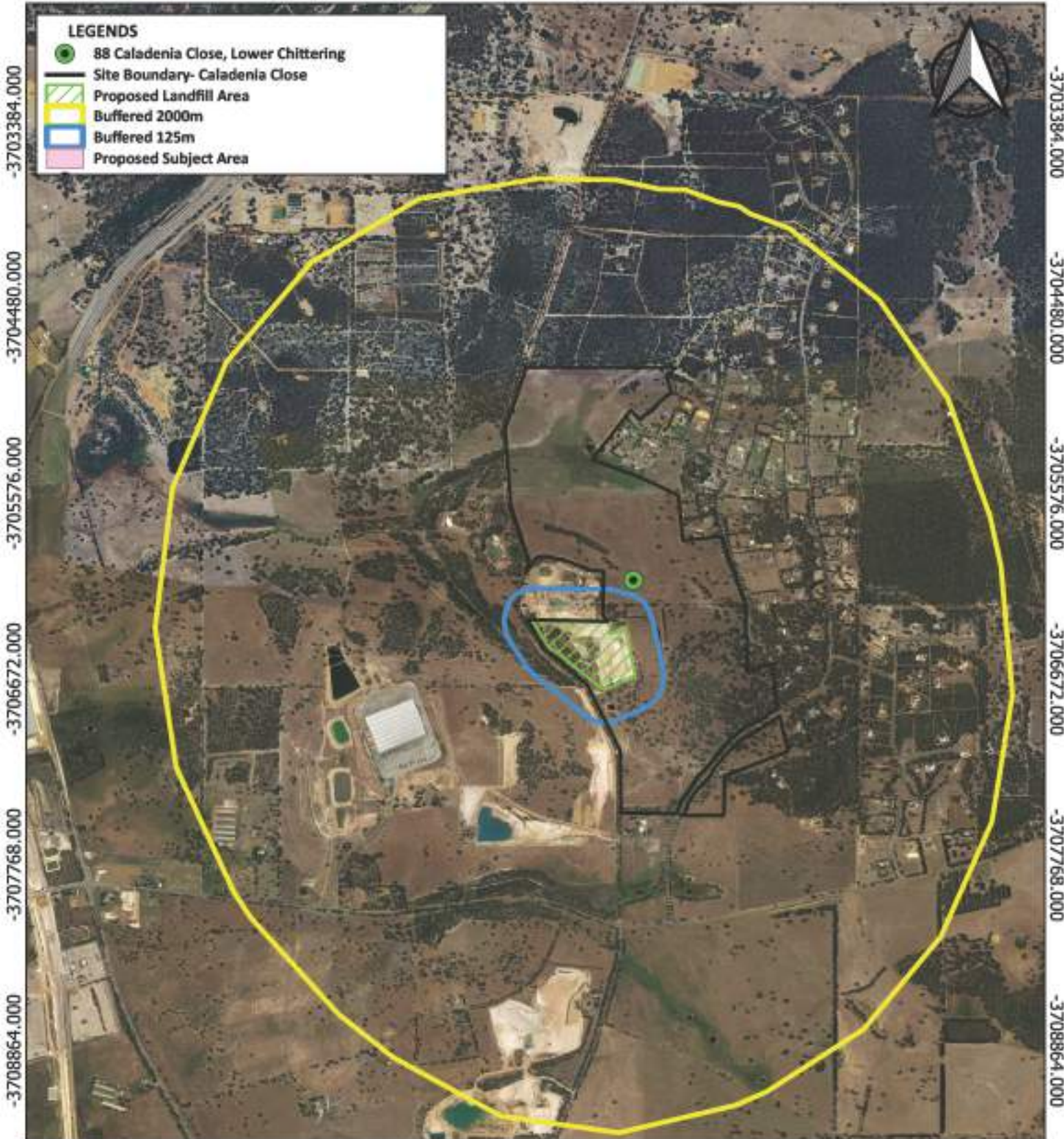
PREPARED FOR
Brajkovich Landfill and Recycling Pty
Ltd

Scale


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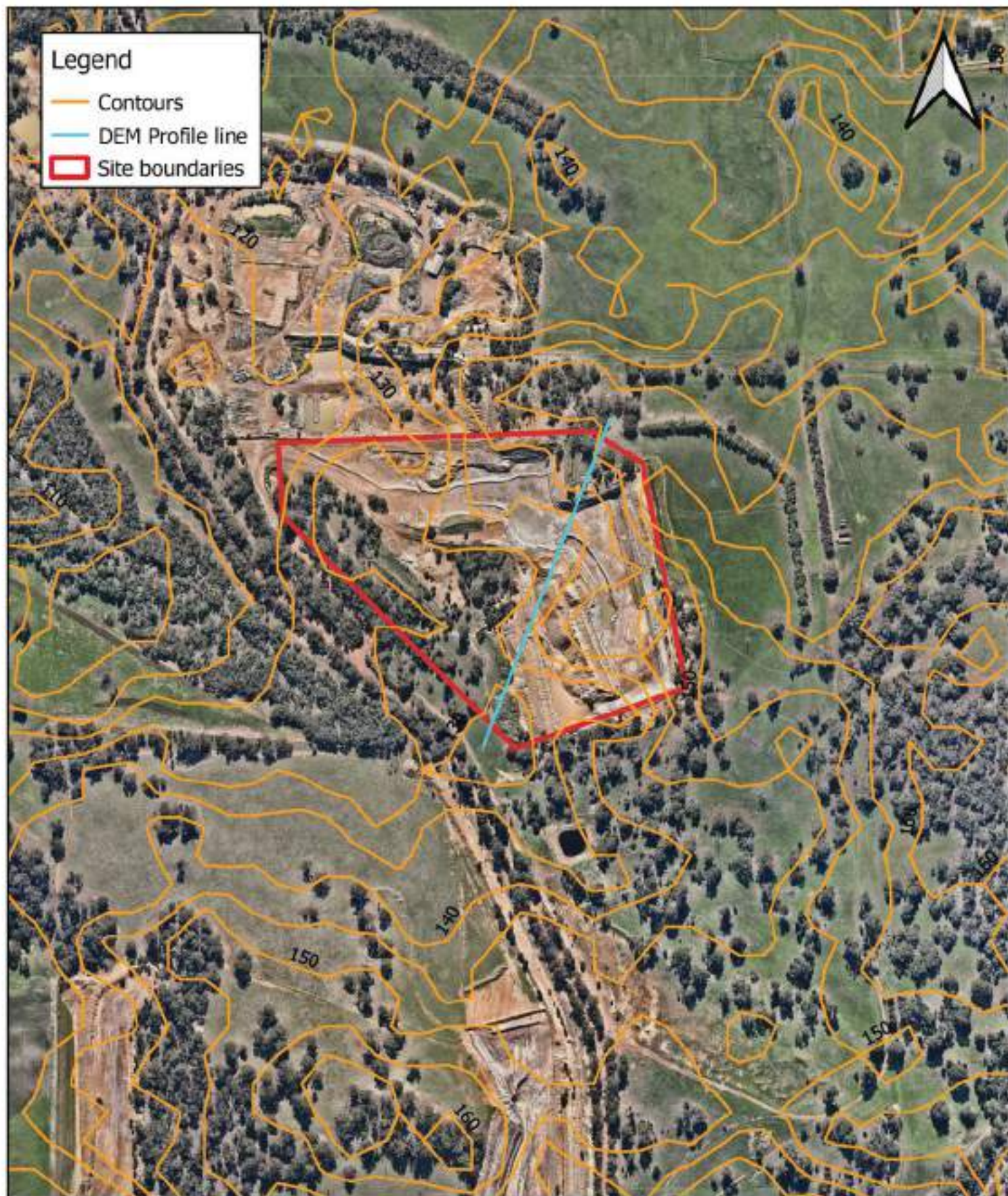
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12912775.000 12913777.000 12914779.000 12915781.000 12916783.000 12917785.000

TITLE		Figure 2. Buffers around proposed landfill area (125m and 2000m)			
PROJECT		Lot 9001 (88) Caladenia Close, Lower Chittering WA 6084- Landfill Application		PROJECT CODE 004-27	
DESIGN/DRAW	BK	CHECKED BY	MC	VERSION	01
		DATE	20/11/2023		
PREPARED BY		Source NearMaps			
		Scale			
		0 5 10 km			
PREPARED FOR		Brajkovich Landfill and Recycling Pty Ltd			





TITLE Figure 5. Topographical Contours and Profile Line			
PROJECT 88 Caladenia Close, Lower Chittering		PROJECT CODE 004-27	
CLIENT Brajkovich Landfill and Recycling (Muccha) Pty Ltd	VERSION 00	DATE 22/11/23	SCALED 100 200 m 
DESIGN/DRAW BK	APPROVED BY: MC	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	



Appendix A – Table of Sensitive Receptors within 2km

All identified human receptors within a 2km receptor

Type of Receptor	Address	Distance	Type of Receptor	Address	Distance
Agricultural	Muchea Livestock Centre Muchea Road East	500m	Residential	331 Powderbark Road, Lower Chittering	1810m
Residential	93 Patens Drive, Lower Chittering	1100m	Residential	323 Powderbark Road, Lower Chittering	1700m
Residential	86 Patens Drive, Lower Chittering	1023m	Residential	305 Powderbark Road, Lower Chittering	1650m
Residential	81 Patens Drive, Lower Chittering	1004m	Residential	303 Powderbark Road, Lower Chittering	1550m
Residential	78 Patens Drive, Lower Chittering	1220m	Residential	281 Powderbark Road, Lower Chittering	1440m
Residential	48 Patens Drive, Lower Chittering	1250m	Residential	328 Powderbark Road, Lower Chittering	1840m
Residential	30 Caladenia Close, Lower Chittering	879m	Residential	310 Powderbark Road, Lower Chittering	1790m
Residential	21 Caladenia Close, Lower Chittering	944m	Residential	290 Powderbark Road, Lower Chittering	1710m
Residential	23 Caladenia Close, Lower Chittering	896m	Residential	280 Powderbark Road, Lower Chittering	1650m
Residential	39 Caladenia Close, Lower Chittering	859m	Residential	260 Powderbark Road, Lower Chittering	1500m
Residential	45 Caladenia Close, Lower Chittering	878m	Residential	258 Powderbark Road, Lower Chittering	1360m
Residential	69 Caladenia Close, Lower Chittering	725m	Residential	246 Powderbark Road, Lower Chittering	1420m
Residential	87 Caladenia Close, Lower Chittering	772m	Residential	232 Powderbark Road, Lower Chittering	1320m
Residential	26 Sollya Retreat, Lower Chittering	1250m	Residential	216 Powderbark Road, Lower Chittering	1290m
Residential	29 Sollya Retreat, Lower Chittering	1280m	Residential	210 Powderbark Road, Lower Chittering	1180m
Residential	33 Sollya Retreat, Lower Chittering	1420m	Residential	194 Powderbark Road, Lower Chittering	1180m
Residential	34 Sollya Retreat, Lower Chittering	1440m	Residential	141 Powderbark Road, Lower Chittering	877m
Residential	38 Sollya Retreat, Lower Chittering	1480m	Residential	143 Powderbark Road, Lower Chittering	918m
Residential	43 Sollya Retreat, Lower Chittering	1570m	Residential	169 Powderbark Road, Lower Chittering	903m
Residential	44 Sollya Retreat, Lower Chittering	1550m	Residential	185 Powderbark Road, Lower Chittering	973m

Residential	46 Soliya Retreat, Lower Chittering	1760m	Residential	205 Powderbark Road, Lower Chittering	972m
Residential	9 Chardonnay Drive, Lower Chittering	1670m	Residential	211 Powderbark Road, Lower Chittering	994m
Residential	17 Chardonnay Drive, Lower Chittering	1570m	Residential	217 Powderbark Road, Lower Chittering	1030m
Residential	23 Chardonnay Drive, Lower Chittering	1550m	Residential	231 Powderbark Road, Lower Chittering	1050m
Residential	33 Chardonnay Drive, Lower Chittering	1510m	Residential	136 Powderbark Road, Lower Chittering	972m
Residential	81 Chardonnay Drive, Lower Chittering	1300m	Residential	140 Powderbark Road, Lower Chittering	1020m
Residential	100 Chardonnay Drive, Lower Chittering	1500m	Residential	136 Powderbark Road, Lower Chittering	969m
Residential	110 Chardonnay Drive, Lower Chittering	1540m	Residential	141 Powderbark Road, Lower Chittering	858m
Residential	130 Chardonnay Drive, Lower Chittering	1470m	Residential	143 Powderbark Road, Lower Chittering	1010m
Residential	152 Chardonnay Drive, Lower Chittering	1650m	Residential	157 Chardonnay Drive, Lower Chittering	1780m
Residential	125 Chardonnay Drive, Lower Chittering	1400m	Residential	143 Chardonnay Drive, Lower Chittering	1640m
Residential	150 Chardonnay Drive, Lower Chittering	1660m	Residential	131 Chardonnay Drive, Lower Chittering	1520m
Residential	119 Chardonnay Drive, Lower Chittering	1360m	Residential	125 Chardonnay Drive, Lower Chittering	1410m
Residential	83 Chardonnay Drive, Lower Chittering	1400m	Residential	136 Powderbark Road, Lower Chittering	969m
Residential	16 Hakea Pass, Lower Chittering	1260m	Residential	141 Powderbark Road, Lower Chittering	858m
Residential	17 Hakea Pass, Lower Chittering	1300m	Residential	143 Powderbark Road, Lower Chittering	1010m
Residential	10 Hakea Pass, Lower Chittering	1140m	Residential	9 Verdelho Place, Lower Chittering	1630m
Residential	7 Hakea Pass, Lower Chittering	1160m	Residential	25 Verdelho Place, Lower Chittering	1750m
Residential	7 Malbec Close, Lower Chittering	1470m	Residential	6 Verdelho Place, Lower Chittering	1710m
Residential	8 Malbec Close, Lower Chittering	1520m	Residential	18 Verdelho Place, Lower Chittering	1790m
Residential	12 Malbec Close, Lower Chittering	1630m	Residential	398 Wandena Road, Lower Chittering	862m
Residential	21 Malbec Close, Lower Chittering	1630m	Commercial	16 Patens Drive, Lower Chittering	1200m
Residential	25 Malbec Close, Lower Chittering	1730m			



Appendix B – Contaminated Land Search



Dear Sir/Madam

BASIC SUMMARY OF RECORDS REQUEST

Thank you for your Basic Summary of Records request for the site consisting of the following parcel(s) of land:

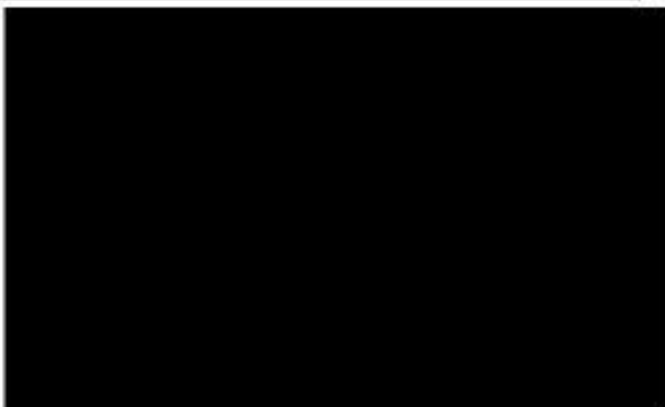
- LOT 9001 ON DEPOSITED PLAN 71254 as shown on certificate of title known as 88 Caladenia Ct, Lower Chittering WA 6084

which Department of Water and Environmental Regulation (the department) received on 16/09/2022.

A search of the department's records of known and suspected contaminated sites was undertaken however, our records indicate that as of 19/10/2022 this site has not been reported to the department as a known or suspected contaminated site either prior to or after the commencement of the *Contaminated Sites Act 2003*.

For general enquiries, please contact the Registrar on 1300 762 982.

Yours sincerely

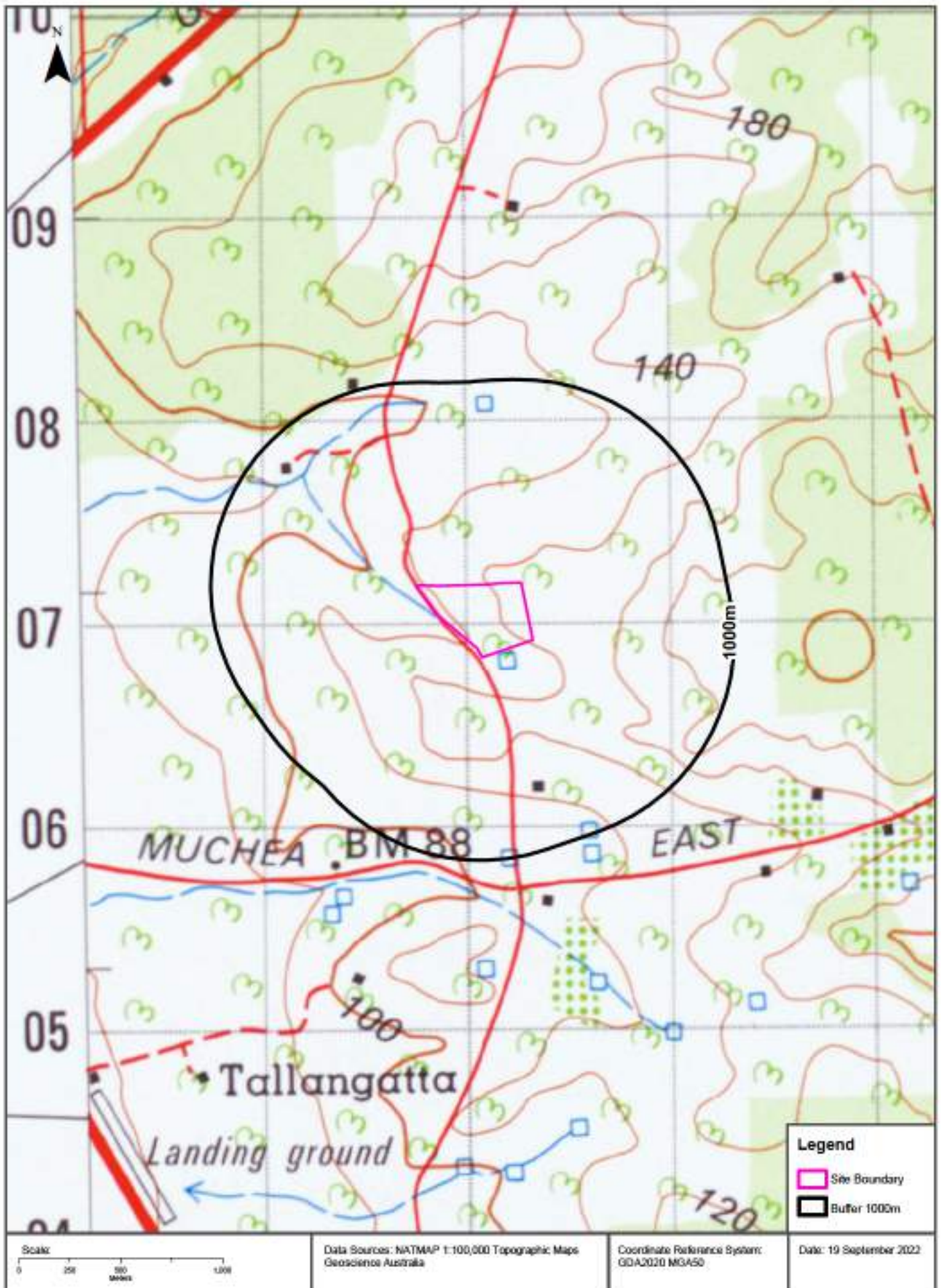




Appendix C – Historical Contours

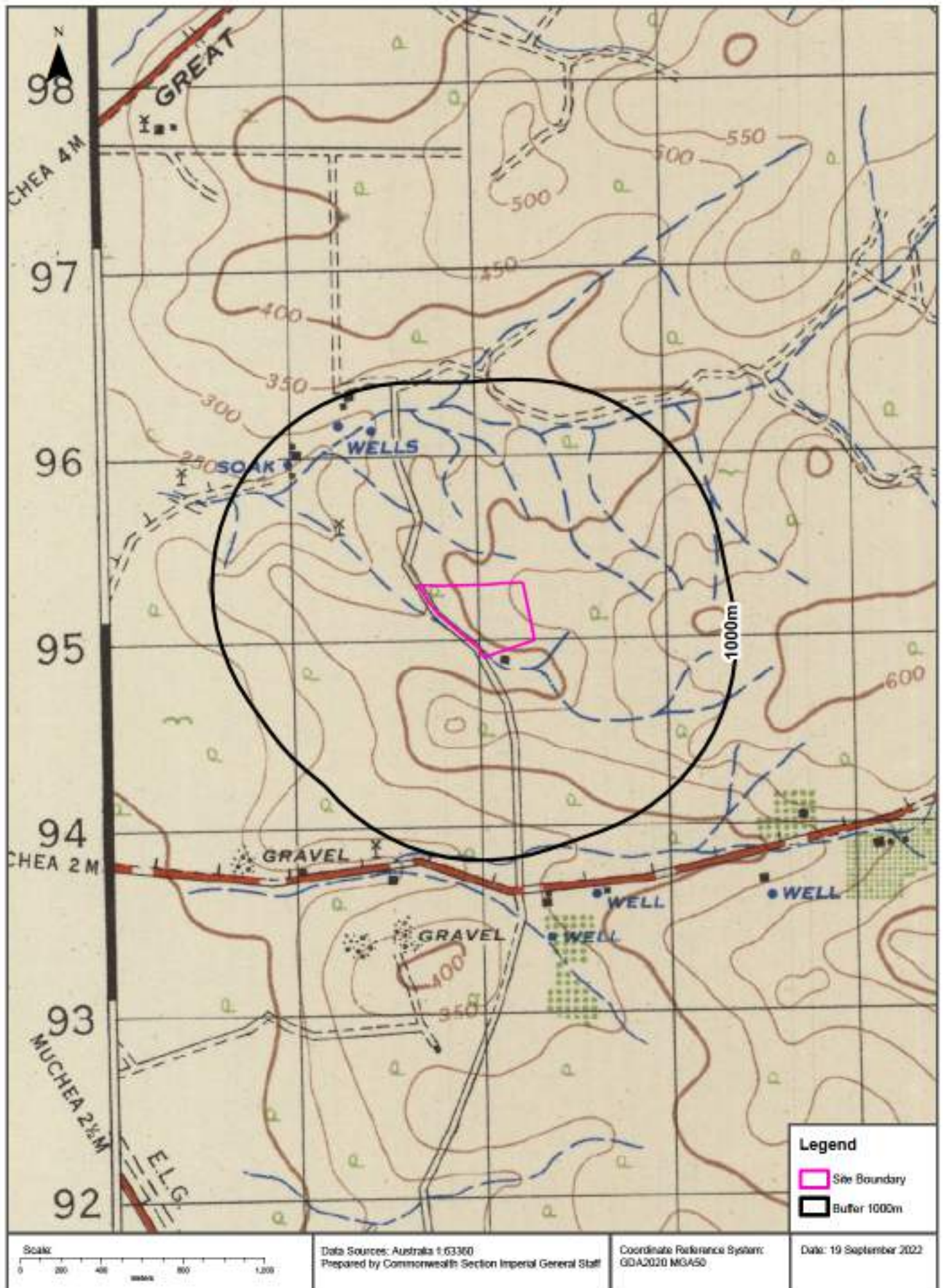
Historical Map 1977

88 Caladenia Close, Lower Chittering, WA 6084



Historical Map c.1958

88 Caladenia Close, Lower Chittering, WA 6084





Appendix D – Dust Management Site Inspection Checklist

Dust Management Inspection Checklist						
Date:						
Item to Check	Yes	No	NA		Person to repair	Repaired
Water running						
Access tracks watered						
Hoses not leaking						
Sprinklers working						
Other:						
Inspected by:						
Signed:						
Repairs completed by						
Signed:						



Appendix E – Complaints Form

End of Document

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SERS
Site Environmental and
Remediation Services



Attachment 3. Site topographical contour and Phases of landfill



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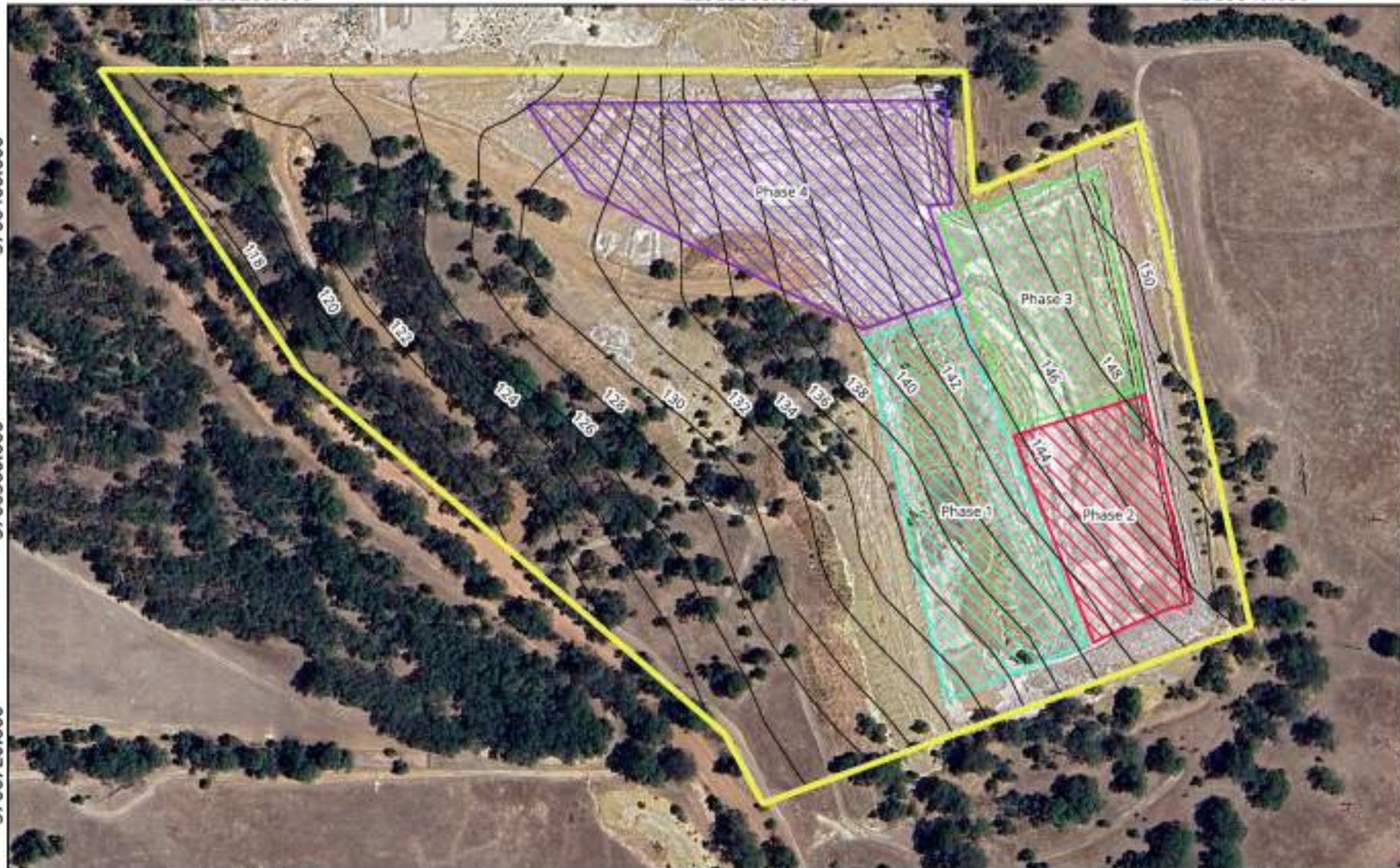


FIGURE 5. Topographical Contour (DPIRD-072)



SERS
Soil Remediation and
Environmental Services Pty Ltd

Tel: +61 (08) 9220 2000
<http://www.sers.net.au>

CLIENT: Bragkovich Landfill & Recycling (Mueha) Pty Ltd

PROJECT: Lot 9001 (88) Caladenia Close- Works Approval

PROJECT No: 004-27 BASEMAP: Near Maps

LEGENDS:

-  Site Boundary
-  Phase 1
-  Phase 3
-  Phase 4
-  Terrain 2m_Clippped
-  Phase 2

SCALE: NTS ISSUE: FINAL DESIGN/DRAWN: BK DATE: March 2024



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