



ROWE
GROUP

DEVELOPMENT APPLICATION: FILL AND REHABILITATION OF CLAY QUARRY

LOT 9001 (NO. 88) CALADENIA CLOSE
LOWER CHITTERING

DOCUMENT CONTROL

Printed 1 March 2023

9670_20230207_R_Chittering_DA_cr

VERSION	FILE NAME	PREPARED BY	APPROVED BY	DATE
1	9670_20230207_R_Chittering_DA_cr	C. Richards	G. Rowe	01/03/2023

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ATTACHMENTS

1. CERTIFICATE OF TITLE AND DEPOSITED PLAN
2. DEVELOPMENT PROPOSAL PLANS
3. ENVIRONMENTAL MANAGEMENT PLAN



1. INTRODUCTION

Rowe Group acts on behalf of Demo Investment 3 Pty Ltd, being the owner of Lot 9001 (No. 88) Caladenia Road, Lowering Chittering (the 'subject site'). This report has been prepared in support of a Development Application for the fill and rehabilitation of an existing (disused) clay quarry located on portion of the subject site.

The report addresses the following matters:

- ▲ Site location and cadastral information;
- ▲ Existing land uses and surrounding development;
- ▲ Description of the proposed development;
- ▲ Overview of relevant town planning and environmental considerations; and
- ▲ Justification for the proposed development.

The application is supported by technical environmental input by Site Environmental and Remediation Services Pty Ltd.



2. DESCRIPTION OF SITE

2.1 LOCATION

The subject site is located within the Shire of Chittering approximately 45km north-east of the Perth Central Business Area.

Refer Figure 1 – Regional Location

It sits within the locality of Lower Chittering and is positioned approximately 11km north of the Bullsbrook District Centre and 5.3km north-east of the Muchea Townsite. The site maintains frontage to Wandena Road in the west and Caladenia Close, Powderbark Road and Patens Drive in the east.

Refer Figure 2 – Local Location

2.2 CADASTRAL INFORMATION

The subject site comprises a single land parcel which is legally described as follows:

- ▲ Lot 9001 on Deposited Plan 71254, held within Certificate of Title Volume 2789 Folio 776.

The following encumbrances are registered on the Certificate of Title:

Document No.	Description	Details
F824729	Easement (Burden) to Shire of Chittering for Access Purposes	Grants rights of access over portions of Lot 9001 along its eastern boundary
G237598	Easement (Burden) to Shire of Chittering for Access Purposes	Grants a right of access over portion of Lot 9001 along its north-eastern boundary
O699101	Caveat by GBC (Australia) Pty Ltd	Relates to an agreement between the former landowner (Lower Chittering & Muchea Pty Ltd) and BGC (Australia) Pty Ltd in relation to quarrying activities

None of the above encumbrances prohibit, or in any way affect, the proposed development. A copy of the Certificate of Title and accompanying Deposited Plan are enclosed.

The Certificate of Title currently references 'Lower Chittering and Muchea Pty Ltd' as of owner of the subject site. An Application for transfer of land ownership was lodged with Landgate on 20 February 2023 and is currently being processed. The new Certificate of Title is expected to be issued by Landgate shortly. Once issued, a copy will be forwarded to the Shire.

Refer Attachment 1– Certificate of Title and Deposited Plan

The site maintains frontage to Wandena Road in the west, Caladenia Close, Powderbark Road and Patens Drive in the east. All roads are gazetted public roads.

Patens Drive terminates along the eastern boundary of the subject site, north of Caladenia Close. The south-east corner of the site is severed by Powderbark Drive.



The site is considerably large in size, measuring approximately 169.8ha in area. The extent of works proposed under this Development Application is limited to the footprint of an existing clay quarry which is located along the western boundary of the subject site, directly south of the Shire of Chittering's Land Refuse Facility.

A plan showing the location of the existing quarry and the extent of proposed works in the context of the entire landholding is enclosed.

Refer Figure 3 – Site Plan

2.3 EXISTING LAND USE AND IMPROVEMENTS

The southern part of the subject site has historically been used by Midland Brick as part of its local clay extraction operations. The Shire has previously advised that extraction activities undertaken on the site have been operating under a non-confirming use right. Extraction of clay from this part of the subject site has now ceased and as a result, a large void is located on the site. The void measures approximately 36,000m²/360,000m³ in area and is located along the western boundary of the site, directly south of the Shire's Land Refuse facility. Access to the quarry is provided via an existing crossover located along Wandena Road.

The balance of the site remains largely undisturbed and has historically been used for grazing. The site contains existing vegetation, which predominantly comprises of trees and shrubs which are scattered throughout the site. No clearing of existing vegetation is proposed as part of this Development Application. There are no existing dwellings or substantial buildings located on the site.

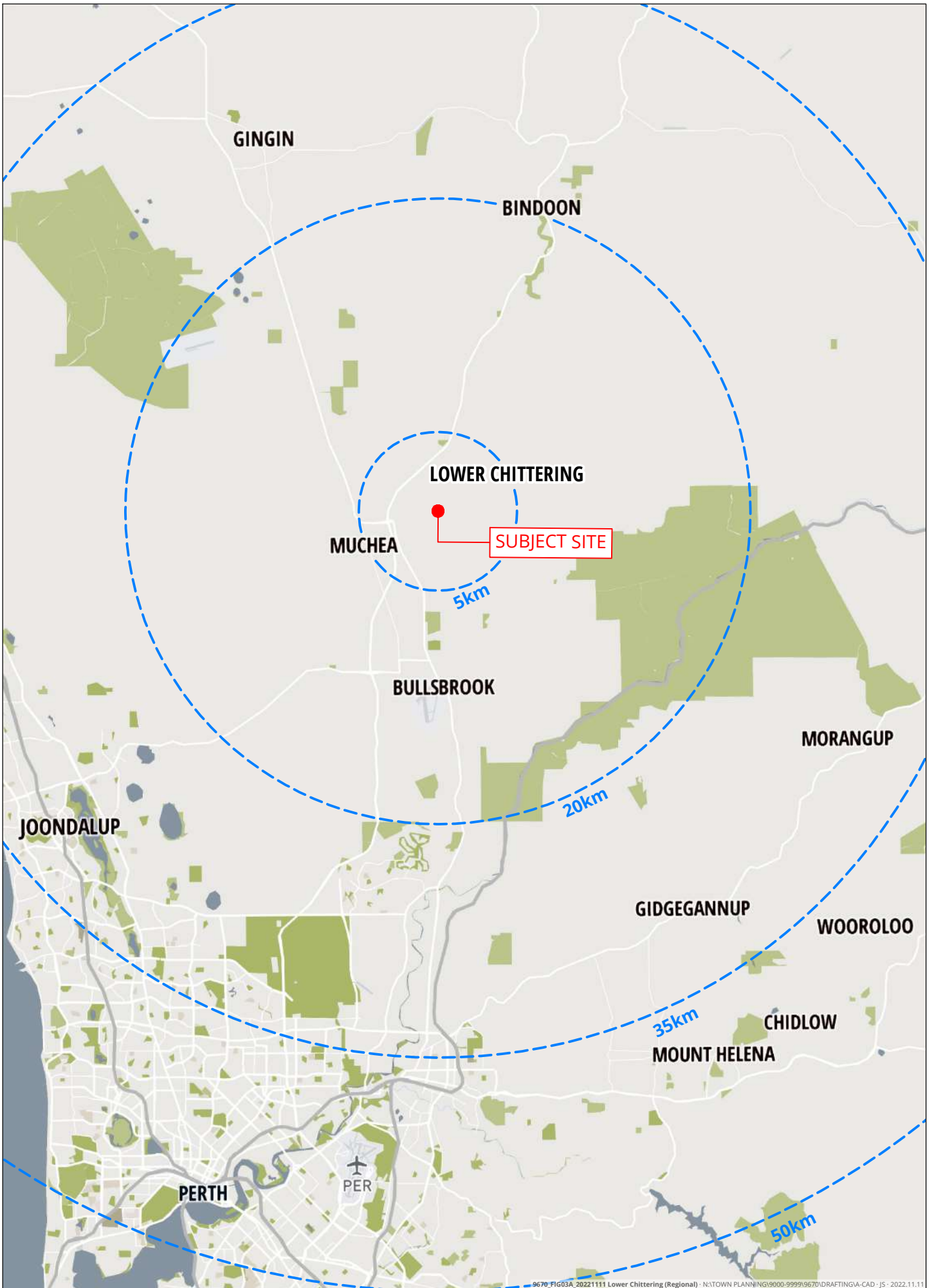
2.4 SURROUNDING LAND USES

The Shire's Land Refuse Facility is located along the western boundary of the subject site. An existing clay quarry, operated by Midland Brick, is located to the south-west of the subject site on the western side of Wandena Road (Lot 6).

The Muchea Livestock Centre (WAMIA) is located approximately 1km to the west of the site, within the adjoining Muchea Industrial Park Structure Plan Area. The balance of the surrounding area, north, west and south of the subject site, is predominantly used for grazing.

The land to the immediate east of the subject site is zoned for Rural Residential purposes and has been subdivided into 2ha lots. This Rural Residential area forms part of an estate named the 'Wandena Country Estate'. The majority of these lots contain a residential dwelling and associated outbuildings.





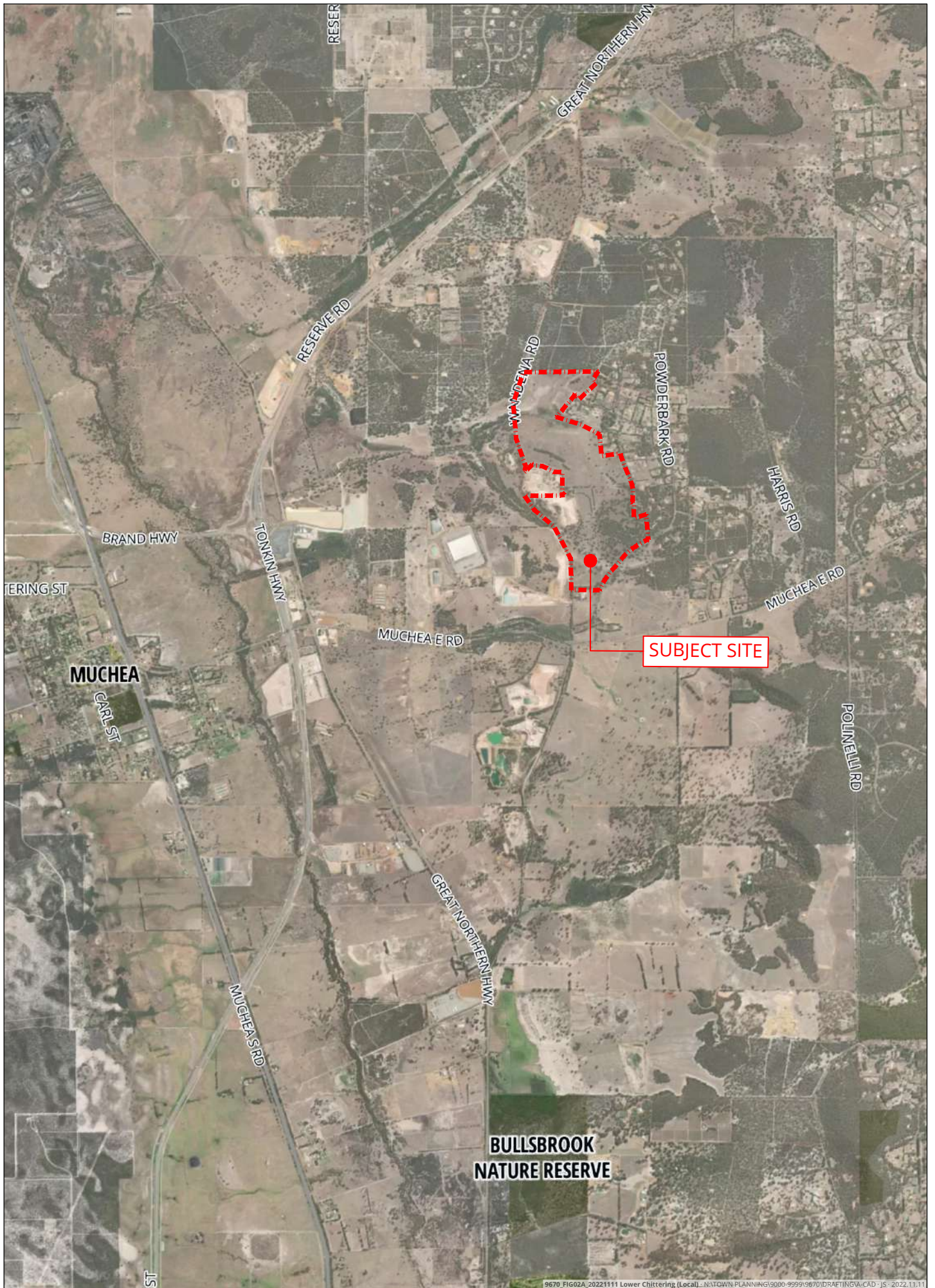
9670_FIG03A_20221111 Lower Chittering (Regional) - N:\TOWN PLANNING\9000-9999\9670\DRAWING\A-CAD - JS - 2022.11.11



0 8000 m
SCALE @ A4: 1:300,000



FIGURE 1
REGIONAL LOCATION



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0 1250 m
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FIGURE 2
LOCAL LOCATION

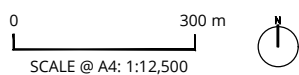
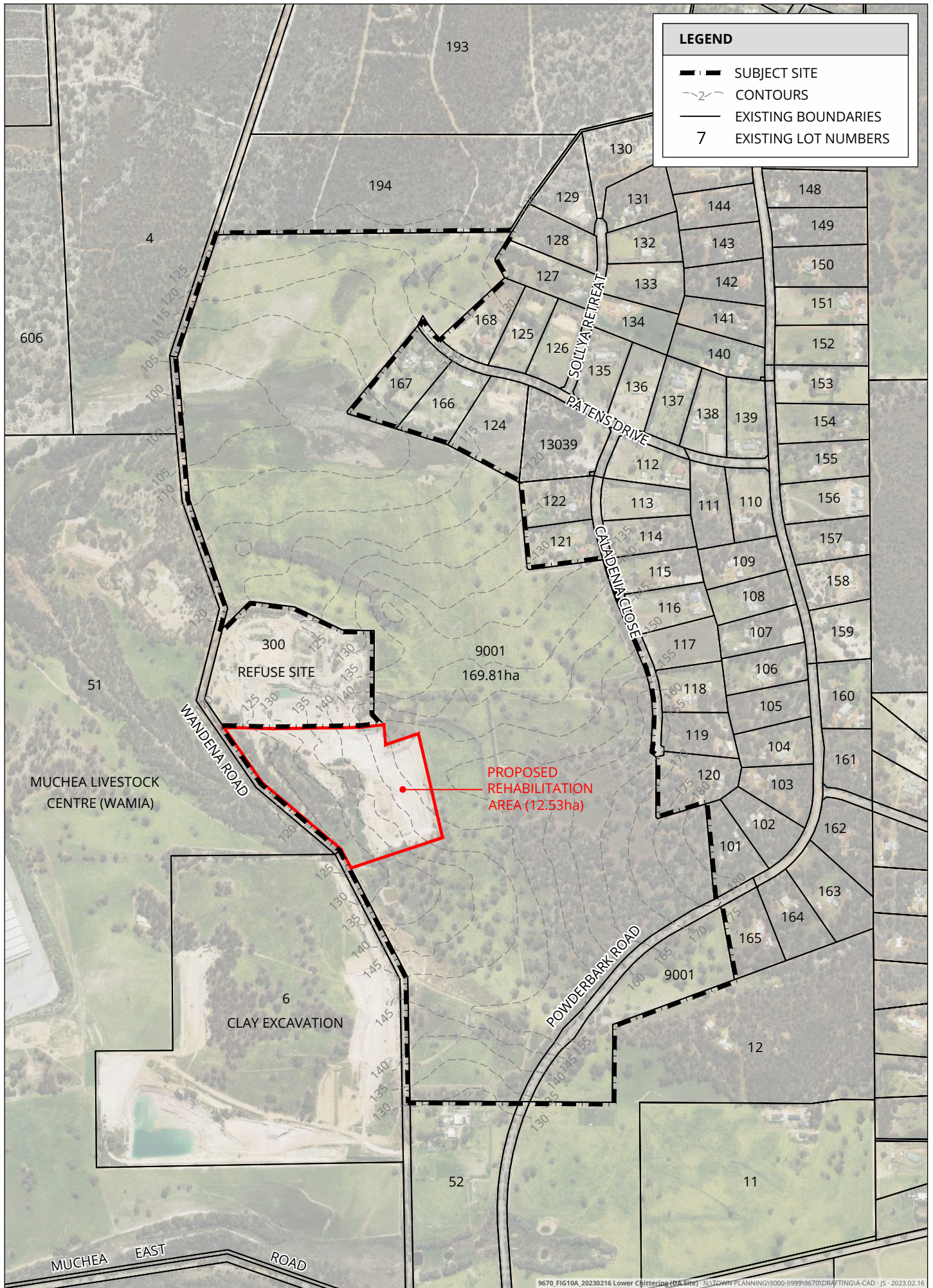


FIGURE 3
SITE PLAN

3. DESCRIPTION OF PROPOSAL

This Development Application seeks approval to fill and rehabilitate an existing (disused) clay quarry located along the western boundary of the subject site, directly south of the Shire's Land Refuse Facility. The void measures approximately 36,000m²/360,000m³ in area. In rehabilitating the site, the Applicant intends to fill the void to its natural ground levels prior to its use for clay extraction. Given the age of the quarry, there is no known rehabilitation plan in place to reinstate the land to its previous form.

The Applicant proposes to fill the void with inert building materials sourced from locations within the Perth Metropolitan Region. The inert materials will comprise concrete, bricks, limestone, rock, rubble, masonry type material, road making materials/aggregates and sand. These materials will be sourced from the Applicant's own demolition activities. No hazardous or putrescible materials will be accepted on site and no public access will be permitted.

Filling of the site will be phased to monitor and assess compaction rates and control the placement of material. The void will accommodate four (4) phases of filling with each predicted to take approximately five years to complete. Once filled, the site will be covered with a layer of soil and planted with native species.

An Environmental Management Plan ('EMP') has been prepared in support of the Development Application by SERS Pty Ltd. The EMP addresses all environmental considerations relevant to the site, explains the manner in which development will occur and demonstrates the proposal's compliance with applicable statutory environmental requirements. The EMP also includes Noise and Dust Management Plans and a Site Closure / Rehabilitation Plan.

The fill material will be transported to site via triple axle semi tippers with a 20m³ capacity. The frequency of vehicle movements is expected to be in the order of 8 loads per day (or 40 loads per week). Once transported to site, the materials will be stockpiled and sorted, before being placed in the void. No crushing or mechanical screening of materials will be undertaken on site.

Machinery to be used on site will comprise one (1) water cart, two (2) loaders, one (1) excavator and a maximum of three (3) large semi-tippers at any one time.

Vehicle access to the site will be achieved via an existing crossover located on Wandena Road. No modifications to this existing crossover is proposed as part of this Application.

A single site office and portable ablutions will be located on the site. A maximum of 5 staff are expected to be on site at any one time. Hours of operation will be limited to between 7am and 7pm Monday to Friday, and between 7am and 3pm on Saturday.

Rehabilitation of the quarry is expected to take approximately 20 years to complete.

Refer Attachment 2 – Development Proposal Plans

Refer Attachment 3 – Environmental Management Plan



4. TOWN PLANNING CONSIDERATIONS

4.1 ZONING

4.1.1 SHIRE OF CHITTERING LOCAL PLANNING SCHEME NO. 6

The subject site is zoned 'Agricultural Resource' under the provisions of the Shire of Chittering *Local Planning Scheme No. 6* ('LPS 6') and is located within the boundaries of the *Basic Raw Materials* and *Land Refuse Special Control Areas* ('SCA').

The objectives of the 'Agricultural Resource' Zone are to:

- a) *"preserve productive land suitable for grazing, cropping and intensive horticulture and other compatible productive rural uses in a sustainable manner;*
- b) *protect the landform and landscape values of the district against despoliation and land degradation;*
- c) *encourage intensive agriculture and associated tourist facilities, where appropriate;*
- d) *allow for the extraction of basic raw materials where it is environmentally and socially acceptable."*

Despite the site being zoned 'Agricultural Resource', this part of the site has not been used for agricultural pursuits for a number of years. The predominant use has been clay extraction.

The proposal to fill the existing void with inert materials and return the site to its pre-excavation levels will enable its future use for agricultural purposes. This end use is consistent with the site's 'Agricultural Resource' zoning.

The Basic Raw Materials SCA under LPS6 is intended to secure known basic raw material resources and protect these resources from incompatible uses. Clay excavation activities on the subject site have been exhausted and the purpose of the proposed development is to fill and rehabilitate the quarry void to enable the site to be used for agricultural purposes. In this regard, the proposed development is consistent with the purpose and intent of the Basic Raw Materials SCA.

The subject site adjoins the Shire's Land Refuse Facility and is therefore partially affected by the Land Refuse SCA under LPS6. The purpose of the Land Refuse SCA is to establish a buffer around the Land Refuse Facility so that development does not encroach within the buffer area. No new residential dwellings are permitted within the designated buffer area. This Development Application proposes to fill and rehabilitate the quarry void to enable the site to be used for agricultural purposes. No residential or other sensitive land uses are proposed. In this regard, the proposed development is consistent with the purpose and intent of the Land Refuse SCA.

Refer Figure 4 – Shire of Chittering LPS6 Zoning Plan



4.1.2 LAND USE DESCRIPTION AND PERMISSIBILITY

The proposed development seeks to fill and rehabilitate an existing void created as a result of clay excavation activities on the site. The clay resource has been exhausted and the quarry is no longer required. The Applicant intends to fill the void with inert materials, return the site to its pre-excavation levels and rehabilitate the site such that it can be used for agricultural purposes.

The form of development proposed by this Application does not fit within any of the specific land use classes contained within LPS6 or the deemed provisions for local planning schemes as set out in Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* (the 'Regulations'). That is to say, there is no specific land use class within LPS6 or the Regulations for 'landfill' or 'site rehabilitation', and neither term is specifically defined.

The closest potential use class could be considered 'Waste Disposal Facility' which is defined in LPS6 as follows:

"premises used –

- (a) For the disposal of waste by landfill; or*
- (b) For the incineration of hazardous, clinical or biomedical waste".*

Whilst the proposed development includes a filling component, its ultimate purpose is to return the site to its pre-excavation levels, rehabilitate the land and enable future agricultural use. The site will not be used for the deposition of household materials or waste from members of the public. Rather, the Applicant proposes to fill the void with inert (ie. non-hazardous and non-putrescible) building materials sourced from their own demolition activities. Once filled, the site will be covered with a layer of soil and planted with native species in accordance with a Site Closure and Rehabilitation Plan. Ongoing management of the rehabilitation area will be undertaken once planting has been completed to monitor surface water, leachate and groundwater and to replace any vegetation that has failed to establish. In this regard, the form of development proposed encompasses activities that are beyond the filling of land and is therefore not considered to fall within the definition of 'Waste Disposal Facility'.

Under the provisions of Clause 3.4.2 of LPS6, where a person proposes to carry out a use that is not specifically mentioned in the Zoning Table and cannot reasonably be determined as falling within the type, class or genus of activity of any other use category, the local government may:

- (a) "determine that the use is consistent with the objectives of the particular zone and is therefore permitted; or*
- (b) determine that the use may be consistent with the objectives of the zone and thereafter follow the advertising procedures of clause 64 of the deemed provisions in considering an application for Development approval; or*
- (c) determine that the use is not consistent with the objectives of the particular zone and is therefore not permitted."*

The proposed development will facilitate the rehabilitation of an existing clay quarry and in doing so, return the site to a state in which it can be used for agricultural purposes. In this regard, the



proposed development is considered to be consistent with the objectives of the 'Agricultural Resource' Zone as is therefore a use that is permitted.

In 2015 Council approved a similar development proposal on Lot 202 Wandena Road, Chittering which was also located within the 'Agricultural Resource' Zone. This proposal involved the filling of a disused clay quarry with inert building materials and the rehabilitation of the site to facilitate future industrial use. The proposal, which was assessed as a 'Use Not Listed - Landfill and Rehabilitation', was deemed a use that was consistent with the objectives of the 'Agricultural Resource' Zone and was subsequently approved.

Having regard to the above, it is our view that:

- (a) the form of development proposed by this Application is most suitably defined as a 'Use Not Listed - Landfill and Rehabilitation' under the provisions of LPS6;
- (b) the proposed use is consistent with the objectives of the 'Agricultural Resource' Zone; and
- (c) the proposed use is therefore permitted and ought to be approved.

4.2 DEVELOPMENT STANDARDS AND REQUIREMENTS

There are no specific site or development standards under LPS6 that apply to land within the 'Agricultural Resource' Zone. There are, however, several general provisions that are relevant to the subject site. These are discussed below:

4.2.1 AMENITY OF NON-RESIDENTIAL DEVELOPMENT

Clause 4.20 of LPS6 lists a number of principles that are to be considered in the assessment of proposals for non-residential development. The proposed development has been considered in relation to these principles and is considered to satisfy the principles for the following reasons:

- ▲ The form and scale of development proposed is compatible with surrounding land uses which include a land refuse facility, clay extraction area, and agricultural uses.
- ▲ The stockpiling and filling of land will occur within the void of a disused quarry and is not visible from adjoining properties or public roads.
- ▲ Traffic movements into and out of the site are comparable to those of the existing quarry, meaning no net increase in the number or frequency of daily traffic volumes.
- ▲ The proposed development will utilise the existing access track and crossover which supported the former extraction activities on site meaning no further clearing of vegetation for access purposes will be required.
- ▲ A Dust Management Plan and Noise Management Plan have been prepared in support of the proposed development and are provided in the enclosed EMP. These management plans demonstrate compliance with all relevant statutory environmental requirements.
- ▲ The nearest residential dwelling is located in excess of 600m from the site meaning the site is well separated from sensitive land uses.
- ▲ Existing vegetation located on site will be retained and protected during development.



4.2.2 BASIC RAW MATERIALS SCA

The subject site is located within the Basic Raw Materials SCA under LPS6. The provisions set out in Clause 5.4 are therefore relevant. The proposed development satisfies these provisions given it does not involve the construction of any new residential dwellings or other sensitive land uses and will not affect any existing or future extractive industry operations on, or in the vicinity of, the site.

4.2.3 LAND REFUSE SCA

The subject site is located within the Land Refuse SCA under LPS6. The provisions set out in Clause 5.6 are therefore relevant. The proposed development satisfies these provisions given it does not encroach upon the operations of the land refuse facility and does not involve the construction of any residential dwellings or other sensitive uses that may inhibit the continued operation of the land refuse facility.

4.2.4 MATTERS TO BE CONSIDERED

Clause 67(2) of the Deemed Provisions under Schedule 2 of the Regulations sets out the matters for which due regard is to be given when considering an Application for Development Approval. The following table contains an assessment of the proposed development's compliance with these matters.

Matter to be considered	Provided
(a) The aims and provisions of this Scheme and any other local planning scheme operating within the Scheme area	Yes. Refer to Section 4 of this report for consideration against the provisions of LPS6.
(b) The requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> or any other proposed planning instrument that the local government is seriously considering adopting or approving	Yes. This report demonstrates that the proposed development is compliant with the local planning framework applicable to the site.
(c) Any approved State planning policy	Yes. Refer to Section 4.5 of this report for consideration against relevant State Planning Policies.
(d) Any environmental protection policy approved under the <i>Environmental Protection Act 1986</i> section 31(d)	N/A. The site is not subject to any environmental protection policies.
(e) Any policy of the WAPC	Yes. Refer to Section 4.5 of this report. There are no additional WAPC policies relevant to the subject site or the proposed development.
(f) Any policy of the State	N/A. There are no State-wide policies relevant to the subject site or the proposed development.
(fa) Any local planning strategy for this Scheme endorsed by the WAPC	Yes. Refer to Section 4.4 of this report for consideration against the Shire of Chittering Local Planning Strategy.



Matter to be considered	Provided
(g) Any local planning policy for the Scheme area	Yes. Refer to Section 4.3 of this report for consideration against relevant local planning policies.
(h) Any structure plan or local development plan that relates to the development	N/A. The site is not subject to any structure plans or local development plans.
(i) Any report of the review of the local planning scheme that has been published under the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i>	N/A. There are no known or publically accessible reports on the review of LPS6.
(j) In the case of land reserved under this Scheme, the objectives for the reserve and the additional and permitted uses identified in this Scheme for the reserve	N/A. The subject site is not reserved under the provisions of LPS6.
(k) The built heritage conservation of any place that is of cultural significance	N/A. The subject site does not contain any built heritage.
(l) The effect of the proposal on the cultural heritage significance of the area in which the development is located	N/A. The subject site is not located within an area of cultural heritage significance.
(m) The compatibility of the development with its setting, including — (i) the compatibility of the development with the desired future character of its setting; and (ii) the relationship of the development to development on adjoining land or on other land in the locality including, but not limited to, the likely effect of the height, bulk, scale, orientation and appearance of the development	Yes. The proposed development is consistent with its existing setting which includes an adjoining land refuse facility, existing (on site) and adjoining clay exaction areas and broader agricultural uses. The proposed development will facilitate the site's return to an agricultural use and is therefore consistent with the desired future character of the area. The development is located within an existing quarry void and is surrounded by existing vegetation. It is located in excess of 600m from the nearest residential dwelling and will not be visible from adjoining properties or public roads. The proposed development is compatible with its surroundings and poses no unacceptable impact on the locality.
(n) The amenity of the locality including the following — (i) environmental impacts of the development; (ii) the character of the locality; (iii) social impacts of the development	Yes. The proposed development will be undertaken in accordance with the EMP submitted as part of this Development Application. The EMP outlines the measures to be taken by the Applicant to ensure the proposed development is undertaken in an environmentally acceptable manner. The re-establishment of natural ground levels on the site by filling to the pre-extraction surface contours and rehabilitating the filled area will effectively remove an existing 'scar' on the landscape. It will enable the site to be returned to



Matter to be considered	Provided
	agricultural use and in doing so, will enhance the amenity and character of the locality.
(o) The likely effect of the development on the natural environment or water resources and any means that are proposed to protect or to mitigate impacts on the natural environment or the water resource	Yes. The potential of the proposal development to impact the natural environment or water resources is addressed in the enclosed EMP.
(p) Whether adequate provision has been made for the landscaping of the land to which the application relates and whether any trees or other vegetation on the land should be preserved	N/A. No existing vegetation will be removed as part of the proposed development. Once filling has been completed, the site will be covered with a layer of soil and revegetated.
(q) The suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bush fire, soil erosion, land degradation or any other risk	<p>Yes. The site is suitable for fill and rehabilitation and does not present any risks of flooding, tidal inundation, subsidence, landslip, soil erosion or land degradation. Filling and rehabilitating the site will reinstate pre-excavation contours and enable the site's return to agricultural use.</p> <p>The proposed filling and rehabilitation area is mapped by DFES as being within a bushfire prone area despite containing little existing vegetation on account of its former use as a clay quarry. No residential dwellings are proposed at part of the application and the development does not result in the intensification of land use or increase the bushfire threat.</p>
(r) The suitability of the land for the development taking into account the possible risk to human health or safety	Yes. The site is not identified on the DWER's Contaminated Sites Database. Its former use as a clay quarry does not present a risk to human health or safety.
(s) The adequacy of — (i) the proposed means of access to and egress from the site; and (ii) arrangements for the loading, unloading, manoeuvring and parking of vehicles	<p>Yes. The proposed development will utilise an existing access track and crossover which was previously used as part of the site's former clay excavation activities. The type of vehicles to be used, and the frequency of trips proposed under this Application are similar to those of the former quarrying activities meaning there will be no net increase in the number of daily vehicle movements to the site.</p> <p>The EMP outlines the manner in which vehicle movements within the site will be managed. This includes the arrangements for the loading, unloading and manoeuvring of vehicles.</p>
(t) The amount of traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect on traffic flow and safety	Yes. As noted above, the type of vehicles to be used, and the frequency of trips proposed for this Application are similar to those of the former quarrying activities. Accordingly, there will be no



Matter to be considered	Provided
	net increase in the number of daily vehicle movements to the site as a result of the proposed development.
(u) The availability and adequacy for the development of the following — (i) public transport services; (ii) public utility services; (iii) storage, management and collection of waste; (iv) access for pedestrians and cyclists (including end of trip storage, toilet and shower facilities); (v) access by older people and people with disability	N/A. Given the location and nature of the proposed development, there is no need for reliance on public transport services, public utility services, waste collection services or other such infrastructure to facilitate public access.
(v) The potential loss of any community service or benefit resulting from the development other than potential loss that may result from economic competition between new and existing businesses	N/A. The site does not currently provide for an existing community service or benefit.
(w) The history of the site where the development is to be located	Yes. The site's former use as a clay quarry means that it is suitable for filling and rehabilitation.
(x) The impact of the development on the community as a whole notwithstanding the impact of the development on particular individuals	Yes. The re-establishment of natural ground levels on the site by filling of the pre-extraction surface contours and rehabilitating the filled area will effectively remove an existing 'scar' on the landscape. It will enable the site to be returned to agricultural use and in doing so, will benefit the community as a whole.
(y) any submissions received on the application	Noted
(za) The comments or submissions received from any authority consulted under clause 66	Noted
(zb) Any other planning consideration the local government considers appropriate	Noted

4.3 LOCAL PLANNING POLICIES

The Shire maintains a number of local planning policies, several of which are relevant to the proposed development. These are discussed below.

4.3.1 LOCAL PLANNING POLICY NO. 7 – OUTBUILDINGS

The proposed development includes a single Site Office and portable ablutions. The Site Office will comprise of a standard 6m by 3m 'demountable' with a maximum floor area of 18sqm and maximum wall height of 3.2m.



Under the Shire's *Local Planning Policy No. 7 – Outbuildings* ('LPP7'), the Site Office would be considered a 'shed'. LPP7 requires that any outbuildings or sheds within the 'Agricultural Resource' Zone are setback a minimum distance of 30m from any roads or site boundaries. The Site Office will be located centrally within the proposed landfill and rehabilitation area and will be setback in excess of 100m from the northern (nearest) side boundary and in excess of 160m from Wandena Road. The proposed development therefore satisfies the requirements set out in LPP7.

4.3.2 LOCAL PLANNING POLICY NO. 13 – CARPARKING

Clause 4.12 of LPS6 requires car parking to be provided in accordance with the Shire's *Local Planning Policy No. 13 – Car Paring* ('LPP13'). Given the low number of staff to be present on site at any one time (between 3 and 5), provision will be made for the informal parking of staff vehicles adjoining the proposed Site Office.

4.3.3 LOCAL PLANNING POLICY NO. 18 – SETBACKS

Building setbacks will be provided in accordance with the Shire's *Local Planning Policy No. 18 – Setbacks* ('LPP18'). Within the 'Agricultural Resource' Zone, buildings are to be setback a minimum distance of 30m from the road and side/rear boundaries.

The only building proposed as part of this Development Application is a Site Office. The Office will be located centrally within the proposed landfill and rehabilitation area and will be setback in excess of 100m from the northern (nearest) side boundary and in excess of 160m from Wandena Road. The proposed development therefore satisfies the requirements set out in LPP18.

4.4 LOCAL PLANNING STRATEGY

The Shire of Chittering *Local Planning Strategy* (the 'Strategy') was endorsed by the Western Australian Planning Commission ('WAPC') in 2019. The Strategic Intent of the Strategy is to:

"Conserve and Consolidate. That is, to 'conserve' its natural areas and rural character, and to 'consolidate' future development in areas where infrastructure and services are available".

The subject site is identified under the Strategy as being within the Rural Zone and within the buffer of the Muchea Industrial Park and Basic Raw Materials Significant Geological Supplies Boundary. The Objectives of the Strategy in relation to Rural land are to:

- *"Promote the sustainable use of rural land for a range of compatible uses;*
- *Prevent the fragmentation and/or loss of agricultural land; and*
- *Promote sustainable agricultural land management.*
- *Support the diversification of land uses within the rural zone.*
- *Preserve 'Rural' zoned land for rural and compatible non-rural land uses".*

The proposed development is consistent with the overall Strategic Intent and Objectives for Rural land as it will fill and rehabilitate an existing disused quarry and in doing so, enable the site to be returned to agricultural use. Given its location, nature and limited lifespan, the proposed development will not interfere with the future development or ongoing operation of the Muchea Industrial Park or the advancement of activities relating to the extraction of basic raw materials in



the immediate area. In this regard, the proposed development is acceptable having regard to the provisions and objectives of the Strategy.

4.5 STATE PLANNING POLICIES

A number of State Planning Policies are relevant to the subject site and/or the proposed development. These are discussed below.

4.5.1 STATE PLANNING POLICY 2.0 – ENVIRONMENT AND NATURAL RESOURCES POLICY

The WAPC's *State Planning Policy No.2: Environment and Natural Resources Policy* ('SPP 2') defines the principles and considerations that represent good and responsible planning in terms of environmental and natural resource issues within the framework of the State Planning Strategy. Its objectives are to:

- *"Integrate environment and natural resource management with broader land use planning and decision-making;*
- *Protect, conserve and enhance the natural environment; and*
- *Promote and assist in the wise and sustainable use and management of natural resources".*

The requirements of SPP 2 have been taken into consideration in preparing this Development Application. The enclosed EMP considers matters such as flora and vegetation, fauna, and overall water management and demonstrates that the proposed development is acceptable in relation to this matters.

4.5.2 STATE PLANNING POLICY NO. 2.5 – RURAL PLANNING

The WAPC's *State Planning Policy No. 2.5 – Rural Planning* ('SPP 2.5') seeks to protect and preserve rural land for rural purposes including primary production, basic raw materials, regional facilities, and protection of biodiversity and landscape. Its provisions are applicable to development proposals on rural zoned land and it is therefore a relevant consideration in the context of this Development Application.

Section 5.9 of SPP 2.5 sets out the WAPC's policy provisions for rural land that is identified as basic raw materials site. These policy provisions include the following:

- "(f) sequential land use planning is encouraged whereby extraction and appropriate rehabilitation can take place on a programmed basis in advance of longer-term use and development".*

The proposed development is consistent with the WAPC's policy provision in relation to basic raw materials sites in that it will fill and rehabilitate an existing quarry void and return the site to a rural use.

The proposed development is also consistent with the following specific objectives of SPP 2.5 :

- "(c) outside of the Perth and Peel planning regions, secure significant basic raw material resources and provide for their extraction; and*



- (g) *protect and sustainably manage environmental, landscape and water resource assets;*

On this basis, the proposed development is considered acceptable and appropriate having regard to the provisions of SPP 2.5.

4.5.3 STATE PLANNING POLICY NO. 2.4 – BASIC RAW MATERIALS

The subject site is identified within the WAPC's *State Planning Policy No. 2.4 Basic Raw Materials* ('SPP 2.4') as a 'Key Extraction Area'. Clay extraction has been occurring on the site for a number of years. The resource has now been exhausted and the quarry as reached its 'end of life'. Approval is sought to fill and rehabilitate the quarry and facilitate its return to agricultural use.

Rehabilitation of disused quarries is a key recommendation of SPP 2.4. Given the age of the quarry, there is no known rehabilitation plan in place to reinstate the land to its previous form. This Development Application therefore provides an opportunity to ensure the suitable and appropriate rehabilitation of a discussed quarry, consistent with the provisions of SPP 2.4.

4.5.4 STATE PLANNING POLICY 3.7 – PLANNING IN BUSHFIRE PRONE AREAS

The subject site is mapped as a 'Bushfire Prone Area' by the Department of Fire and Emergency Services (DFES). Any planning and development considerations for the subject site are therefore subject to the requirements of *State Planning Policy 3.7: Planning in Bushfire Prone Areas* ('SPP 3.7') and accompanying Guidelines. Despite being mapped as bushfire prone, the existing quarry is void of any vegetation and does not, in itself, present a bushfire risk.

Section 2.6 of the Guidelines identifies situations wherein compliance with SPP 3.7 is considered to be exempt from assessment. This includes situations where there is no intensification of land use and/or the proposal is not increasing the bushfire threat. Both these attributes apply to the proposed development. The Guidelines list a number of examples wherein an exemption under SPP 3.7 would apply. These examples include the following:

"A development application for an extractive industry where the extraction is undertaken in an open cleared area (for example, quarries and open cut mining) and no habitable buildings are proposed".

Whilst the proposed development does not contemplate further clay extraction, it does propose the filling and rehabilitation of an existing quarry whereby all land use and activities will occur within an open clear area. Furthermore, it does not propose the construction of any habitable buildings and the number of staff to be present on site at any one time is limited.

It is our view that the proposed development satisfies the provisions under Section 2.6 of the Guidelines and is therefore an exempt activity under SPP 3.7.

5. ENVIRONMENTAL CONSIDERATIONS

This Development Application is supported by an EMP which has been prepared by SERS Pty Ltd on behalf of the Applicant. SERS are responsible for the design of the fill area and management of the environmental control systems. A copy of the EMP is enclosed at **Attachment 3**. The following provides a summary of key matters addressed in the EMP.

5.1 MATERIALS ACCEPTED ON SITE

As outlined in Section 3 of this report, the quarry void will be filled with inert building materials sourced from the Applicant's own demolition activities. No hazardous or putrescible materials will be accepted on site and no public access will be permitted.

Sorting of inert materials to segregate any recyclable components or potentially hazardous materials is conducted off site as part of the demolition process. Materials suitable for re-use are transported directly to the Applicant's Salvage Yard. Residue materials (such as wood waste, soft plastic) or contaminated extracted material are directed to an appropriately licenced (Class 2 or above as appropriate) landfill facility.

Once transported to site, the materials are stockpiled and undergo initial inspection and further sorting. Materials not suitable for fill will be quarantined and removed from site.

5.2 LAND USE BUFFERS

The *Environmental Protection Act 1986* and the Environmental Protection Authority's *Guidance for the Assessment of Environmental Factors* recommend a minimum 150m buffer between inert landfill facilities and sensitive (residential) land uses. The proposed landfill and rehabilitation area is located a distance of approximately 630m from the nearest residential dwelling and in this regard, satisfies the recommended environmental buffer.

5.3 WORKS APPROVAL

Under the provisions of the *Environmental Protection Act 1986*, the proposal requires a Works Approval to be obtained before construction commences. An Application for Work Approval has been prepared by SERS and submitted to the Department of Water and Environmental Regulation ('DWER') for assessment. A Works Approval cannot be issued until Development Approval has been granted.

5.4 DUST MANAGEMENT

A comprehensive Dust Management Plan has been prepared in support of the proposed development and is included within the enclosed EMP. Dust management measures to be utilised on-site include the following:

- ▲ 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.



- ▲ Enforcement of an on-site speed limit of 10km/h.
- ▲ Supervision of tipping, loading, and compaction.
- ▲ Wetting down of waste loads during tipping.
- ▲ Enforcement of maximum tipping heights.
- ▲ Compaction of completed areas.
- ▲ Ensuring vehicles are well maintained to control emissions.
- ▲ Integrated response to complaints and installation of boundary monitors on the site perimeter if required.
- ▲ Additional sprinklers use throughout dry and windy conditions.

5.5 ODOUR MANAGEMENT

There is a negligible risk of odour becoming an issue on-site due to the inert nature of materials being used for landfill, and the regular removal of any organic waste components from the site. In the event that any complaints are received regarding odour generated on the site, they will be recorded, logged, and forwarded to the environmental manager. The source shall be identified as soon as possible and the complainant kept informed of all remedial measures undertaken.

On-site odour prevention measures include dust suppression, using covers on waste loads, preventing on-site fire, and controlling vehicle emissions. A supply of fine-grained lime shall be retained on-site as a contingency measure for use as a cover material, should waste become odorous.

5.6 NOISE MANAGEMENT

A comprehensive Noise Management Plan has been prepared in support of the proposed development and is included within the enclosed EMP. Noise management measures to be utilised on-site include the following:

- ▲ De-activating reversing beepers during more sensitive times of the day.
- ▲ Negating the need for reversing beepers by using a one-way internal traffic system.
- ▲ Ensuring machinery is well-maintained.
- ▲ Restricting vehicle speeds.
- ▲ Restricting the use of airbrakes.
- ▲ Prohibiting excess revving.
- ▲ Prohibiting entry of excessively noisy trucks and reporting them for service.
- ▲ Restricted operating hours.

5.7 SURFACE WATER MANAGEMENT

The site does not contain any known or mapped wetlands and is not located within any reserves or water supply catchments. The site is underlain with permeable sands. Natural drainage of the site has been affected by the excavation of clay on the site and the excavation of the adjacent (land refuse) site to the immediate north (Lot 300).

The inert materials to be used for fill will be mixed with some fines consisting of sand and clay for stability. The different particle sizes will be well mixed to allow for a final infiltration rate similar to natural soils. Final ground levels will be designed to maintain the natural flow of surface water cross the site.

Bunds will be used on site to intercept downhill surface flow and redirect water into existing holding ponds located on site. Additional holding ponds shall be constructed to prevent on-site water from being transported to waterways or subsoil, as they are needed.

Any water retained on-site will be used for dust management and/or fire control as necessary.

5.8 EROSION CONTROL

There is evidence of erosion on-site where clearing has taken place, with evidence of erosion lines in the area. Existing vegetation shall be retained for as long as possible and clearing shall be restricted to areas required for operations, stockpiling, and access roads only.

Interim vegetation will be used to stabilise any areas, not under extraction or being used for fill. Sedimentation shall be controlled by ensuring clay particles entrained in surface runoff are diverted to holding ponds. Erosion and scouring will be minimised by installing cover material on a gentle slope.

5.9 GROUNDWATER MANAGEMENT

The subject site is not located within a groundwater supply area and does not sit above the regional water table. The closest depth to groundwater is estimated at approximately 30m below ground, with groundwater flowing in a south-westly direction.

The base of the fill area is not expected to be exposed to groundwater. In any event, no inert material will be placed within 2m of groundwater.

Monitoring bores will be installed during the initial phase of construction to establish pre-works groundwater levels and thereafter used to monitor groundwater levels as part of an agreed monitoring regime.

5.10 FIRE MANAGEMENT

Fire prevention and control measures to be utilised on site are described in the enclosed EMP. These measures include the following:

- ▲ Providing adequate staff training.
- ▲ Ensuring all firebreaks are maintained.



- ▲ Minimising the presence of fuel on-site (vegetative, motor, and chemical).
- ▲ Providing adequate fire-fighting capacity and ensuring equipment is stored in an appropriate location and is readily accessible.
- ▲ Preventing unauthorised entry to the site.
- ▲ Ensuring all machinery have a fire extinguisher installed either in the cab or within reach of the cab.
- ▲ Providing fire extinguishers at the gatehouse and wherever fuel is stored.
- ▲ Ensuring water sources with sufficient pressure to extinguish fires will be available via any of the reticulation points around the operational site area.
- ▲ Ensuring a water truck with a fire-hose attachment will be always on-site. The fire hose should be capable of reaching any area of the site without the water truck leaving the access roads.
- ▲ Implementing on-site smoking restrictions.

5.11 REHABILITATION MANAGEMENT PLAN

A Landfill Closure / Rehabilitation Plan has been prepared in support of the proposed development and is provided within the enclosed EMP. The objective of the Rehabilitation Plan is to restore the landscape and return the site to its previous agricultural / rural use.

Active rehabilitation of the site will take place on completion of the surface of each cell/phase. Once surface levels are achieved, topsoil will be spread and seeded. The area will then be cordoned off to allow the effective establishment of native vegetation. Additional planting may be necessary if plant loss is high.

The Rehabilitation Plan also includes provision for weed control and post-closure water monitoring. Finished ground levels have been formulated for the site using topographic levels supplied by Landgate. A plan showing these levels is included within the enclosed EMP.



6. CONCLUSION

This Development Application seeks approval to fill and rehabilitate an existing (disused) clay quarry located along the western boundary of Lot 9001 (No. 88) Caledonia Close, Lower Chittering. The Applicant proposes to fill the void with inert building materials sourced from locations within the Perth Metropolitan Region. The inert materials will comprise concrete, bricks, limestone, rock, rubble, masonry type material, road making materials/aggregates and sand. These materials will be sourced from the Applicant's own demolition activities. No hazardous or putrescible materials will be accepted on site and no public access will be permitted.

Once filled, the site will be covered with a layer of soil and planted with native species in accordance with the enclosed Site Closure / Rehabilitation Plan. Filling and rehabilitation of the quarry is expected to take approximately 20 years to complete.

The form of development proposed by this Application does not fit within any of the specific land use classes contained within LPS6 and is therefore considered a 'Use Not Listed'. The proposed development will facilitate the rehabilitation of an existing clay quarry and in doing so, return the site to a state in which it can be used for agricultural purposes. In this regard, the proposed development is consistent with the objectives of the 'Agricultural Resource' Zone as is therefore a use that is permitted and ought to be approved pursuant to Clause 3.4.2 (a) of LPS6.

The proposed development is considered suitable and appropriate for the site given it:

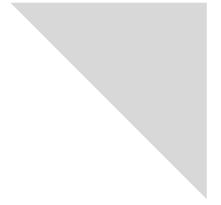
- ▲ is consistent with the objectives of the 'Agricultural Resource' Zone under LPS6 and satisfies the applicable development standards and requirements set out in LPS6 and the local planning policy framework;
- ▲ complies with the provisions at Clause 5.4 and Clause 5.6 of LPS6 in relation to the Basic Raw Material and Land Refuse Special Control Areas;
- ▲ is consistent with the Shire's Local Planning Strategy and applicable State Planning Policies;
- ▲ satisfies the matters for which due regard is to be given under Clause 67(2) of the Deemed Provisions under Schedule 2 of the Regulations;
- ▲ will effectively remove an existing 'scar' on the landscape and facilitate the site's return to an agricultural use, consistent with the desired future character of the area;
- ▲ is compatible in form and scale with surrounding land uses which include a land refuse facility, clay extraction area, and agricultural uses and is located in excess of 600m from the nearest residential dwelling;
- ▲ will not generate any significant or adverse off-site impacts in relation to matters such as noise, dust, visual amenity or traffic;
- ▲ will be undertaken in the void of a disused quarry and will therefore not be visible from adjoining properties or public roads;
- ▲ does not necessitate any additional clearing of land; and



- ▲ will be undertaken in accordance with an EMP which outlines the measures to be taken by the Applicant to ensure the proposed development is undertaken in an environmentally acceptable manner.

Having regard to this above it is requested that the enclosed Development Application be approved by the Shire of Chittering.





ATTACHMENT 1

CERTIFICATE OF TITLE AND DEPOSITED PLAN



ROWE
GROUP

WESTERN



AUSTRALIA

REGISTER NUMBER 9001/DP71254	
DUPLICATE EDITION 1	DATE DUPLICATE ISSUED 14/5/2012

RECORD OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

VOLUME **2789** FOLIO **776**

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 9001 ON DEPOSITED PLAN 71254

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

LOWER CHITTERING & MUCHEA PTY LTD OF LEVEL 3 338 BARKER RD, SUBIACO WA 6008
(T O499263) REGISTERED 16/9/2020

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

- EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 4390/1927.
- F824729 EASEMENT TO SHIRE OF CHITTERING FOR ACCESS PURPOSES - SEE SKETCH IN DEPOSITED PLAN 71254. REGISTERED 9/3/1995.
- G237598 EASEMENT TO SHIRE OF CHITTERING FOR ACCESS PURPOSES - SEE SKETCH IN DEPOSITED PLAN 71254. REGISTERED 25/7/1996.
- *O499264 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 16/9/2020.
- *O699101 CAVEAT BY BGC (AUSTRALIA) PTY LTD LODGED 12/4/2021.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

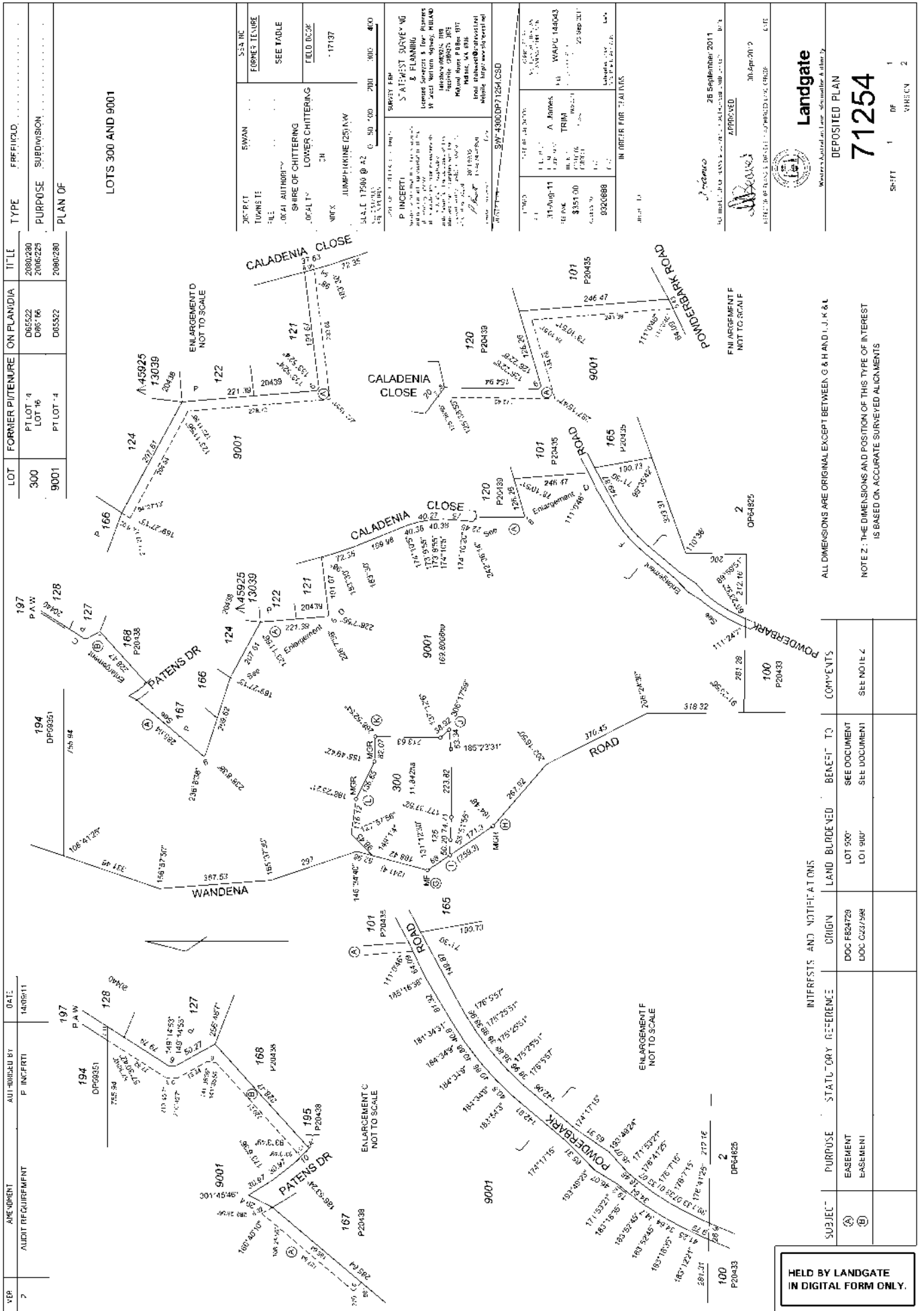
-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: DP71254
PREVIOUS TITLE: 2080-280
PROPERTY STREET ADDRESS: 88 CALADENIA CL, LOWER CHITTERING.
LOCAL GOVERNMENT AUTHORITY: SHIRE OF CHITTERING

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING O499264



HELD BY LANDGATE
IN DIGITAL FORM ONLY.

SUBJECT	PURPOSE	STATUTORY REFERENCE	ORIGIN	LAND BURDENED	BENEFIT TO	COMMENTS
(A)	EASEMENT		DOC F624726	LOT 9007	SEE DOCUMENT	SEE NOTE 4
(B)	EASEMENT		DOC C237598	LOT 9007	SEE DOCUMENT	SEE NOTE 4

ALL DIMENSIONS ARE ORIGINAL EXCEPT BETWEEN G & H AND I, J, K & L

NOTE 2: THE DIMENSIONS AND POSITION OF THIS TYPE OF INTEREST IS BASED ON ACCURATE SURVEYED ALIGNMENTS

VER	2	AMENDMENT	AMENDED BY	F. INCERTI	DATE	14/09/21
		AUDIT REQUIREMENT				
			PT LOT 4	300	085522	2080280
			LOT 16	085522	2086225	2086225
			PT LOT 4	9001	085522	2080280

PURPOSE SUBDIVISION
PLAN OF

DATE	14/09/21	BY	F. INCERTI
PROJECT	AMENDMENT	TO	PLAN
LOT	300	PT LOT	4
LOT	9001	PT LOT	4

FORMER TITLE
SWAN

FORMER TENURE
SEE TABLE

FIELD BOOK
17137

ENLARGEMENT D NOT TO SCALE

ENLARGEMENT C NOT TO SCALE

ENLARGEMENT F NOT TO SCALE

SURVEY FOR
STATEWEST SURVEYING & PLANNING
Level 5, 300 Hay Street, Perth, WA 6000
Phone: (08) 9437 3873
Fax: (08) 9437 3874
Email: info@statewestsurveying.com.au
www.statewestsurveying.com.au

DATE OF SURVEY
26 September 2011

APPROVED
30 Sep 2021

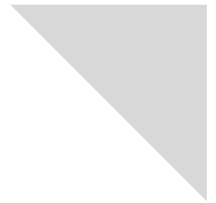
IN ORDER FOR SIGNATURES

Landgate

DEPOSITED PLAN

71254

SHEET 1 OF 2
WHEN 2

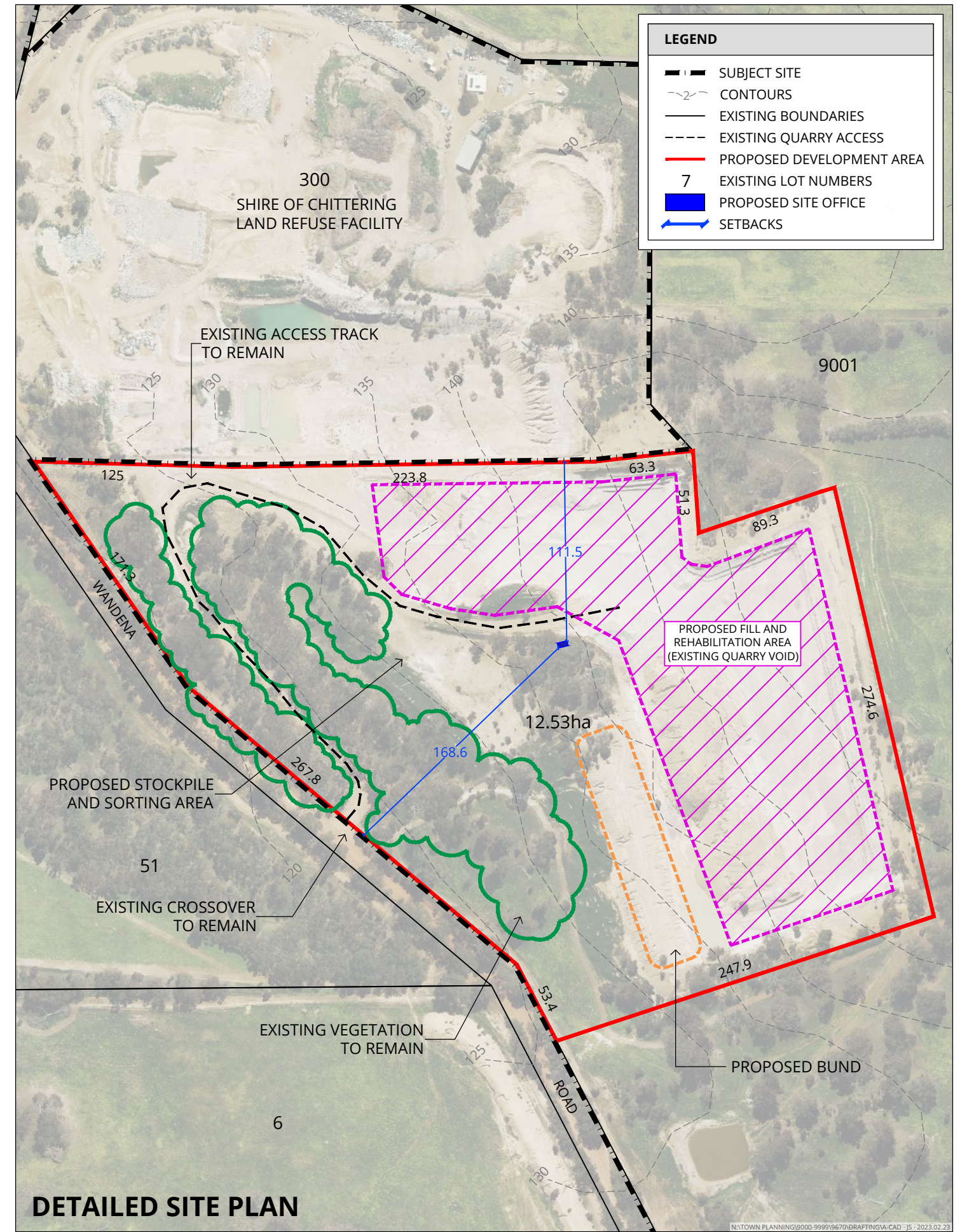
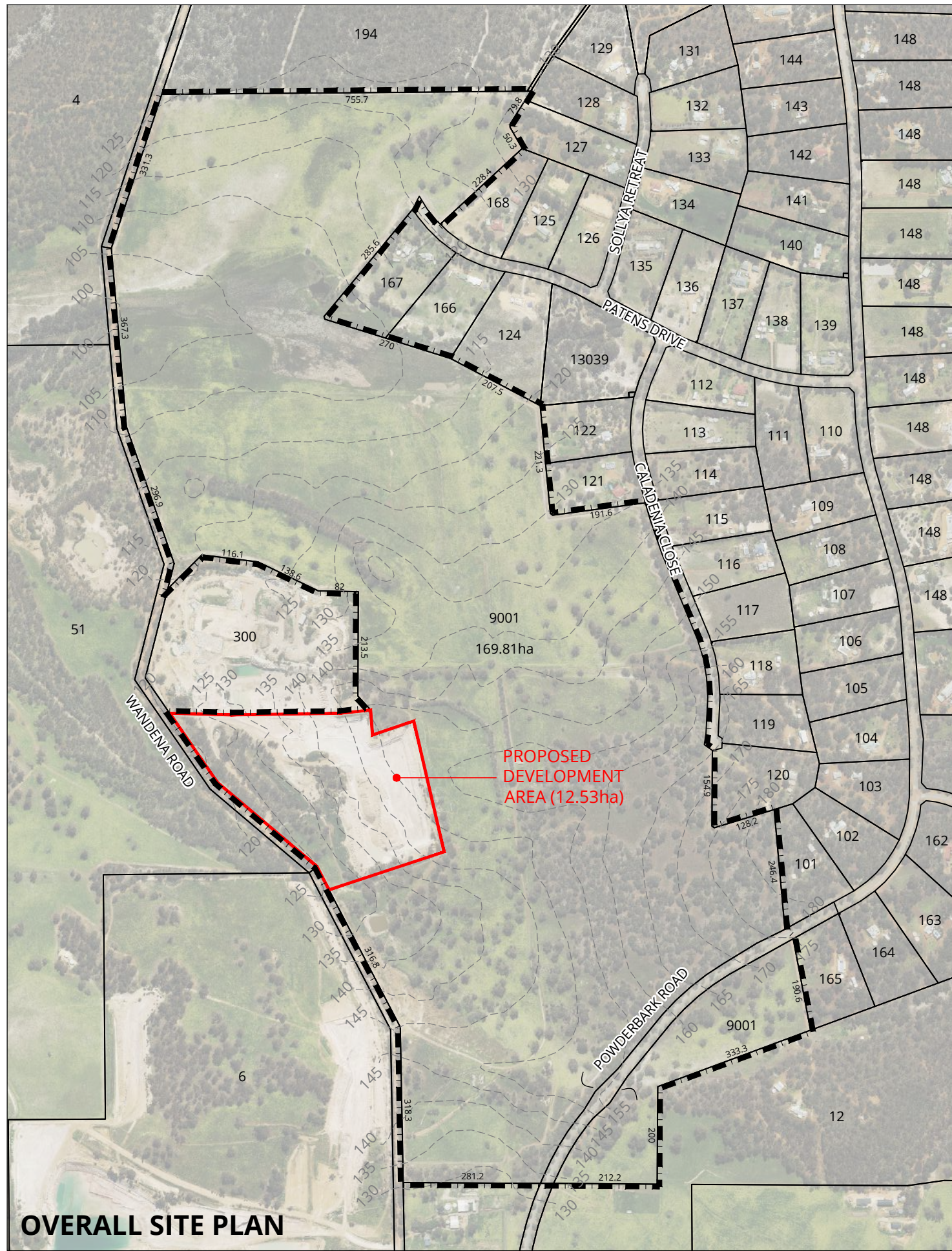


ATTACHMENT 2

DEVELOPMENT PROPOSAL PLANS



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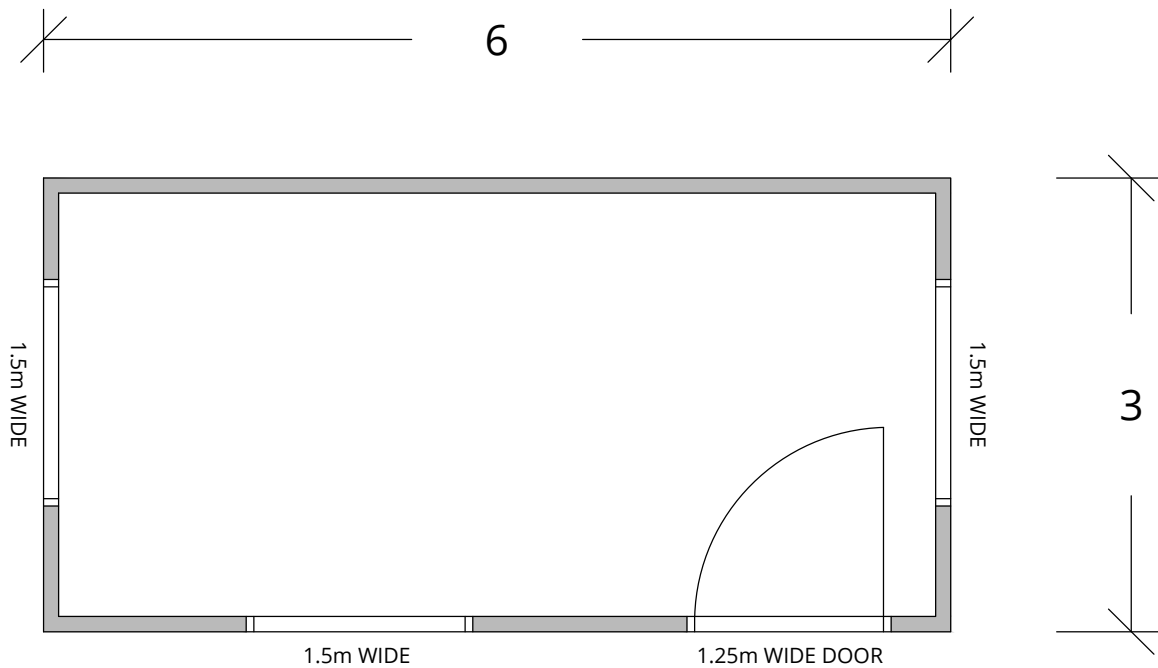


SITE PLAN
 LOT 9001 No.88 CALADENIA CLOSE
 LOWER CHITTERING

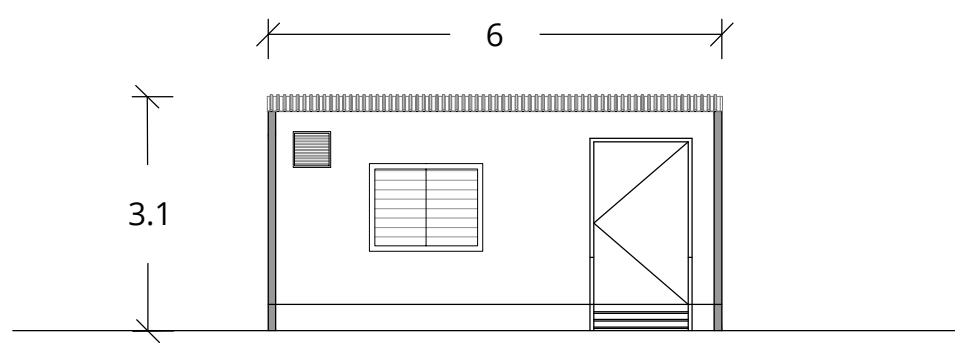
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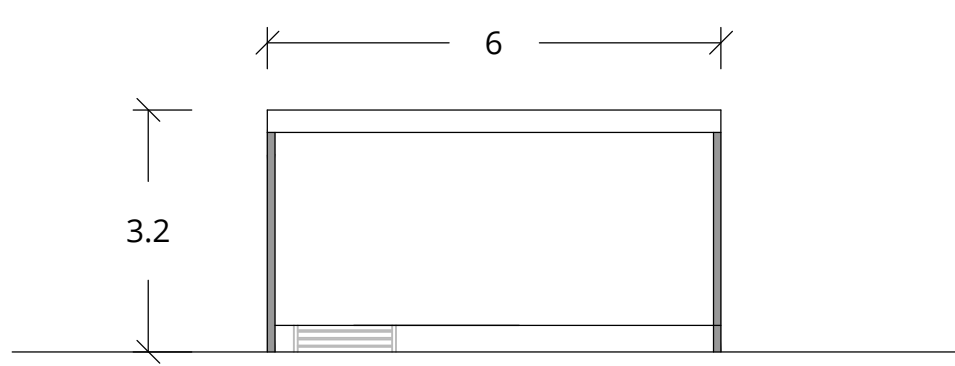




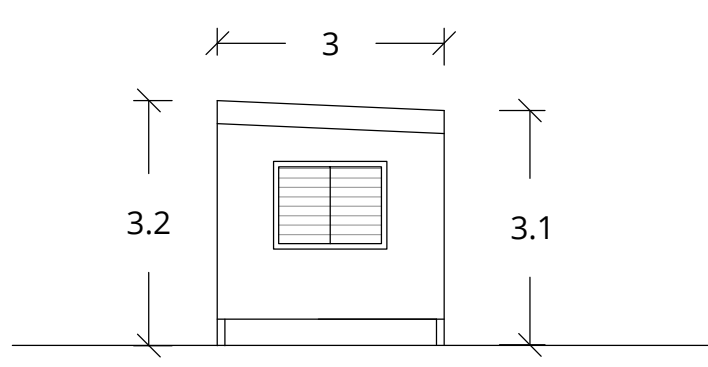
FLOOR PLAN
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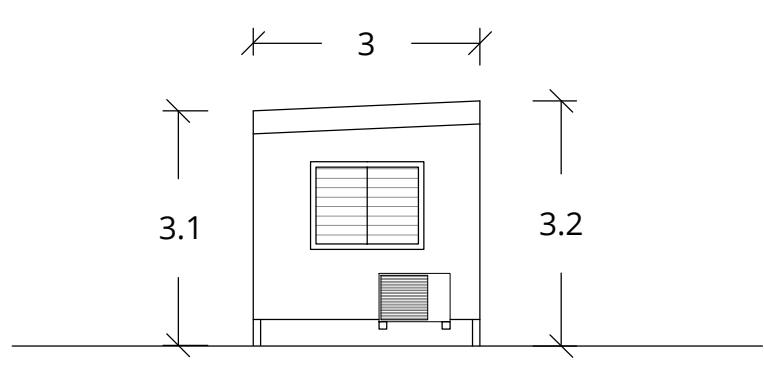
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ELEVATION 2
SCALE 1:100

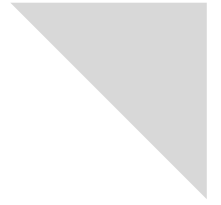


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ELEVATION 4
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ATTACHMENT 3

ENVIRONMENTAL MANAGEMENT PLAN



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SERS
Site Environmental and
Remediation Services

ENVIRONMENTAL MANAGEMENT PLAN

Lot 9001 (88) Caladenia Close, Lower Chittering Western Australia 6084



Prepared for:

Brajkovich Landfill and Recycling Pty Ltd

T: +61 8 9227 8222

Prepared by:

Site Environmental and Remediation Services

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PO Box 377 Northbridge WA 6865

T: +61 8 9220 2000

W: www.sers.net.au



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Figure 7	Propose Monitoring Bore Locations
Figure 8	Landfill Staging
Figure 9	Infrastructure and Operations Layout
Figure 10	Landfill Rehabilitation Finished Contours

Attachments

Attachment 1	Asbestos Handling Procedure
Attachment 2	Perth Groundwater Atlas Data and Images

Part 1 Environmental Siting and Conceptual Site Model

1.1 Siting context and background

Lot 9001 (88) Caladenia Close, Lower Chittering, Western Australia. The proposed site location is approximately 12.53 hectares. The Site Location is displayed in **Figure 1**.

Site Environmental & Remediation Services Pty Ltd (SERS) have been engaged by Brajkovich Landfill and Recycling Pty Ltd to prepare a licence application to the satisfaction of the Department of Water and Environmental Regulation (DWER) in support of a development application to be made to the Shire of Chittering by town planners, Rowe Group at Lot 9001 (88) Caladenia Close, Lower Chittering, Western Australia 6084.

The characteristics of the site were assessed to establish the engineering and management controls required to meet the objectives of all relevant environmental policies. Cardno (2008) notes that inert landfills throughout Perth are generally old quarry pits or natural depressions, and the DoE (2006) have previously noted that using the area method of filling an existing hole such as a former quarry is the most preferable when screening for potential landfill sites. It can achieve the additional outcome of rehabilitating an existing hole and offers an easier way to manage leachate and litter. More recently, M. Yellishetty from Monash University (2020) highlights that the excessive number of abandoned mines and quarries in Australia, they could present viable opportunities for supplementary waste disposal sites. Mine and quarry site rehabilitation is a growing challenge that all states and territories face. The combination of extraction industries and filling is already being undertaken by multiple businesses in the region.

The *Siting, Design, Operation, and Rehabilitation of Landfills* (Victorian EPA, 2005) highlights that an 'important aspect of screening for potential landfill sites is the type of landfill to be developed. The four basic methods of landfilling and the hierarchy of their preference for use are discussed below:

- the area method, where an existing hole such as a former quarry is filled
- the trench-and-fill method, where a hole is dug and backfilled with waste using the excavated material as the cover
- the mound method, where most of the landfill is located above the natural ground level
- the valley or change of topography fill method, where a natural depression is filled.'

1.1.1 History of the site

The proposed site is 12.53 hectares of a 169-hectare parcel of land, shown in Figure 1. The site has previously been used for clay extraction, with the pit located in the centre of the Site. Midland Brick Pty Ltd had ownership of the land from 1983 to 2020.

1.1.2 Current and historical land use of Lot 9001 (88) Caladenia Close

Historical aerial photography available dates from 1977, however, there is a break between available aerial photographs between 1989 and 2000, which is when works appear to have begun on the site.

- 1977 - 1989** The land can be seen with no structures present and sparse vegetation.
- 2000** Visible in the northern area of the site are sand extraction works and an access road that covers approximately 5% of the site, which is due to the expansion of the now adjacent site.
- 2004** Further expansion of the adjacent site is visible, which covers approximately 15% of the site.
- 2010** The adjacent sand mine covers approximately 50 – 60% of the proposed site area.
- 2015** The sand mine coverage remains similar 2010, holes are deeper.

The site has been operated as an extraction point for clay from 1983 to 2020. The mining of clay started on the adjacent property and expanded to Lot 9001. The area has been progressively excavated throughout the duration of operations at the site. Historical aerial images and title records have been used for the interpretation of the historical site activities, the current title is attached in **Appendix A**.

Surrounding land is made up of bare land, with the proprietor of the site also having ownership of the surrounding 169 hectares, excluding the Muclea Landfill which is located adjacent from the site. The Muclea Livestock Centre is located 500m away and the remaining surrounding land is rural residential properties, with the closest located approximately 630m to the east from the proposed site.



1.1.3 Best Practice Siting Considerations

Table 1-1 Assessment of appropriate siting

	Item	Justification
1	Community needs	The Perth Metropolitan area requires further space for landfill, The Waste Authorities (2019) <i>Waste Avoidance and Resource Recovery Strategy 2030 Action Plan</i> highlights the need for developing waste management infrastructure to meet the needs of Perth and Peel '3.5 million population city'. The visual and noise impact of the operations is predicted to be negligible due to the distance from residents and proposed bunds.
2	Landfill types	Class 1 carries the least risk of off-site impacts to groundwater due to the inert, non-leaching nature of the materials. It has the potential to pose a risk of off-site impacts to air and surface water quality – where controls will be in place to minimise any effect. The applicable area method (filling a former quarry) has the greatest preference for use, achieving the additional outcome of rehabilitating an existing hole and easing the management of litter and leachate.
3	Buffer Distance	Buffer distances for the applicable category of landfills are 150m for site works with an internal site buffer of 25m. See Figure 3 for buffer distances.
4	Groundwater	The site is not located within a groundwater supply area and does not sit above the regional water table. The nearest groundwater elevation underlying the site as indicated by November 2004 contours is 60m AHD (Australian Height Datum 1971), which would correlate to groundwater depth being approximately 30mbgl. Bore records are attached in Appendix B . Considering the depth of the surrounding bores, groundwater is not expected to be impacted. The Gngangara Water Pollution Control Area, a Priority 1 Public Drinking Water Source Area, is located 7.6km east of the site and is considered too distant to have the potential to affect the integrity of this resource. More detail on the site hydrology is in Section 1.2.3 .



	Item	Justification
5	Surface water	The site does not contain any protected wetlands and is not found within reserves or water supply catchments. Several surface water bodies were identified within the 2km sensitive area buffer, and one was identified within the 150m buffer. Figure 4 shows the surface water identified in the area.
6	Flora and fauna	Due to the historic clearing of this area for the extraction of clay, there are no critical habitats or communities of flora or fauna remaining, and landfilling is unlikely to have a significant impact on threatened species and ecological communities. Bush Forever sites are displayed in Figure 5 . As described in Section 1.1.6 , vulnerable and endangered species have been identified within 10km in a Nature Map search provided by DBCA. The complete list is attached in Appendix C . There are no plans to clear vegetation at the site, as the site already contains a pit and an adequate area to be a landfill.
7	Infrastructure	One (1) administration office will be erected on site.
8	Geology	The site is located adjacent to the Darling Scarp. The Darling Fault, however, is located approximately 1 – 3km west of the site, placing it outside of the 100m buffer for fault lines.
9	Land ownership	Ownership changed in February-2023. The property is now under the private ownership of Demo Investment 3 Pty Ltd. The longest ownership was Midland Brick Company Pty Ltd from 1983 to 2020. The previous owner was Lower Chittering & Muchea Pty Ltd, which was acquired in 2020. The title is attached in Appendix A .
10	Aboriginal and Cultural Heritage	The Site falls within the scope of a registered site. Site name: Ellen Brook: Upper Swan Type: Mythological ID: 3525 Protected Area: No As the fill hole has already been excavated, works on the site should not have an effect.

1.1.4 Groundwater

The site is not located within a groundwater supply area and does not sit above the regional water table. There is no direct groundwater data available on *Perth Groundwater Atlas*, however, the nearest groundwater elevation underlying the site as indicated by November 2004 contours is 60m AHD (Australian Height Datum 1971), which would correlate to groundwater depth being approximately 30mbgl and flowing in a south-westerly direction.

The Gnangara Water Pollution Control Area, a Priority 1 Public Drinking Water Source Area is located 7.6km west of the site and is considered too distant to have the potential to affect the integrity of this resource. More detail on the site hydrology is in **Section 1.2.3**.

1.1.5 Surface water

The site does not contain any protected wetlands and is not found within reserves or water supply catchments. Several surface water bodies were identified within the 2km sensitive area buffer, and one was identified within the 150m buffer.

1.1.6 Sensitive Flora and Fauna

There are no Bush Forever sites located within a 2km radius of the site, with the closest site approximately 4.5km away – this is displayed in **Figure 5**.

Likelihood of proposed works threatening sensitive ecological receptors within a 10km radius of Lot 9001

The earliest imagery available is from 1977, where can be seen the site had previously been cleared for grazing, leaving only remnant vegetation. Due to the clay extraction works on the site, most of the remnant vegetation has been cleared. A site inspection has determined the area in question does not represent the vegetation complexes described above, and as such, there is no perceived threat to nearby sensitive ecological receptors.

1.2 Topography, geology, and hydrology

1.2.1 Surface Elevation and Topography

The surface contour map and DEM graph are included in **Figure 6**.

1.2.2 Soil and Geology

The site is located on the Dandaragan Plateau, a feature between the Darling Scarp and Gingin characterised by Cretaceous marine sediments that are mantled by sands and laterites. Generally duplex, some uniform fine, yellow to yellowish brown alluvial soils.

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." See **Appendix D** for Lotsearch soil identification map.

GeoVIEW.WA (Geological Survey of Western Australia, accessed 03/10/2022) identifies underlying geology at the site characterised under State Regolith as:

Characterised under 1:50 0000 Geology:

- SILTSTONE – white thinly bedded well laminated fine-grained large ferruginous concretions and laminae occasionally micaceous.
- SAND – loose white pale grey to yellow medium to coarse-grained moderately sorted angular quartz minor feldspar; residual of colluvial origin.

To the west lies an area of:

- GRAVEL – loose fine (less than 19mm) red-brown to black moderately sorted pisolitic highly variable content of angular quartz sand

To the north lies an area of:

- LATERITE – massive and vuggy to cemented pisolites up to 4m thick associated loose sandy pisolite gravel (G2) of residual origin.

1.2.3 Regional and Local Hydrology

Datasets

The boundary of the groundwater height data contained in the Perth Groundwater Map (accessed 03/10/2022) falls on the boundary of the site. The nearest groundwater elevation underlying the site as indicated by November 2004 contours is 60m AHD (Australian Height Datum 1971), which would correlate to groundwater depth being approximately 30mbgl, displayed in **Attachment 2**.

1.2.4 On-site Monitoring Data

Historical monitoring data

From data provided by the Groundwater Borehole Data Source: Bureau of Meteorology (20/09/2022), 38 bores were identified within a 2km radius of the site. Bore locations are attached in **Appendix B**.

Table 1-9. Most applicable bore detail data provided Groundwater Borehole Data Source: Bureau of Meteorology

Representativeness	Bore ID	Distance & Direction	Details
Nearest to the site – no water level data	#50065050	381m Southeast	Bore located on the property owned by. Drill date 3/1/1997
Second nearest to the site – no water level data	#50059513	457m Northwest	Water supply for livestock
Closest bore with depth availability. Bore depth 62	#50062319	592m Northeast	Drill date 10/18/2002
Bore depth 55m	#50062305	993m North	Drill date 2/26/2009
Located on the property	#50063247	1047m North	Investigations should be undertaken.



Part 2 Landfill Concept

Site Entry

All C&D-derived waste material brought onto the site must be recorded, even if it is brought in temporarily, stockpiled in quarantine, or removed immediately.

Sorting of waste rubble to segregate recyclable components is conducted at the site of demolition as much as possible. Demolished rubble is segregated into:

- Materials with an immediate re-use (salvageable materials) are directed to a salvage yard for re-distribution.
- Residue materials (wood waste, soft plastic) or contaminated extracted material are directed to an appropriately licenced (Class 2 or above as appropriate) landfill.
- Inert materials suitable for landfill are placed within the landfill cell.

Waste types proposed for disposal and the sorting procedure can be seen in **Table 2-1**.

Table 2-1. Categorisation of received waste and management

ID	Waste type	Management following sorting
A	Concrete	Placed within the landfill cell
B	Bricks	Placed within the landfill cell
C	Tiles	Placed within the landfill cell
D	Ceramics	Placed within the landfill cell
E	Glass	Placed within the landfill cell
F	Plastic	Stockpiled with other residue
G	Wood/ timber/ green waste	Stockpiled for periodic transfer off-site
H	Bitumen	Placed within the landfill cell
I	Metals ferrous	Stockpiled as scrap iron followed by periodic off-site transfer
J	Metals non-ferrous	Stockpiled as scrap mixed metal followed by periodic transfer off-site
K	Cabling	Treated as J – metals non-ferrous
L	Soil or clay virgin excavated	Stockpiled for use as cover material
	Damp/wet soil or clay validated within EIL criteria for potential contaminants	Damp soil stockpiled separately and allowed to dry out prior to landfilling



M	Soil or clay validated within EIL criteria for potential contaminants Damp/wet soil or clay validated within EIL criteria for potential contaminants	Stockpiled for use as cover material Damp soil stockpiled separately and allowed to dry out prior to landfilling
N	Contaminated soil or clay Damp/wet soil or clay contaminated	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
O	Material containing asbestos	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
P	Liquid waste	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
Q	Paper	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
R	Cardboard	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
S	Other residue solid waste	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated
X*	*Included if mixture expected to contain dangerous substances	Moved to a quarantine area whilst transfer to appropriate disposal facility is coordinated

Integrity of Construction

The design of the fill area and management of the environmental control systems are the responsibility of SERS Pty Ltd. The construction of the landfill is the responsibility of the lessee for Brajkovich Landfill and Recycling Pty. Ltd.

Where required, geotechnical testing shall be carried out by consultants sub-contracted to the lessee. Investigations shall be conducted under AS 1726:1993 *Geotechnical site investigations*. The proposed future use of the site (pasture) is not expected to require geotechnical certification.

A detailed site-specific Sampling and Analysis Plan shall be submitted to DEWR for review prior to commencement of filling works, providing specifications regarding sampling locations, sample size, applicable criteria, and reporting. Test results shall be stored at the site office along with other site records and retained for a period of five years.

Table 2-2. Guidance documents for field sampling

Testing	Responsible party	Method
Calibration of testing equipment	SERS	Dependant on equipment and sampling methods
Surface water sampling - on-site holding ponds and pond to the south of the site	SERS	In accordance with: <i>AS 5667.1:1998 Water quality-Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples</i> <i>Part 4: Guidance on sampling from lakes, natural and man-made</i> <i>Part 6: Guidance on sampling of rivers and streams</i> <i>Part 10: Guidance on sampling of waste waters</i>
Pollution, erosion and sedimentation control measures: the surface water drainage system, segregation system and leachate collection system	SERS	Field testing for turbidity (Total Suspended Solids) Pollution control criteria will be dictated by investigation levels contained in <i>Assessment Levels for Soil, Sediment and Water</i> (DoE, 2003).
Groundwater sampling	SERS	In accordance with:



Testing	Responsible party	Method
		<p>AS 5667.1:1998 <i>Water quality-Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples</i></p> <p>Part 11: <i>Guidance on sampling of groundwaters</i></p>
<p>TSP, PM₁₀, PM_{2.5}, dust deposition sampling</p>	<p>SERS</p>	<p>In accordance with:</p> <p>AS 2922 <i>Ambient Air -Guide for the Siting of Sampling Units</i></p> <p>AS/NZS 3580.1.1:2007 <i>Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment.</i></p> <p>AS/NZS 3580.9.3:2003 <i>Methods for sampling and analysis of ambient air -Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method</i></p> <p>AS/NZS 3580.9.6:2003 <i>Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM10 high volume sampler with size-selective inlet - Gravimetric method</i></p> <p>AS 3580.9. 7:1990 <i>Methods for sampling and analysis of ambient air - Determination of suspended particulate matter – PM(sub)10(/sub) dichotomous sampler - Gravimetric method</i></p> <p>AS 3580.9.8:2001 <i>Method for sampling and analysis of ambient air - Determination of suspended particulate matter - PM(sub)10(/sub) continuous direct mass method using a tapered element oscillating microbalance analyser</i></p> <p>AS/NZS 3580.10.1:2003 <i>Methods for sampling and analysis of ambient air - Determination of</i></p>

Testing	Responsible party	Method
		<i>particulate matter - Deposited matter - Gravimetric method.</i>
Analysis of water/air/dust samples	Subcontracted to NATA-accredited laboratory	Method selection dependant on analyte and required LOD. Specified methods to be finalised in a site-specific SAP.

Part 2F Surface Water Management

2.2.1 Drainage, erosion, and siltation management

Objectives of on-site surface water are as follows:

- Prevention of water pollution
- Detection of water pollution and remediation if detected
- Maximisation of infiltration capacity of surrounding land by maintaining vegetative cover and minimise clay content of soil on the surface
- Active management of stormwater
 - Divert clean surface flow approaching the pit to minimise the risk of clean water entering areas in which it has the potential to become contaminated
 - Prevent on-site water from entering the road reserve, the surrounding properties, or stormwater drains
 - Enhance the slope of the angle of the capping layer, utilise doming and install drainage channels
 - Prevent disruption to site operations of blocked access from ponded water or mud formation by channelling and containing surface flows
 - Collect any water with the potential to be contaminated and contain it for evaporation or appropriate disposal.
- Prevention of erosion and sedimentation using intermediate capping on flanks of the landfill, draining channels and contour drains
- Ensuring the drainage system is safe for all on-site personnel and site visitors by conducting regular maintenance
- Installation of drainage management measures in keeping with local amenity

2.2.2 Applicable Legislation and Local Government Specifications

Waterways Conservation Act 1976

The Act is defined as:

An act to make provision for the conservation and management of certain waters and the associated land and environment.

Waterways Conservation Regulations 1981

Provide regulations under the following areas:

- Conflict of powers
- Management programs
- General offences
- Licences
- Inspectors and honorary wardens
- Modified penalties

Western Australia Development Design Specification D7 – Erosion Control and Stormwater Management

Acknowledges that construction activity requires the disturbance of the soil surface, predisposing it to erosion. Measures to reduce the erosion hazard are therefore developed as well as measures to control run-off that may contain entrained sediment. Permanent water quality control structures play an ongoing role following the completion of construction and rehabilitation has been finalised.

Stormwater Management Manual for Western Australia

The manual's purpose is to provide a consistent approach to a variety of stormwater management options that may be suitable to a range of built environments throughout Western Australia. The overarching stormwater management objective embraces the principle of sustainability, to achieve a balance of economic, social, and environmental outcomes through policy, planning, and development

2.2.3 Natural Site Drainage

The site is underlain with permeable sands; natural drainage of the site has been affected by the excavation of the clay on the site, and the excavation of the adjacent site in the north. Historically, the surface runoff would have been minimised by native vegetation binding the soil, however, erosion is likely to have increased with the clearing of the site. Recent lower levels of rainfall have also affected the survival of vegetation, further enhancing the erosion potential of cleared areas of Lot 9001.

2.2.4 Predicted Drainage Qualities of Landfilled Inert Material

Inert fill material is intended to consist of brick, limestone, concrete, sand, soil, and other inert material. These materials are expected to be mixed with some fines consisting of sand and clay for stability. The different particle sizes will be well mixed to allow for a final infiltration rate of approximately that of natural soils.

2.2.5 Impact on Surface Water Flow Paths

Due to the extent of the disruption of the site surface and exposure to below-ground clay, the natural drainage has been altered. Completed levels will be designed to maintain the natural flow of surface water across the site. Bunds are present on the site to inhibit surface flows should they develop, and there is slight evidence of erosion of said bunds from heavy flow since their installation. The integrity of existing bunds will be inspected, and additional bunds will be installed in the initial phase of the construction, surface flow shall be a consideration in this process.

2.2.6 Erosion, Sedimentation and Siltation Prevention

There is existing evidence of erosion on-site in the centre of the site where clearing has taken place, with evidence of erosion lines in the area. Much of the existing vegetation shall be retained for as long as possible and clearing shall be restricted to areas required for operations, stockpiling, and access roads only. Interim vegetation will be used to stabilise any areas, not under extraction or being used for fill

Sedimentation shall be controlled by ensuring clay particles entrained in surface runoff are diverted to holding ponds.

Sedimentation shall be controlled by ensuring clay particles entrained in surface runoff are diverted to holding ponds.

2.2.7 Predicted Contaminants

Due to the inert nature of materials intended for processing and disposal on site, the rigorous sorting process that precedes the material being processed, the likelihood that rainwater infiltrating through C&D waste shall contain contaminants is predicted to be negligible.

2.3 Additional Surface Water Management

2.3.1 Infiltration capacity

Traditionally, infiltration of surface water would be maximised in underdeveloped areas of the site and minimised into cover material and across stockpile storage areas. Due to the inert nature of the material to be landfilled, cover material will enhance runoff by implementing materials of low runoff coefficients rather than maximising runoff to minimise infiltration during the times of the year when evaporation rates do not exceed precipitation levels. Erosion and scouring shall be minimised by installing cover material on a gentle slope.

2.3.2 Storm events

Where a heavy storm event is predicted (strong weather warnings issued by the Bureau of Meteorology), batters shall be checked, as well as the integrity and capacity of holding ponds. Erosion prevention measures shall be applied as early as feasible prior to interim revegetation placement.

2.3.3 Quarantine

The quarantine area shall consist of skip bins for designated unacceptable waste, to be cleared from the site periodically. No leachate is predicted from the material contained in the skip bins.

2.3.4 Design of Water Retention

Runoff from the operational areas of the site is not expected to differ in quality from unimpacted areas of the site due to only inert material being processed, and any non-inert material being sorted to prevent leachate formation. As such, surface runoff from the site shall be retained cohesively for irrigation for dust management or fire control.

Nonetheless, any water entering the operations has the potential to impede the progress of the site activities and threaten safe access by 2WD vehicles, thus shall be prevented by the maintenance of the current and installation of additional bunds around the pit. The bunds shall intercept downhill surface flow and redirect water to installed holding ponds.

2.3.5 Local Requirements

In accordance with the Shire of Chittering Local Planning Scheme No. 6 (2000):

- Dams are to be set 30m from any effluent disposal area and have their outer walls stabilised by plants or other means.
- Drains and levees are to be designed to prevent scouring as much as possible, are to discharge into natural drainage lines or basins (where necessary) and are not to be discharged into road reserves.

2.3.6 Drainage

Drainage channels shall take the form of open channels filled with drainage aggregate or piped drains of 300-500mm diameter. They shall be trapezoidal in shape or constructed of a flexible material allowing for settlement. Channels shall pass through restored areas or be re-routed once areas of the site have been filled and capped. Channel gradients shall be restricted to between 1:1.5 and 1:5. Low gradients encourage energy dissipation by minimising splash, thus preventing scouring.

2.3.7 Spillway

On intersection with the holding pond or sedimentation pond, the drain shall widen and flatten to slow flow rate. This spillway shall be reinforced to resist erosion using rip-rap or geotextile, and contain boulders greater than 200mm. Emergency spillways to back-up overflow ponds shall also be constructed of erosion-resistant material such as rip-rap or textile.

2.3.8 Sedimentation Ponds

Due to the nature of the previous extraction on Lot 9001, there are ponds on site that will be utilised provided they are functional and operative with the landfill layout. Channels shall be constructed to direct stormwater into a water sump to better control surface flow and slow flow rate, this will be assessed in the initial stages of the landfill development.

Further holding ponds shall be constructed to prevent on-site water from being transported to waterways or subsoil, as they are needed. Evaporative loss of water being held in the detention lagoons shall be enhanced using reticulation systems, however, this is seen as an emergency contingency measure due to annual water shortages. Holding ponds shall be constructed with a 300mm liner of compacted clay placed in 2 x 150mm lift to the 98% compaction (AS1289) to achieve 1×10^{-9} m/s.

Perimeter bunds shall be trapezoidal in shape, constructed of compacted clay, with 300mm thick layers on the inward to prevent seepage.

2.3.9 Groundwater

Groundwater at the site is currently not known, this will be established when monitoring bores are drilled in the first phase of the construction, however, the known depths of the nearest bores are 62 and 55m. Whilst further material is intended for extraction from the pit, assumed clay content with depth renders extracted material less valuable ex-situ, and more valuable left in place to act as an in-situ low permeable 'liner'. As such, the base of the fill area is not expected to expose groundwater, thus preventing lateral in-flow contributing to leachate formation, or potential contamination of down-gradient groundwater. No inert material shall be placed within 2m of groundwater.

Down-gradient groundwater use tends toward rural activities; however, groundwater extraction is conducted for residential purposes in the area also, thus the highest beneficial use is extraction for drinking.

On-going groundwater investigations shall facilitate the establishment of the hydraulic gradient to enable the assessment of an appropriate groundwater monitoring regime, further details are provided in **Section 2G**.

Part 2G Monitoring Requirements

2.4 Groundwater and Surface Water Monitoring

It is a priority to establish an understanding of the pre-works monitoring quality to assess any changes observed in the future are a result of the on-site operations. As a result, four perimeter bores shall be installed to establish the starting levels, the inferred direction of flow, and the levels of the suite analysis listed below. These analytes have been selected from the Department of Environment monitoring requirements for landfills. Bores shall be installed as part of the initial site works. Their locations will consider the accessibility and the future site landscape, see **Figure 7** for proposed bore sample locations.

2.4.1 Bore Construction

Bores should be drilled by a licenced groundwater bore driller with considerations for the siting, design, and construction method. The bore design should consider the protection of the groundwater resource. Monitoring bores are drilled specifically to obtain data on groundwater, their basic characteristic is that they are typically low-yield construction yet provide an accurate means for water sampling and water level measurements (*Minimum construction requirements for water bores in Australia, 2020*). Once drilled, the contractor should provide a Quality Construction Report.

2.4.2 Monitoring

Monitoring shall commence prior to filling and occur 6 monthly and must be 5 months apart, longitudinal quality comparisons will occur between samples taken in the same year, and groundwater quality has to propensity to change with the level of the water table. There is a surface water body located within the 150m buffer south of the site, this shall be tested for the same analytes as the groundwater at the same time as the bore monitoring, this should be included in the pre-works sampling period.

The highest inferred beneficial use for groundwater surrounding the site is for stock-watering, irrigation, and industry. A water licence is required for abstract groundwater for surface use under Western Australian legislation.

The site is located within the Gingin groundwater area.

The Department of Water Register lists 11 Water Extraction Licences within 2km to the east and south of the Lot 9001 boundary, however, it does not provide details of groundwater use. The available data detailing groundwater extraction use is described as domestic, household, and livestock. It is known that bore water for domestic use is common in the area, it is also used for stock water and irrigation.

Field groundwater testing shall be carried out bi-annually for the following characteristics:

- Standing water level m(AHD)
- pH
- Electrical conductivity
- Aluminium, Arsenic, Cadmium, Chromium
- Copper, Iron, Mercury, Lead
- Manganese, Nickel, Zinc, Potassium, Selenium, Chloride, Sulphate
- Total acidity, Total alkalinity, Total aluminium, Total iron
- Total nitrogen, Total phosphorus
- Total Dissolved Solids (TDS)
- Organochlorine pesticides BTEX (benzene, toluene, ethylbenzene, xylene)
- Polycyclic aromatic hydrocarbons (PAHs)

The groundwater monitoring shall be done by a suitably qualified person using a water pump and YSI monitor and analysed at a NATA-accredited laboratory. Results will be kept, analysed, and reported in a yearly Annual Environmental Report submitted to the Department of Water and Regulation.

Part 3 Premise Operations

3.1 Landfill Management and Operations

3.1.1 Management Objectives

Along with continued clay extraction, the site will be used as a landfill. Due to the increasing scarcity of landfill space, the Perth Metropolitan area requires further space for landfill, The Waste Authorities (2019) 'Waste Avoidance and Resource Recovery Strategy 2030 Action Plan' highlights the need for developing waste management infrastructure to meet the needs of the Perth and Peel '3.5 million population city'. As such, the maximum amount of material able to be recycled will undergo re-use and the capacity of the available space will be utilised most efficiently.

Waste material shall be handled and disposed of using the procedures specified within this document. Landfill operations will be conducted with the following objectives

- To assure the quality of design, construction, and operation
- To provide adequate staffing and training
- To assure the quality of incoming waste by the implementation of a thorough screening process on entry and re-direction of unacceptable waste
- To measure waste quantities received by recording quantities, types and sources of waste received
- To minimise landfill space utilised by reducing waste to individually recyclable components, maximising recycling processes, following a filling plan with finished contours, and using effective compaction methods
- To close and rehabilitate the landfill, undertaking follow-up post-closure monitoring if required and completing maintenance by capping the site, revegetating, and, if necessary, providing financial assurance for remediation

3.1.2 Operational hours

Operational hours of the facility are proposed to be as follows:

Monday to Friday 7am – 7pm

Saturday 7am – 3pm

3.1.3 Security Fencing and Site Access

No public access to the site shall be permitted as a preventative measure to protect public safety and to eliminate the potential for instances of fire and illegal dumping.

A Class 1 extractive industry site requires a 1.8m wire mesh fence constructed around the site perimeter.

It will contain locked gates to permit access via restricted points at driveways and internal haul roads.

The fence shall be sufficient to prevent access by stock and protect the offsite area from on-site impacts.

Gates shall be locked whenever the site is unattended.

To prevent any possible instance of illegal dumping and ensure any air-borne litter is retained within the site boundaries, the fencing will be examined during daily inspections and maintained immediately should it appear compromised.

The inert nature of disposal materials and the frequency of removal of quarantined materials deemed unacceptable for disposal makes after-hours security non-compulsory. To ensure accurate recording of material received and removed, and to prevent any out-of-hours dumping, the truck access to the site shall be denied without the manager in attendance.

Gates providing contingency access to the site other than the main site gates shall remain locked unless required for emergency access, or the main access road is compromised.

Internal Site Security

Where access needs to be restricted to certain areas of the site, appropriate boundaries shall be delineated using bunting. The reason for restricted access should be conveyed to all site staff via an impromptu toolbox meeting, or if it is not urgent or hazardous, at the toolbox meeting the following day.

3.1.4 Internal Traffic Control

Traffic will be managed with clear signage and enforced by all management staff on site. 10km/h signage will be displayed at the entrance and throughout the site. During the site induction staff will be made aware of the 10km/h limit.

3.1.5 Nature of Landfill

The landfill will be designed to reinstate the volume of sand that has historically been removed and is proposed for future removal, by replacing the space with inert rock and concrete material.

C&D waste is made up of a mixture of broken bricks, tiles, concrete, sand, gravel, PVC piping, mixed steel, and some soil. It does not contain toxic materials. This material once sorted is appropriate as bulk fill for use in raising site levels for former quarries.

Landfill Lifecycle

Landfills are phased to better assess compaction rates and control the placement of material. The current configuration of the pit shall house the four phases of filling, each phase predicted to take five years, see **Figure 8**.

Cells will be marked out before commencement and filled to final levels in succession to enable even raising of site elevation to preserve safety and amenity values. This ensures a cycle of progression filling across the base level whereby cells are filled concurrently to provide access to higher levels, reducing the fall distance and minimising the generation of dust. This also allows one phase to be restored whilst a second is being filled and another is being prepared for filling. Benefits include:

- Allowing tight organisation of site disposal operations
- Reducing noise and litter
- Providing a positive visual impression

Estimated Duration of Landfill Operations

Phase 1 has been designed to take approximately five years to complete, with the potential to be extended should insufficient material be available. This timeframe shall be subject to revision and/or extension as the supply and demand of materials fluctuate. Revisions of filling plans shall be submitted with the annual environmental report submitted to the Department of Environment and Water and Shire of Chittering. Phases 2, 3 and 4 are expected to take approximately five years to complete subsequently.

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 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) – illustrated in **Figure 8**. The four phases' areas are as follows:

Phase 1 approximately 12,000m²

Phase 2 approximately 6,000m²

Phase 3 approximately 8,000m²

Phase 4 approximately 10,000m²

3.1.6 Acceptable Material

Providers of raw C&D waste shall be required to source-segregate the waste, and only acceptable material as detailed below shall be received for processing.

Acceptable materials shall comprise the following:

Brick, tile, concrete, limestone, excavated materials, sorted ferrous and non-ferrous scrap metal, soil, clay, asphalt, hard plastics and bitumen.

Material that does not fall into the above category shall be deemed 'non-conforming' and be appropriately dispatched from the site.

Material is source-sorted for transport into the following categories:

- Inert materials
- Salvageable timber
- Salvageable bricks/ limestone/ tiles
- The residue (all non-conforming material)
- Scrap metal

The process minimises the sorting required once the material is tipped and ensures that only a very small amount of residue or green waste material is included in any mixed load.

Once loads of materials are off-loaded, the material shall undergo initial inspection and further sorting, and materials that would otherwise be considered unacceptable shall be classed as residue and stockpiled or quarantined accordingly, and recyclable materials (wood waste, green waste, ferrous and non-ferrous scrap metal) shall be stockpiled or quarantined for regular collection for off-site processing.

Strict waste acceptance criteria and successful segregation techniques shall dictate that no organic waste shall be landfilled. This process ensures that neither landfill gas nor leachate is formed, thus the installation of a leachate collection and removal system and a landfill gas control system is not required.

The site manager is responsible for the coordination of diverting, handling, and re-directing waste for recycling, re-use, or re-processing. Only inert material shall be used as fill, negating the possibility of scavenging.

Any green waste or wood waste requiring re-processing before recycling shall be stockpiled on-site prior to off-site transportation. No composting shall occur on-site.

Pliable, moist shall be accepted on the conditions below:

- There is no free liquid
- It is 'spadable'
- There is no slump at an angle of repose 1:2
- It is not contaminated and has passed leaching criteria – results to be provided to environmental management and acceptability conveyed to the site manager prior to acceptance of waste.

3.1.7 Unacceptable Waste Material (non-inert)

Unacceptable waste material shall comprise the following:

Recyclable materials requiring off-site processing, paper, cardboard, tyres, liquid waste in drums, fuel drums, batteries, pesticide bottles, ash, municipal solid waste, asbestos, contaminated soil, explosives, poisons, dangerous goods, radioactive materials, clinical or hospital waste, scheduled pharmaceuticals, biohazards or medical waste, grease trap waste, brine, tannery waste, and any other waste for which the site is not licenced.

Any loads visibly containing the above shall be re-loaded following sorting and dispatched from the site. The load coordinator shall be notified, and loads shall be directed to an appropriate alternative facility at terms agreed between the operator and the supplier.

When these materials become visible following tipping, the site supervisor should be informed, the material shall be immediately quarantined, and an incident form will need to be completed. Any material sorted from inert waste unsuitable for disposal on-site under licenced conditions shall be transferred to the quarantine area and placed in skip bins to prevent leachate.



Table 3-1. Site personnel responsibility and machinery

Step	Activity	Personnel				Machinery				
		Site Supervisor	Machine Operator	Truck Driver	Semi-tipper	Excavator	Loader	Screener	Watercart	Compactor
Pre-start										
	Site inspection – details of the site recorded	X								
	Toolbox meeting – outline weather conditions and impact on proposed site activities	X								
On-going site maintenance										
	Dust suppression		X						X	
Gate – entering vehicles										
1	Material received at entry point – time, vehicle registration number, waste volume, waste type and source recorded	X		X	X					
2	Material directed: - To stockpile - To quarantine - Turned away and redirected to an appropriately licenced facility	X		X	X					
On-site										
3	Stockpiled material manually sorted:		X			X	X			



	<ul style="list-style-type: none"> - Non-inert material moved to appropriate stockpile: <ul style="list-style-type: none"> - Green waste - Scrap metal - Other residue - Quarantine Inert material stockpiled for screening 									
6	Inert material undergoes screening		X	X			X	X		
7	Screened material consolidated into stockpiles <ul style="list-style-type: none"> - Fines - Medium-grade aggregate - Drainage aggregate - Green waste - Scrap metal - Other residue 		X				X			
8	Materials loaded for transport off-site: Immediate re-use value <ul style="list-style-type: none"> - Fines - Medium-grade aggregate - Drainage aggregate Secondary reuse value following re-processing off-site <ul style="list-style-type: none"> - Green waste - Scrap metal End-of-life materials requiring disposal at alternative facility with the appropriate licence <ul style="list-style-type: none"> - Residue 		X	X	X					
9	Inert material landfilled and compacted		X			X	X			X
10	Cover material (sand/fines) placed on inert fill		X			X				X
Gate – exiting vehicles										



11	Empty trucks leaving site – details of time, vehicle registration number recorded	X		X	X					
12	Material leaving at exit point – details of time, vehicle registration number, waste volume, waste type and destination.	X		X	X					

Disposal at Landfill Sites

Within the metropolitan area, Asbestos Containing (AC) waste must be disposed of in accordance with the requirements of the *Health (Asbestos) Regulations 1992*.

Landfill sites that accept ACM waste are listed below however the sites should be contacted to determine conditions of disposal. Further information can also be obtained from the Asbestos Safety and Eradication Agency.

Table 3-2. Landfills accepting Asbestos

Landfill	Address	Contact Phone Number
Red Hill Waste Management Facility	Toodyay Road, Red Hill	9574 6235
Hester Landfill & Recycling Facility	Hester Avenue, Neerabup	0437 208 429
Brajkovich Landfill North	91 Walyunga Road Bullsbrook	0411601844
EMRC	Toodyay Road, Gidgegannup	9574 6235
Waste Stream Management	Thomas Road, Kwinana	9439 1300

Asbestos-handling risk assessments and handling procedures are to be always utilised.

At the conclusion of the removal of AC material, the site is inspected against the initial inspection log to ensure that all hazardous materials have been removed. If the inspection finds additional material not sighted or the removal procedures have not been carried out correctly, remedial action will be required. This inspection process is to be repeated until such time as all hazardous material known has been removed.

Equipment

Machinery and equipment proposed for use on the site consist of:

- Water Cart (1)
- Loaders (2)
- Excavators (1)
- Large semi-tippers (maximum 3 at any one time)

Inspection on Tipping

Material shall undergo a thorough inspection upon tipping. All tipping shall be done with the site manager present to allow recording of tipped material.

A copy of the licence conditions shall be always retained in the site office.

Details of each load shall be recorded for inclusion in monthly site reports and provision to regulatory authorities. Waste shall be inventoried according to the categories provided in **Table 2.1**.

Should material appear to contain unacceptable material in breach of licence conditions, details of the load shall be noted, and the supplier notified that the load shall be re-directed to a licenced disposal facility.

If hazardous materials have been transported to the site, unacceptable waste or excluded waste without the appropriate warning signs, the Department of Water and Environment Regulation and Main Roads shall be notified of the vehicle details including the registration number and source of waste.

Quarantine

There shall be an isolated compound for unacceptable waste that must be temporarily stored on-site until it can be re-directed to an appropriately licenced facility. The quarantine area shall have a compacted surface with bunded edges to contain any possible run-off from non-conforming wastes contained in covered skip bins.

Unacceptable waste that requires quarantine includes:

- Asbestos
- Green and wood waste
- Scrap metal
- Other non-conforming waste

Asbestos waste shall be handled according to the procedure outlined in **Attachment 1** of this document. Other waste described above shall be isolated using mechanical separation and stockpiled or placed in skip bins in quarantine independently. Details shall be reported to the site manager to update the diary, noting the date and from which load the material originated.

Off-site Disposal

End-of-life products isolated following the sorting and screening process shall be quarantined before disposal to an alternative landfill facility. This material shall be transported off-site prior to the end of the month; thus, the entire quarantine area will be cleared once a month.

3.1.8 Working face

The working face shall be approximately 50m in length and easily accessible for large trucks. It will be shielded from the roads by the attenuation bunds constructed to the west of the landfill area see **Figure 9**.

The placement of material shall be coordinated by the site manager to engage dust minimisation measures. Roads accessing the tip face shall be constructed to facilitate ease of navigation and manoeuvring by semi-tipping, allowing a one-way system to minimise any disturbance of amenities caused by reversing alarms.

Compaction

Compaction rates and therefore the life of the landfill will ultimately be constrained by the volume of airspace available, licenced intake volumes, operational constraints, and the characteristics of material undergoing compaction. The compaction rate shall be maximised to achieve the maximum lifespan of the landfill. A combination of the grade of surface integrity required for the final land use and the desired volume of material to be disposed of within the volume of airspace available determines the desired density following compactions, dictating the compaction rate. Pasture requires a stable surface that will not settle unevenly, however, there is no future construction planned for the area of Lot 9001.

The material in question, clean fill and crushed aggregate (to 100mm) which will be imported to the site for purpose of compaction and structural integrity of the landfill, shall be placed, spread, and compacted to an even density of between 0.95 – 1.5 tonnes per m³ using the compactor. Compaction shall thus entail four to five passes of the compactor (moving uphill) to ensure the greatest compaction is achieved.

The compaction rate achieved shall be sufficient to:

- Withstand erosion and settlement
- Stabilise slopes

3.1.9 Cover material

As the composition of waste material is inert and is otherwise used alone for drainage whereby it is left exposed and has not resulted in the generation of odours or has been appropriated for habitat or nesting by vermin, the placement of cover material is not considered a necessity.

Cover material shall be placed periodically, however, to assist with stability.

Cover material shall be made up of either virgin excavated sand such as that extracted from the site itself or other clean fines such as those which arrive on site (previously crushed).

Should any part of the site remain inactive for a period exceeding ninety days, a 300mm cover shall be placed. The capping shall be implemented as part of the site rehabilitation measures. These are covered in **Part 4.**

Life expectancy of fill operation

Fill operations are currently estimated to take approximately twenty years to complete, however, this will depend to a large degree on the demand for landfill space and future advances in the recycling capability of C&D waste material.

3.1.10 Dust Management

Below is a summary of site operations that have the potential to generate dust and the proposed control measures. A comprehensive dust management plan is provided in **Appendix E**.

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

- Movements of heavy vehicles on haul roads
- Tipping C&D material
- Movement of inert material on the site

Movement of materials, disturbance of stockpile surfaces, and general operations have 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 Policies and Bylaws.

Objectives

The objectives of a 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 specific 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 operations

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 loading and off-loading of rubble. Dust management measures are primarily addressed at the landfill operations, and secondarily at clay extraction activities as there is no history of complaints received from clay 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 sprinklers use throughout dry and windy conditions

3.1.11 Odour Management

There is a negligible risk of odour becoming an issue on-site due to the inert nature of materials being used for landfill, and the regular removal of any organic waste components from the site.

Should any complaints be received regarding odour generated on the site, they should be recorded, logged, and forwarded to the environmental manager. The source shall be identified as soon as possible, and the complainant kept informed of all remedial measures undertaken.

Odour prevention measures include dust suppression, using covers on waste loads, preventing on-site fire, and controlling vehicle emissions. A supply of fine-grained lime shall be retained on-site as a contingency measure for use as a cover material, should waste become odorous.

3.1.12 Noise Management

Below is a summary of site operations that have the potential to generate noise and the proposed control measures. A comprehensive Noise Management Plan is provided in **Appendix F**. Noise assessments are undertaken as part of an environmental impact assessment to ensure that noise emissions comply with the Environmental Protection (Noise) Regulations 1997 such an assessment includes both audible vibration (sound) and non-audible vibration, experienced as a physical sensation. Both forms have the capacity to

cause discomfort, and long-term environmental noise exposure has been linked to community health impacts.

Movement of materials, disturbance of stockpile surfaces has the potential to contribute to noise emissions, potentially impacting human health 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 Noise Regulations 1997, and the Shire of Chittering and Bylaws.

The nearest residential building (house on Lot 118) is located 769 meters from the Lot 9001 property boundary.

From the proposed landfill boundary within Lot 9001, the nearest residential buildings lie within the distances below:

- 769m – Lot 118 to the east of the site
- 852m - Lot 52 to the south of the site
- 820m - Lot 120 to the south-west of the site
- 840m - Lot 101 to the east of the site

There are, however, no noise-sensitive premises within a one-hundred-and-fifty metre radius of the area proposed as an inert landfill. The area for Phase 1 of the landfill is located between 700 and 800 metres from the nearest four residences (both on- and off- site).

Objectives of noise management

Objectives of managing noise include

- Prevention of noise pollution
- Prevention of impact on residents of neighbouring properties
- Prevention of impact on the amenity of the area

Control Measures

Noise can be controlled via a combination of machinery-specific and ambient methods.

Machinery-specific methods:

- De-activating reversing beepers during more sensitive times of the day
- Negating the need for reversing beepers by using a one-way traffic system
- Ensuring machinery is well-maintained

- Using mufflers on machinery where possible

Ambient methods:

- Restricting vehicle speeds
- Restricting the use of airbrakes
- Prohibiting excess revving
- Prohibiting entry of excessively noisy trucks and reporting them for service
- Restricted operating hours

3.1.13 Incident prevention measures and contingency plan

Training in emergency response and action plans. Emergencies can arise:

- Anytime

The requirement of emergency action on-site can be prompted by many situations. Each situation shall require a slightly different approach depending on the type of emergency and the likely area of impact.

Emergency response training prioritises the safety of human health by using appropriate procedures for each situation, Emergency Response Procedures and Action Plans, as well as providing the basis for site induction and six-monthly training of staff and visitors, they will be posted in the site office.

Spills

Spills or leaks can occur:

- During re-fuelling
- During machine operation from poor maintenance
- During the transport of fuel
- During machinery storage if left exposed

Prevention measures

Spill kits shall be available at the gatehouse, and wherever fuel is stored.

Site employees shall be trained in spill prevention, for example during machinery maintenance works, and immediate containment of spills or leaks. Where possible, machinery maintenance shall be carried

out off-site. If this is impossible, maintenance shall not be carried out on the unsealed ground. If machinery cannot be moved from the unsealed ground, sufficient ground sheets shall be laid and the edges bunded to allow the effective collection of any spilled liquid, preventing infiltration to soil. Trays shall be underlain during re-fuelling.

Slope collapse

Slope collapse can occur:

- During heavy storm events
- Following heavy storm events

Prevention measures

Periodic testing of the stability of slopes and berms and regular inspection for signs of erosion or scouring shall prevent incidents of this nature. Should any signs of comprised resiliency or integrity be observed by any site personnel, they should report to the site supervisor, and repair works initiated.

3.1.14 Fire

Fires can occur:

- Due to arson
- Due to poor practice during fire-risk periods of hot, dry weather
- From lightning
- From the poor implementation of regional fire management practices to reducing fuel loads

Applicable legislation

Bushfires Act 1954 - defined as 'an act to make better provision for diminishing the dangers resulting from bush fires, for the prevention, control, and extinguishment of bush fires, for the repeal of the Bush Fires Act 1937 and for other purposes.

Prevention measures

All on-site staff will be appropriately trained in fire response procedures, placing the protection of human health, and ensuring fires do not leave site boundaries as the highest priorities.

Fire prevention objectives are comprised of the following

- Provide adequate staffing and training requirements
- Ensure Lot 9001 firebreaks are maintained
- Minimise the presence of fuel on-site (vegetative, motor, and chemical)
- Provide adequate fire-fighting capacity for Lot 9001 and ensure equipment is stored in an appropriate location and is readily accessible
- Prevent unauthorised entry to the site

Areas with high levels of remnant vegetation are identified as having the greatest fire risk, and mixed-use areas have undergone clearing to allow for expansion of agricultural activities in the vicinity of Lot 9001, the area is in a bushfire-prone area.

Documents used to collate these fire prevention measures are listed below:

- Guidelines for Planning in Bushfire Prone Areas V 1.4 (December 2021)
- Planning for Bush Fire Protection Guidelines Ed. 2 (May 2010) (WAPC, DoP, FESA)
- Fire Control and Extinguishing Procedures at Permitted Construction and Demolition Landfills (KDHE)
- Landfill Fires - their magnitude, characteristics, and mitigation (FEMA 2002)

Fire extinguishers

All machinery will have a fire extinguisher installed either in the cab or within reach of the cab. Fire extinguishers shall also be available at the gatehouse and wherever fuel is stored.

Water access points

Water sources with sufficient pressure to extinguish fires will be available via any of the reticulation points around the operational site area.

Additionally, a water truck with a fire-hose attachment will be always on-site. The fire hose should be capable of reaching any area of the site without the water truck leaving the access roads.

Water will be sourced from the on-site sump, supplied by an on-site extraction bore.

Placement of fuel material - green waste, waste timber, and wood

Any organic matter has the potential to act as fuel, thus loads will be kept to a strict minimum in accordance with proposed management practices entailing removal off-site by close of business each Friday.

Tyres shall not be placed anywhere a fire can reach them, and not be mixed with other waste. Any

overhanging timber or vegetative material should be trained away from tyres or other stockpiled waste, preventing contact

Seasonal fire bans

Fire bans are imposed every summer to ensure the prevention of accidental bushfires. The start and end dates of the fire ban will be identified at the start of every financial year, and all site operators notified on the days approaching the commencement of the fire ban.

Additionally, common rural behaviours and activities with the capacity to produce sparks are often prohibited as part of the ban, such as driving across dry paddocks and using power tools. Any such additional requirements by the Shire of Chittering will be adhered to.

Implementation and maintenance of rural property fire breaks

As a requirement by the Shire of Chittering, internal fire breaks within each property boundary must be established and maintained throughout the year.

Smoking restrictions

Due to the dry climate of the area, cigarette butts must be completely extinguished prior to disposal and disposed of using an appropriate vessel.

Smoking will be prohibited within 15m of any heavy machinery being operated.

Signage

Signs will be erected on-site stipulating: No naked flames within 15m of operating heavy machinery
Equipment locations shall be clearly signposted.

Restricted site access

Site access shall be limited to inducted personnel and site visitors. There will be no access to the public. Entry gates shall be locked whenever the site is unattended, thus deterring potential arsonists.

Material received alight

Any ignited material received at the gate shall be extinguished and the supplier contacted immediately. The load shall be diverted to an alternative disposal facility as soon as is feasible.

Any material revealed on tipping to be smouldering, smoking, or showing any other signs of being alight shall be extinguished immediately, and moved away from any potential fuel (vegetative, motor, chemical). The gatehouse should be contacted to ascertain the supplier, and the supplier must be contacted immediately, and further loads diverted.

Compaction rate

In putrescible landfills, a low compaction rate has a higher corresponding fire risk. As the only material proposed for filling is inert rock and soil material, the compaction rate is not anticipated to correlate to fire risk.

3.1.15 Chemical and Fuel Storage

To ensure the minimisation of incidents occurring with hazardous materials such as fuel which have to potential to be catastrophic for personnel as well as the environment, strict procedures will be followed. Diesel fuels that will be used on site are classified as a Class 1 combustible liquids and are classified as dangerous goods for storage purposes.

Applicable Legislation

Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007

Fuel use and storage

All chemicals stored on-site that may pose a threat to water resources if released into the environment such as pesticides and fuel – these substances should be held in weatherproof bunded compounds.

These chemicals should always be used in accordance with the supplier's instructions. In Priority 3 Underground Water Pollution Control Areas, this Department's written approval underwater catchment protection by-laws is needed for the storage of more than 250 litres of chemicals (including fuel). (Part 24). The following guidance should be adhered to, to ensure the safety of all personnel on-site and protection of the environment:

- “A person must not smoke or have any open flame within 4 m of a fuel tank or other storage or handling system while the flammable liquid is being supplied from a discharge facility to that tank or system
- A person must not dispense any flammable liquid into the fuel tank of an engine while the engine is running except as permitted under the Civil Aviation Act 1988 of the Commonwealth.

- An operator of a dangerous goods site must ensure that storage or handling systems at the site have been designed, built, installed, commissioned, maintained, and isolated by means of distance or barriers so that, so far as is reasonably practicable, they can be operated with minimal risk to people, property and the environment.” (Dangerous goods Act, 2007)

Servicing of mechanical equipment that involves liquids such as coolants, hydraulic oil, brake fluid or lubricants may be acceptable provided the site operator demonstrates the implementation of effective management systems to capture and export these liquids for recycling or disposal at an approved facility (part 27)

Part 4: Landfill closure and rehabilitation

4.1 Site Rehabilitation Plan

Post-closure management is subject to regulatory change prior to being instituted, thus will require updating as the landfill progresses. Further details of the rehabilitation are in the **Landfill Closure Plan in Appendix G**. Currently, ongoing management of closed landfill sites which are undergoing rehabilitation and aftercare is regulated by the EPA.

The restoration of the landscape will aim to return it to its previous use which was identified in the historical aerial images as bare rural land with vegetation.

Objectives of site rehabilitation

Rehabilitation of the site will be carried out with the following objectives in mind:

- Contain buried waste material
- Restore sufficient material to emulate natural pre-excavation hill contours
- Install a capping able to minimise infiltration of rainwater and thus reduce leachate generation
- Facilitate the construction of long-term drainage systems requiring little to no future maintenance
- Replace topsoil suitable for supporting vegetative growth
- Re-planting capping to a mixture of pasture and some vegetation endemic to the area
- Provide a suitable platform for the re-use of the site as pasture
- Comply with licence conditions to implement site rehabilitation and maintenance measures

The post-closure management measures outlined below shall be subject to ongoing updates throughout the tenure of the project.

Historic rehabilitation measures

Works at the site aim to restore land levels approximating those present prior to excavation of the hill. Excavation works progressed in rough stages and as early stages were completed, they were left as is. Vegetation in these areas has been slow to re-establish however can be considered present across most historically excavated areas.

Some areas were deliberately built up and actively revegetated to preserve the visual amenity of the site. Vegetation in these areas appears densely planted and healthy and has successfully stabilised banks and bunds.

Active rehabilitation of the site will take place on completion of the surface of each cell. Once surface levels are achieved, topsoil will be spread and seeded. The area will then be cordoned off to allow the effective establishment of native vegetation.

Site restoration and reinstatement

From the outset, Extraction Licences were granted on the basis that rehabilitation is conducted upon completion of excavation works. Initially, rehabilitation referred to reverting the land to pasture. Later, emphasis began to be placed on the re-institution of native vegetation, along with the vegetation of banks and bunds put in place for the purpose of retaining visual amenities of the site from the road.

Capping

Waste material shall be overlain with a topsoil layer capable of supporting vegetation allowing for effective use of the land following completion and posing no future risk to land users. The whole structure, however, must be anticipated to settle over a period of approximately five years by up to 30%. As such, 'final finished levels' are subject to change and must be established to allow for settling. Settling can be minimised by secure compaction of waste material, and compaction of cover material once in place.

The final capping should consist of a layered structure. It should be noted that this layer shall not be placed until the final levels have been achieved. Rehabilitation shall commence at the completion of each phase to allow for periodic reclamation of land. As a minimum of five years is expected to elapse before this is achieved for the first phase, the design of the final capping layer is anticipated to be updated prior to implementation.

Over the top of waste material shall be placed the following:

- Seal-bearing surface: gradient <5% towards defined drainage points
- Sealing layer of clay: >500mm permeability 10^{-8} m/s
- Infiltration drainage layer: >300mm of permeability $>10^{-5}$ m/s
- Topsoil layer: >100mm

Permeability testing will be performed by qualified personnel to ensure the cap construction and installation are in line with regulations and is fit for purpose for the future.

Finished topography

Indicative proposed levels have been formulated using the topographic levels supplied by Landgate, as the topographic levels provided are from (Year) which is prior to excavation. They are provided in **Figure 10**.

Revegetation works

Topsoil shall be returned to its area of origin as much as possible, with overburden being placed before topsoiling up to surface level.

Planting is to occur during autumn and winter as appropriate to each species.

The second round of revegetation is to occur should high mortality rates be experienced during the first round.

Weed control

Weed control measures will comprise the following:

- Control of access
- Monitoring of new weed populations
- Early detection and eradication of new weeds
- Application of herbicide where the appropriate and safe application can be ensured
- Manual control of small infestations or where chemical control is unviable, ensuring gross soil disturbance does not lead to weed replacement.

Post-closure monitoring

Closure of the landfill is not expected to occur for approximately twenty years, by which time land management measures are expected to have changed, thus only provisional measures are proposed here. Current management practices stipulate ongoing monitoring of surface water, leachate, groundwater, and landfill gas. As landfill gas is not expected to be generated by a landfill of inert material, it is not proposed for monitoring either throughout the life of the landfill or post-closure.

Ongoing monitoring of groundwater and surface water is proposed for a period of two years on a six-monthly basis of a limited suite of analytes, listed below:

- Ammonium, Calcium, Iron, Manganese, Magnesium, Potassium, Sodium
- Chlorine, Fluorine, Nitrate, Sulphate

References

- Australia, Government of Western Australia, WA Planning Commission. (2021). *Guidelines for Planning in Bushfire Prone Area* (Vol. 1.4). Perth, WA: Western Australian Planning Commission.
- Australian Ramsar Wetlands. (2022). Retrieved October 3, 2022, from <https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/australian-ramsar-wetlands>
- Department of Environment and Conservation. (2011). *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities*. Perth, WA: Department of Environment and Conservation, Western Australia.
- Department of Mines, Industry Regulation and Safety GeoVIEW.WA. (2022). Retrieved October 25, 2022, from <https://geoview.dmp.wa.gov.au/geoview/?Viewer=GeoView>
- Department of Water and Environmental Regulation, *Assessment of environmental noise emissions* (draft) 4–17 (2021). Perth, WA; Government of Western Australia.
- Department of Water and Environmental Regulation, Waste Authority. (2019). *Waste avoidance and resource recovery strategy action plan 2030: Western Australia's waste strategy*. Perth, WA
- Department of Water and Environmental Regulation. (2019). *Landfill Waste Classification and waste definitions 1996 (as amended 2019)* (pp. 8-25). Perth, WA: Government of Western Australia.
- Department of Water and Environmental Regulation. (2021). *Managing asbestos at construction and demolition waste recycling facilities* (pp. 5-25). Perth, WA: Government of Western Australia.
- Department of Water, *Landfilling with inert materials* Water Quality Protection Note
- Department of Water. Perth Groundwater Map. (2017). Retrieved September 25, 2022, from <https://www.water.wa.gov.au/maps-and-data/maps/perth-groundwater-atlas>
- Desmond, A. (2001). *Swan Coastal Plain 1 (SWA1 – Dandaragan Plateau subregion)* (pp. 1-11) (Department of Parks and Wildlife). Perth, WA: Government of Western Australia.
- El-Fadel, M., Sadek, S., & Chahine, W. (2001). Environmental management of quarries as waste disposal facilities. *Environmental Management*, 27(4), 515-531. doi:10.1007/s002670010167
- Environmental Protection Agency, *Separation distances between industrial and sensitive land uses* 5–12 (2005). Perth, W.A.
- Environmental Protection Authority. (2018). *1490.1: Closed landfill guidelines* (pp. 1-28). Melbourne, VIC: EPA Victoria.
- Government of Western Australia. (2015). *Landfilling with inert materials* (Note no. 24, pp. 2-10). Perth, WA: Department of Water.
- Hirschberg, K. J. (1992). *Municipal Waste Disposal in Perth and its impact on groundwater quality*. Perth, WA:

Western Australia Geological Survey.

Minimum construction requirements for water bores in Australia. (2020). Wangara, WA: Australian Drilling Industry Association.

Siddiqua, A., Hahladakis, J., & Al-Attiya, W. (2022). An overview of the environmental pollution and health effects associated with waste landfilling and open dumping. *Environmental Science and Pollution Research*, 29(39). doi:10.1007/s11356-022-21578-z

State Government Victoria. (2015). *Siting, design, operation and rehabilitation of landfills* (pp. 10-55). Southbank, VIC: Environment Protection Authority.

The Department of Planning. (2021). *Guidelines for Planning in Bushfire Prone Areas* (Vol. 1.4). Perth, WA: Western Australian Planning Commission.

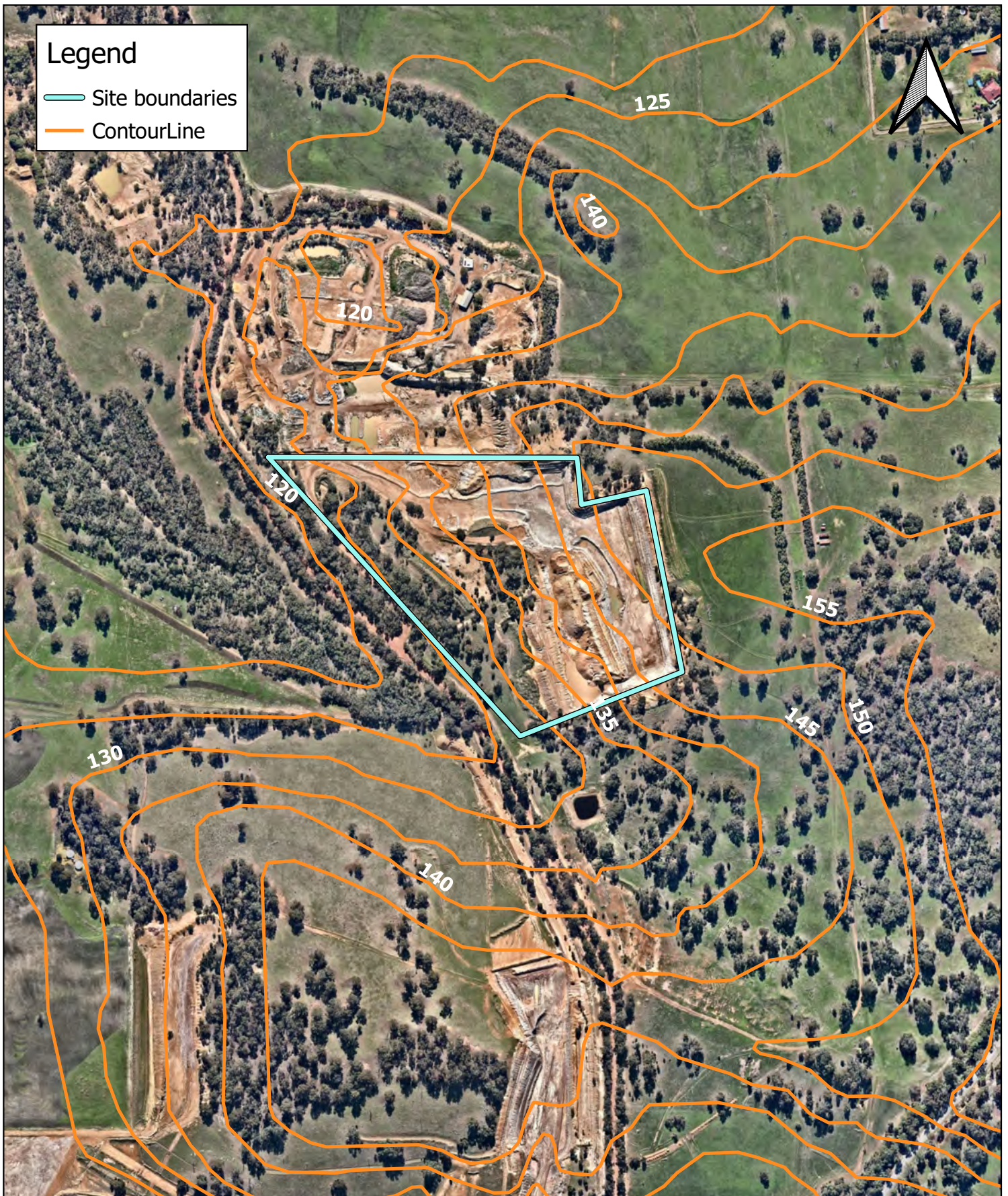
Western Australia., Environmental Protection Authority. (2005). *Separation distances between industrial and sensitive land uses* (Vol. 3, pp. 5-12). Perth, W.A., WA: EPA.

Western Australian Government. (2022). *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* (Vol. 2, Dangerous Goods Safety Act 2004, pp. 120-125). Perth, WA.



Work Health and Safety (General) Regulations 2022. (2022). Perth, WA: Government of Western Australia.



Yellishetty, M. (2020). Rehabilitation opportunities: How Victoria can repurpose its abandoned mines. Retrieved October 10, 2022, from <https://lens.monash.edu/@technology/2020/08/06/1380973/how-victoria-can-repurpose-its-abandoned-mines>

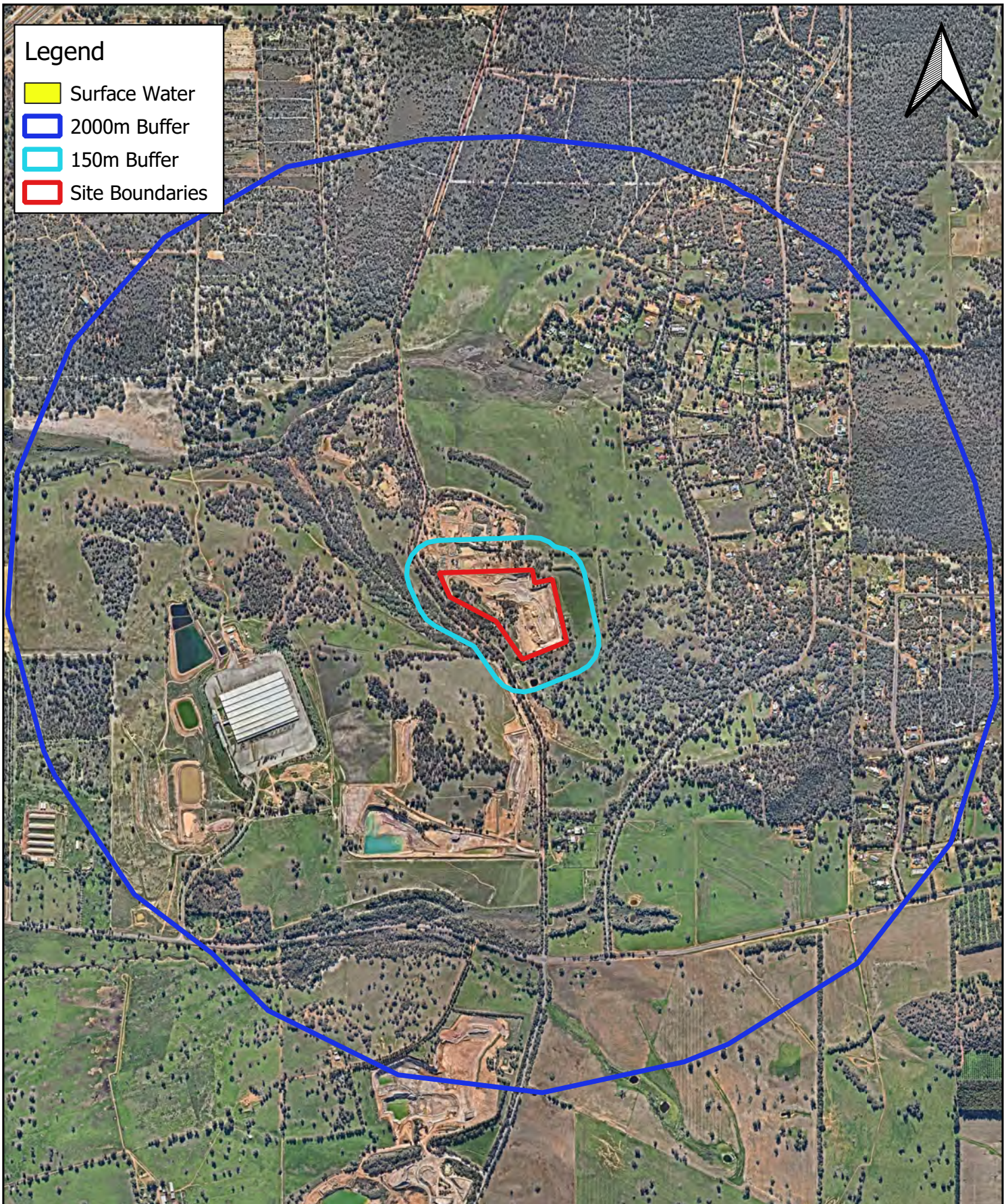
Figures





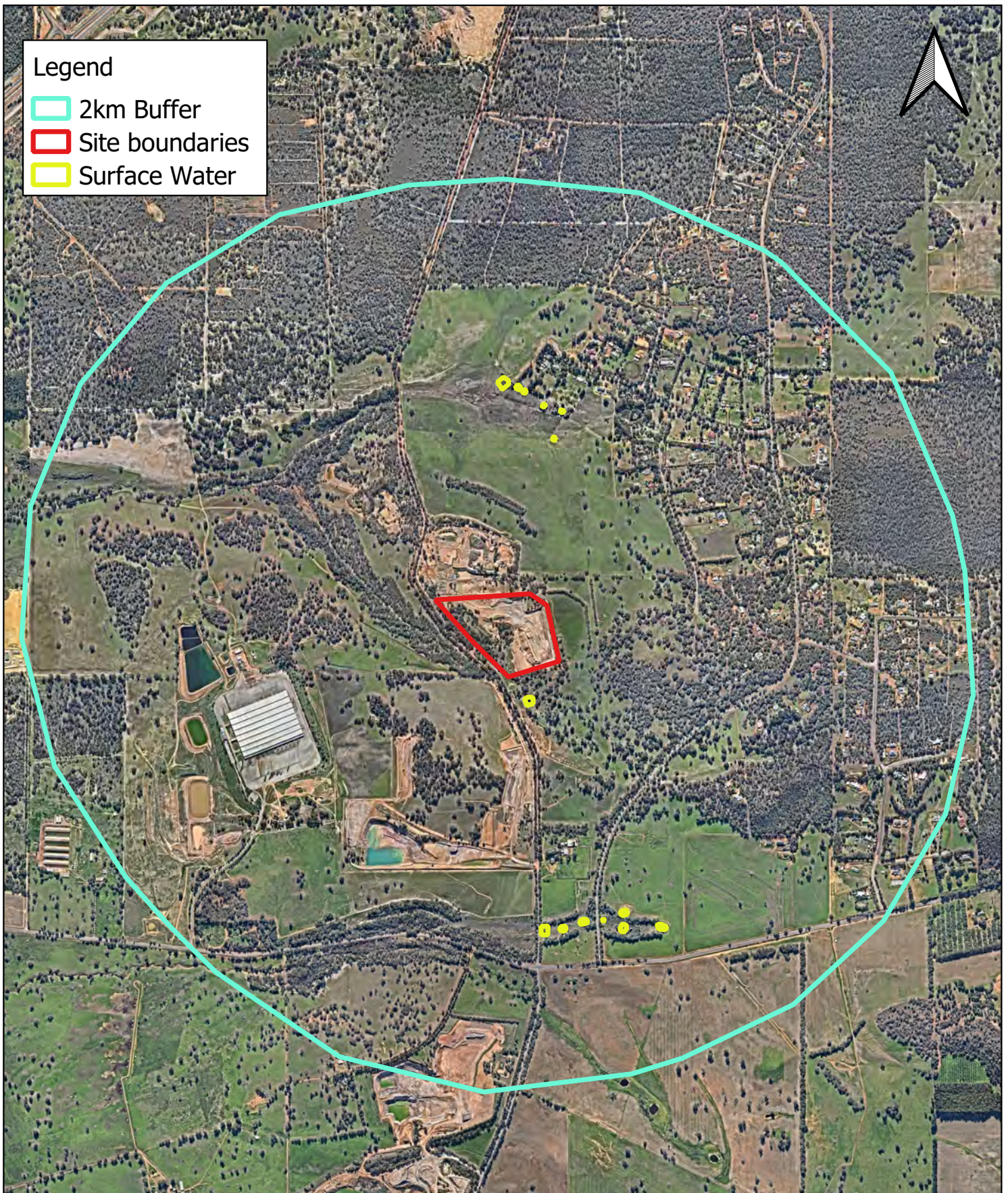
Legend



-  Site boundaries
-  ContourLine

TITLE			 SERS Site Environmental and Remediation Services
Figure 2. Topographic Contours			
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering	PROJECT CODE	166898
CLIENT	Brajkovich Landfill and Recycling Pty Ltd	VERSION	00
DESIGN/DRAW	DC	DATE	01/11/2022
APPROVED BY:	MC	SOURCE	Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.
		SCALE 0 50 100 m	
			





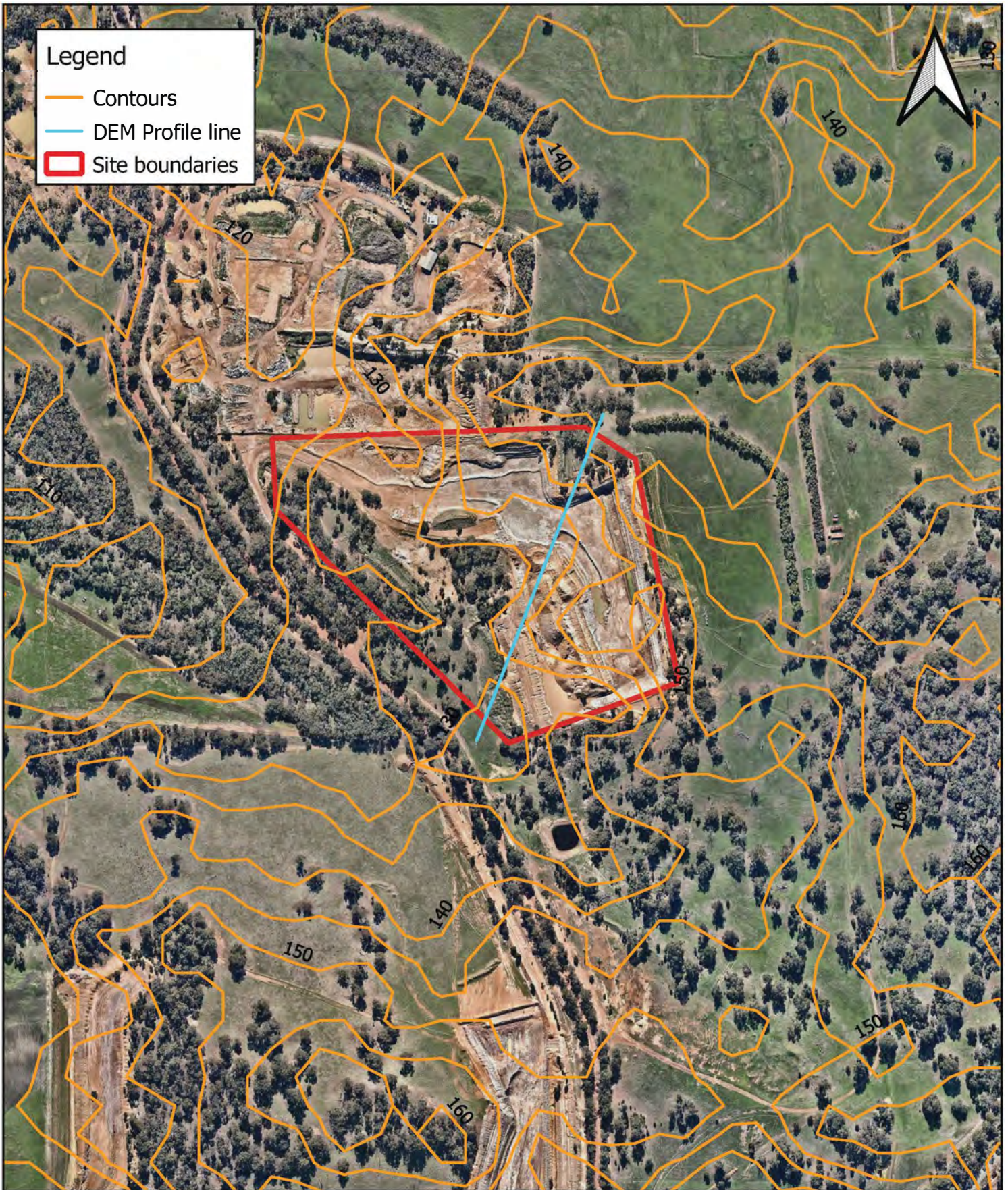
TITLE Figure 3. Buffer Distances and Surface Water			 SERS Site Environmental and Remediation Services
PROJECT Lot 9001 Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT Brajkovich Landfill and Recycling Pty Ltd	VERSION 00	DATE 25/10/2022	SCALE 0 250 500 m 
DESIGN/DRAW DC	APPROVED BY: BD	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	





TITLE			 SERS Site Environmental and Remediation Services
PROJECT		PROJECT CODE	
88 Caladenia Close, Lower Chittering		165952	SCALE 0 250 500 m 
CLIENT	VERSION	DATE	
Brajkovich Demolition	00	29/09/2022	
DESIGN/DRAW	APPROVED BY:	SOURCE	
DC	BD	Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	





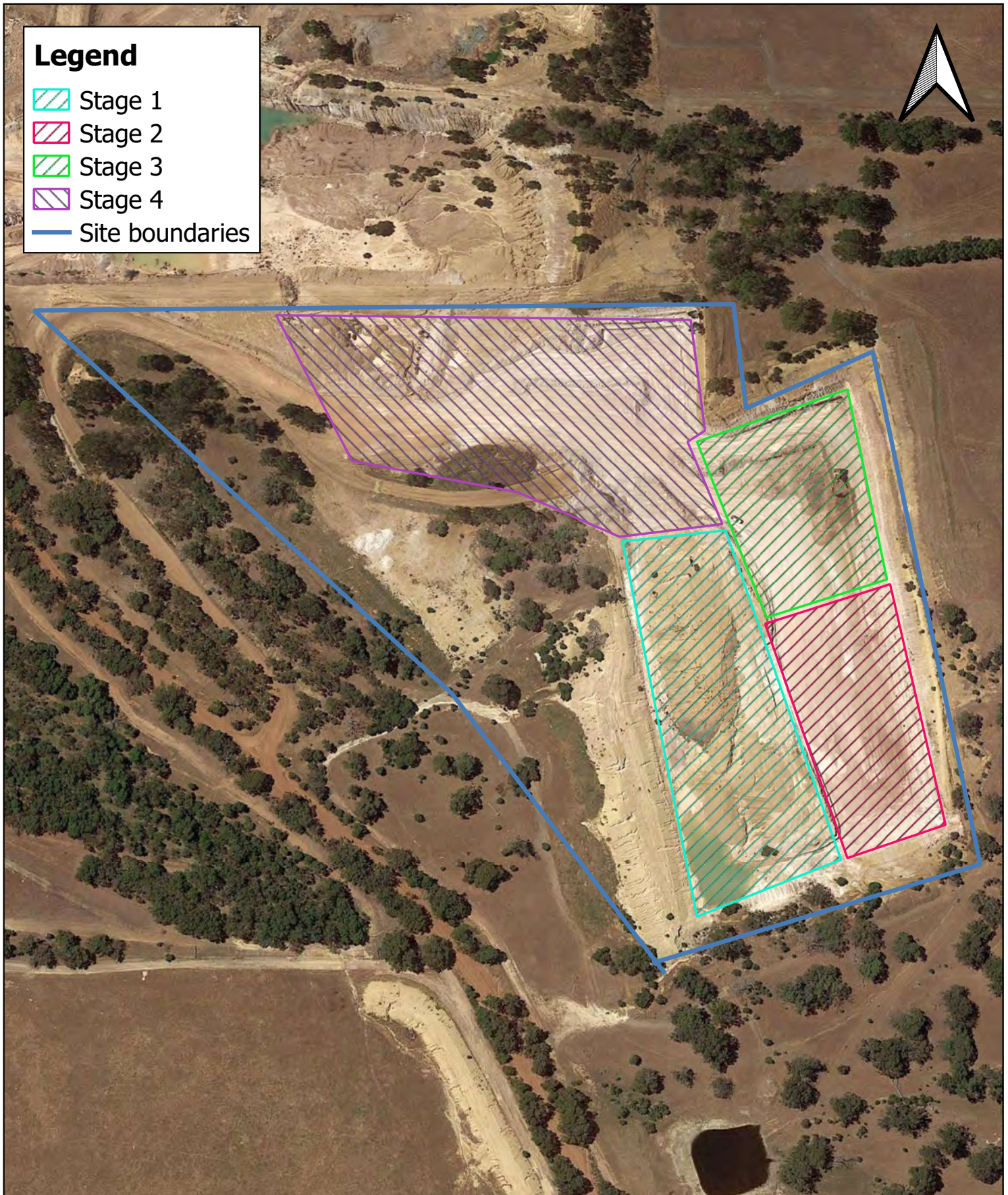
TITLE		Figure 8. Bush Forever Areas		 SERS Site Environmental and Remediation Services
PROJECT		88 Caladenia Close, Lower Chittering		
CLIENT		VERSION		SCALE 0 1 2 km 
Valmec Australia Pty Ltd		00		
DESIGN/DRAW		APPROVED BY:		SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.
DC		BD		
PROJECT CODE		DATE		
		165952		
DATE		14/10/2022		



TITLE Figure 6. Topographical Contours and Profile Line			 SERS Site Environmental and Remediation Services
PROJECT 88 Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT Brajkovich Landfill & Recycling Pty Ltd	VERSION 00	DATE 12/10/2022	SCALE 100 200 m 
DESIGN/DRAW DC	APPROVED BY: BD	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	



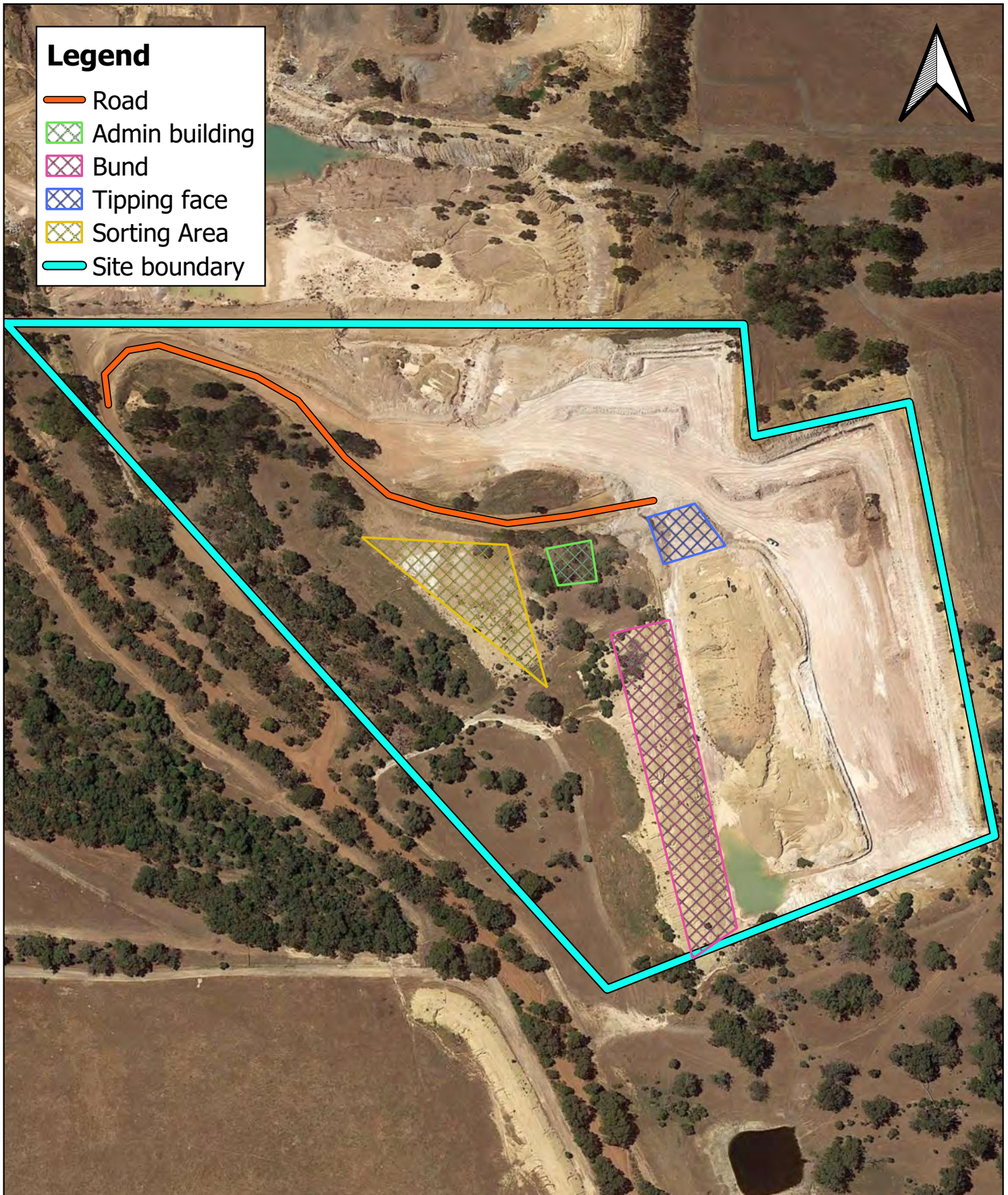
TITLE			 SERS Site Environmental and Remediation Services	
Figure 7. Proposed Bore Locations				
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE	166898
CLIENT	Brajkovich Landfill and Recycling Pty Ltd	VERSION	DATE	01/11/2022
		00		
DESIGN/DRAW	APPROVED BY:	SOURCE		
DC	MC	Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.		
			SCALE	0 50 100 m
				





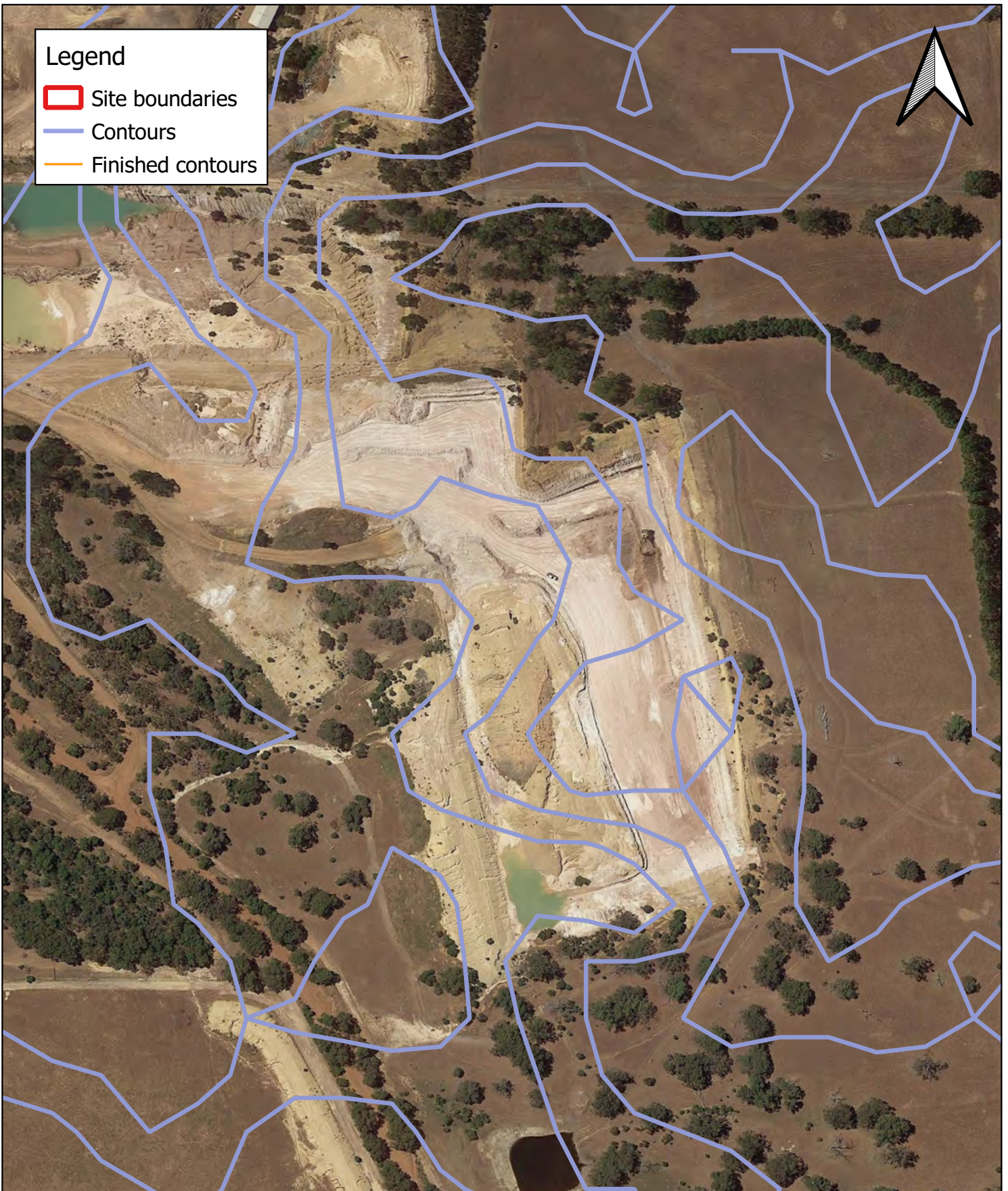
Legend



- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Site boundaries

TITLE Figure 2. Phase Stages of Landfill			 SERS Site Environmental and Remediation Services
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering	PROJECT CODE 166898	
CLIENT	Brajkovich Landfill and Recycling Pty Ltd	VERSION 00	DATE 31/10/2022
DESIGN/DRAW DC	APPROVED BY: MC	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	
			SCALE 0 25 50 m



TITLE Figure 9. Infrastructure & Operations Layout			 SERS Site Environmental and Remediation Services
PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering	PROJECT CODE 166898		
CLIENT Brajkovich Landfill and Recycling Pty Ltd	VERSION 00	DATE 31/10/2022	SCALE 0 25 50 m 
DESIGN/DRAW DC	APPROVED BY: MC	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	



TITLE			Figure 3. Finished Topographical Contours		 SERS Site Environmental and Remediation Services
PROJECT		88 Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT		Insert		VERSION 00	DATE 27/10/2022
DESIGN/DRAW		DC		APPROVED BY: MC	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.
			SCALE 0 50 100 m 		

Appendix A – Title & Historical Images

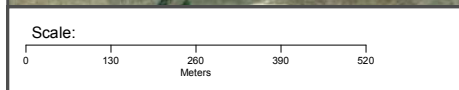
Aerial Imagery 2016

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Aerial Imagery 2010

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Data Source Aerial Imagery: © 2023 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate Reference System: GDA2020 MGA50

Date: 10 February 2023



Aerial Imagery 2004

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Google Earth

Legend

-  Site Boundary
-  Buffer 150m

Scale:



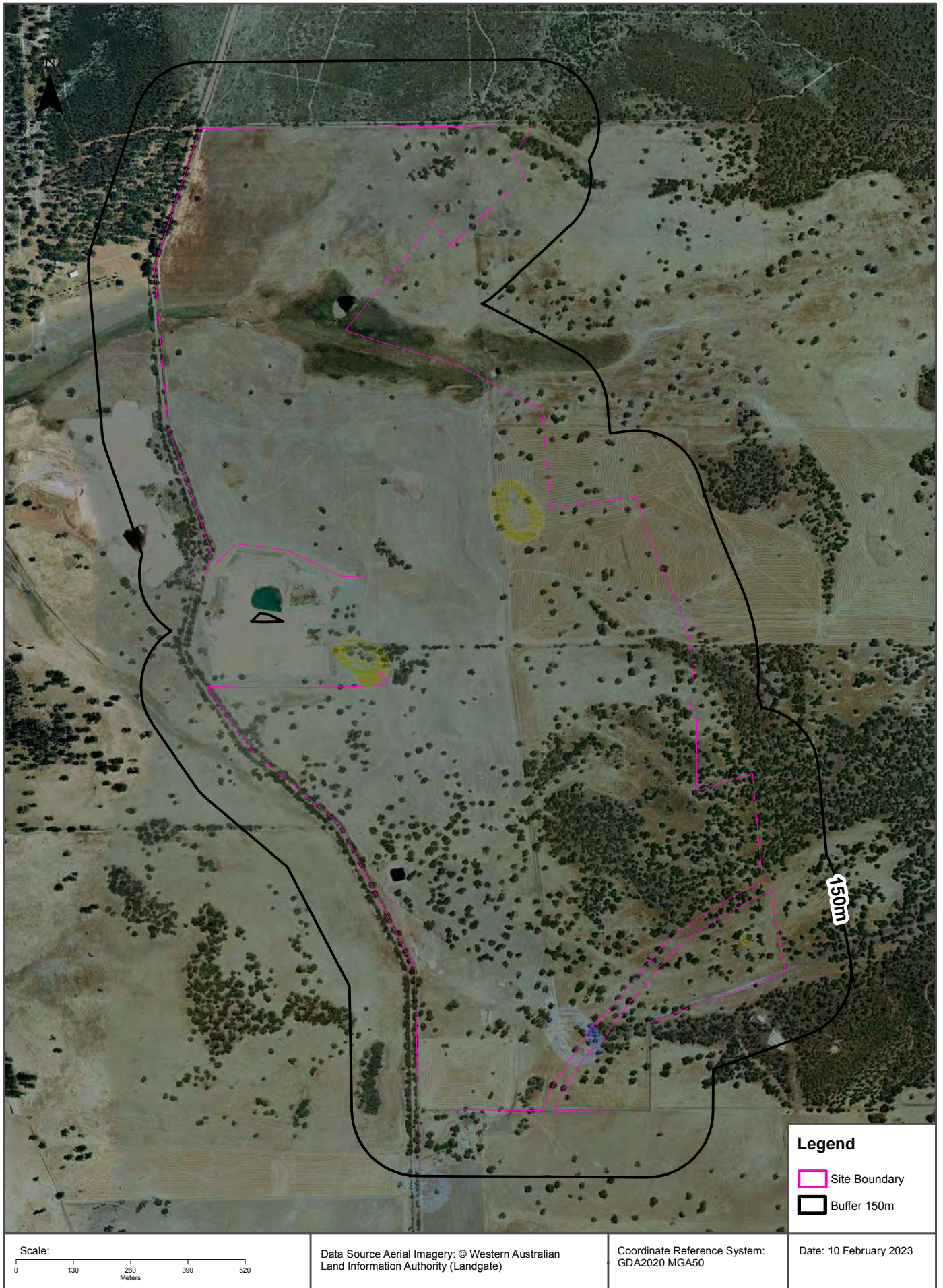
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Coordinate Reference System: GDA2020 MGA50

Date: 10 February 2023

Aerial Imagery 1989

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



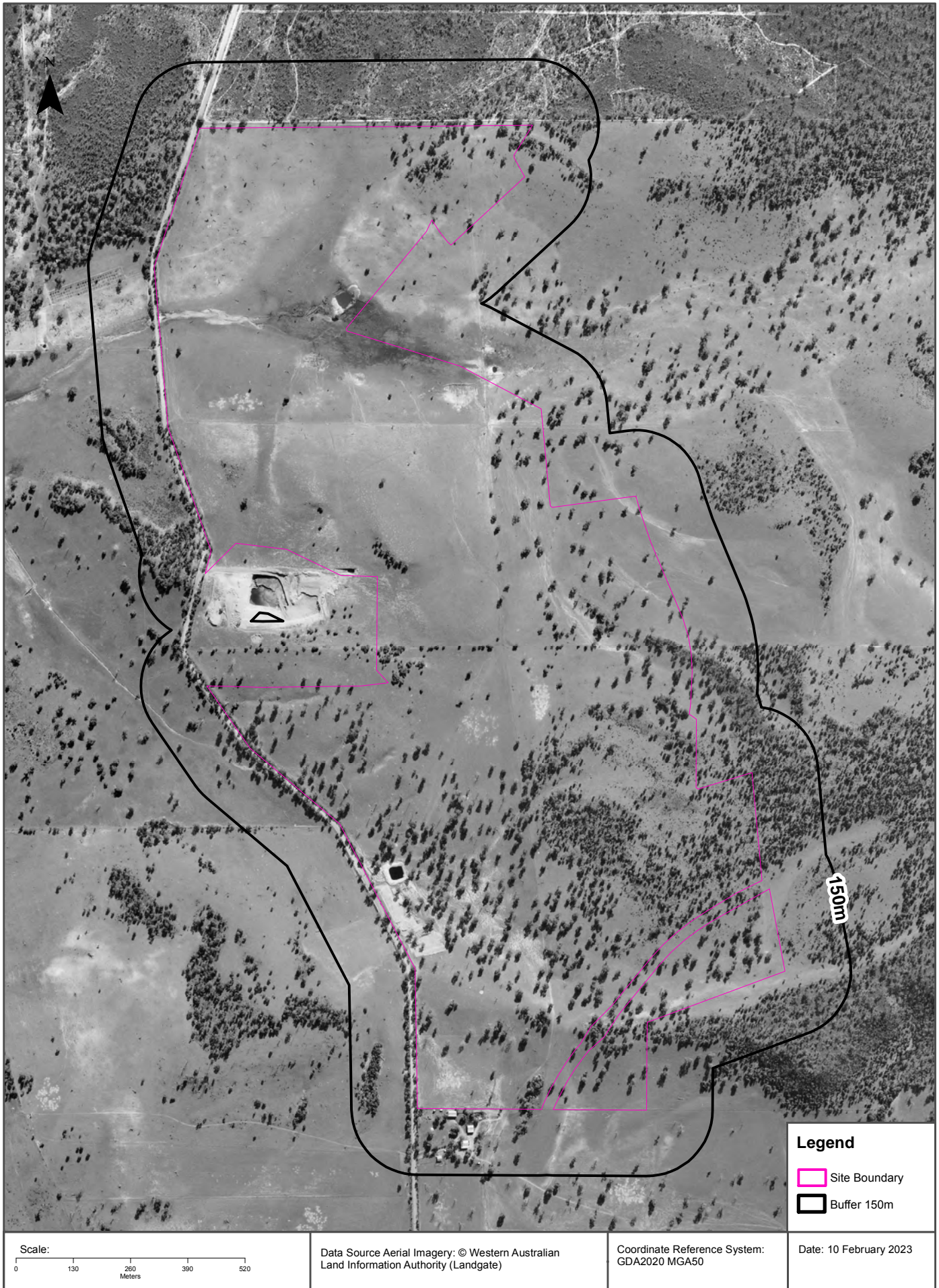
Aerial Imagery 1983

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Aerial Imagery 1977

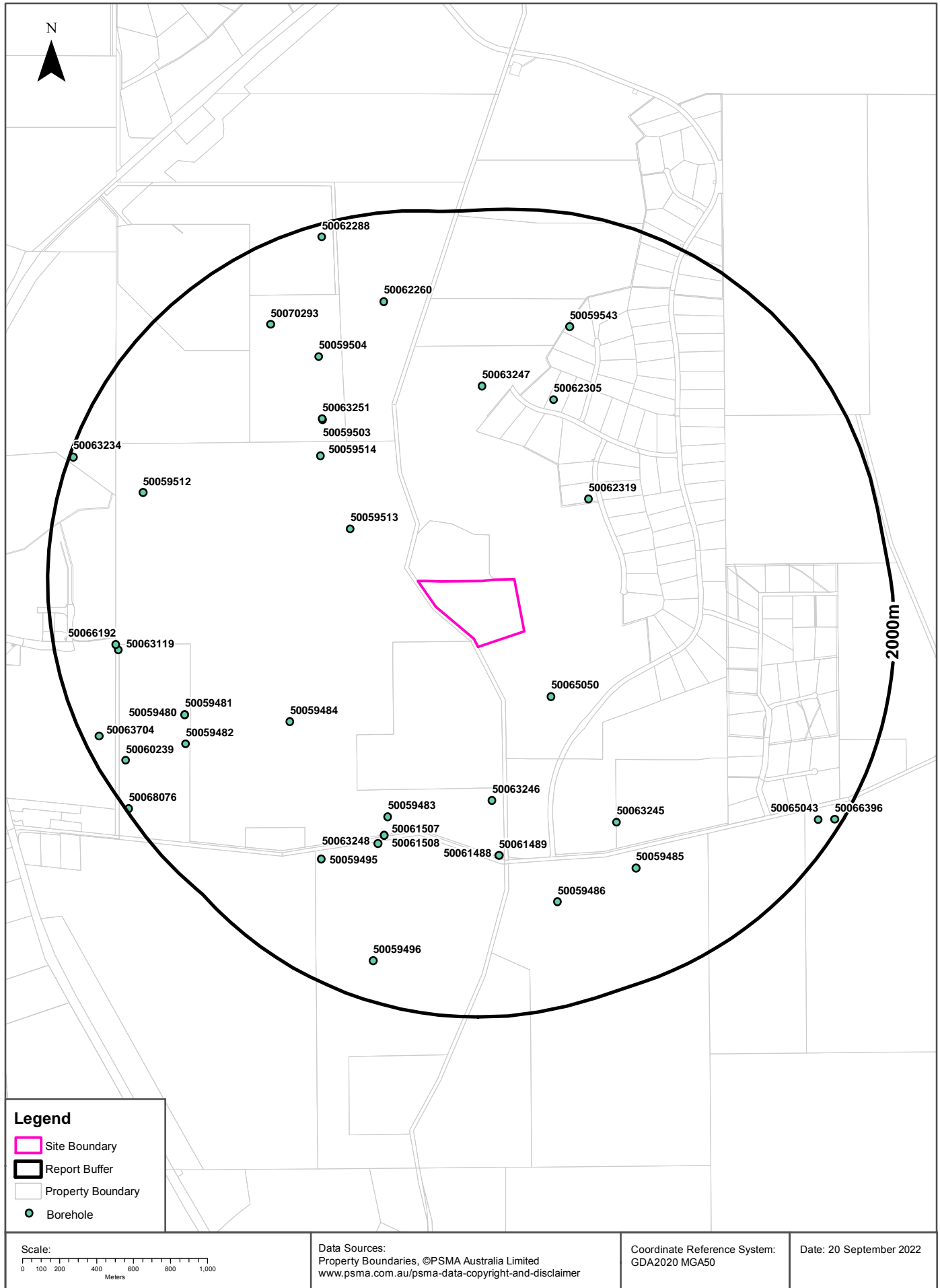
Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Appendix B – Regional Groundwater Bores

Groundwater Boreholes

88 Caladenia Close, Lower Chittering, WA 6084



Groundwater

88 Caladenia Close, Lower Chittering, WA 6084

Groundwater Boreholes

Groundwater Boreholes within the dataset buffer:

NGIS Bore ID	WA Bore ID	Agency Responsible	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Reference Elevation Description	Distance	Direction
50065050	61617083	Department of Water and Environmental Regulation	Unknown	Unknown	3/1/1997			NGS	381m	South East
50059513	61609210	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	457m	North West
50062319	61612067	Department of Water and Environmental Regulation	Unknown	Unknown	10/18/2002	62.00		NGS	592m	North East
50063246	61615243	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	835m	South
50059514	61609211	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	853m	North West
50062305	61612052	Department of Water and Environmental Regulation	Irrigated agriculture	Unknown	2/26/2009	55.00		NGS	993m	North
50059484	61609181	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1003m	South West
50059503	61609200	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1010m	North West
50063251	61615248	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1016m	North West
50059483	61609180	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1040m	South West
50063247	61615244	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1047m	North
50061489	61611188	Department of Water and Environmental Regulation	Monitoring	Unknown			109.27	NGS	1134m	South
50061488	61611187	Department of Water and Environmental Regulation	Monitoring	Unknown			109.27	NGS	1134m	South
50061507	61611206	Department of Water and Environmental Regulation	Monitoring	Unknown			90.86	NGS	1136m	South West
50061508	61611207	Department of Water and Environmental Regulation	Monitoring	Unknown			90.86	NGS	1136m	South West

NGIS Bore ID	WA Bore ID	Agency Responsible	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Reference Elevation Description	Distance	Direction
50063245	61615242	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1148m	South East
50063248	61615245	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1192m	South West
50059504	61609201	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1323m	North West
50059543	61609240	Department of Water and Environmental Regulation	Domestic household, Household	Unknown	7/14/1996	25.50		NGS	1398m	North
50059485	61609182	Department of Water and Environmental Regulation	Water supply for livestock, Domestic household, Household	Unknown				NGS	1416m	South East
50059495	61609192	Department of Water and Environmental Regulation	Domestic household, Household	Unknown				NGS	1424m	South West
50059486	61609183	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1444m	South
50059481	61609178	Department of Water and Environmental Regulation	Irrigated agriculture	Unknown	6/30/1972			NGS	1452m	West
50059480	61609177	Department of Water and Environmental Regulation	Domestic household, Household	Unknown				NGS	1452m	West
50062260	61612007	Department of Water and Environmental Regulation	Unknown	Unknown	8/11/1985	147.22		NGS	1518m	North
50059482	61609179	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1533m	South West
50059512	61609209	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1559m	West
50070293	61671673	Department of Water and Environmental Regulation	Unknown	Unknown	10/20/2005	63.00		NGS	1595m	North West
50063119	61615103	Department of Water and Environmental Regulation	Monitoring	Decommissioned		330.00	68.52	NGS	1659m	West
50066192	61621502	Department of Water and Environmental Regulation	Monitoring	Functioning	3/4/2016	327.00	68.28	NGS	1667m	West
50059496	61609193	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1787m	South
50060239	61609936	Department of Water and Environmental Regulation	Monitoring	Unknown	6/6/2000	156.00		NGS	1853m	South West
50065043	61617076	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1889m	South East

NGIS Bore ID	WA Bore ID	Agency Responsible	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Reference Elevation Description	Distance	Direction
50063704	61615737	Department of Water and Environmental Regulation	Water supply for livestock	Unknown				NGS	1916m	West
50062288	61612035	Department of Water and Environmental Regulation	Irrigated agriculture	Unknown	9/5/2007	180.00		NGS	1927m	North West
50066396	61622151	Department of Water and Environmental Regulation	Water supply	Unknown				NGS	1963m	South East
50063234	61615231	Department of Water and Environmental Regulation	Unknown	Unknown				NGS	1978m	West
50068076	61642079	Department of Water and Environmental Regulation	Monitoring	Unknown				NGS	1984m	South West

Groundwater Boreholes Data Source: Bureau of Meteorology

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Appendix C – Vulnerable and Endangered Species List

Fauna Endangered Species within 10km of site

Taxon	Common	Class	WAstatus	EPBCstatus	Change2022
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	VU	VU	No
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	EN	EN	No
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	EN		No
<i>Dasyurus geoffroii</i>	chuditch, western quoll	MAMMAL	VU	VU	No
<i>Euoplos inornatus</i>	inornate trapdoor spider (northern Jarrah Forest)	INVERTEBRATE	P3		No
<i>Falco peregrinus</i>	Peregrine falcon	BIRD	OS		No
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	P4		No
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	P4		No
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	P4		No
<i>Neelaps calonotos</i>	black-striped snake, black-striped burrowing snake	REPTILE	P3		No
<i>Notamacropus irma</i>	western brush wallaby	MAMMAL	P4		No
<i>Phascogale tapoatafa wambenger</i>	south-western brush-tailed phascogale, wambenger	MAMMAL	CD		No
<i>Westralunio carteri</i>	Carter's freshwater mussel	INVERTEBRATE	VU	VU	No

Endangered Flora 10km Radius of site

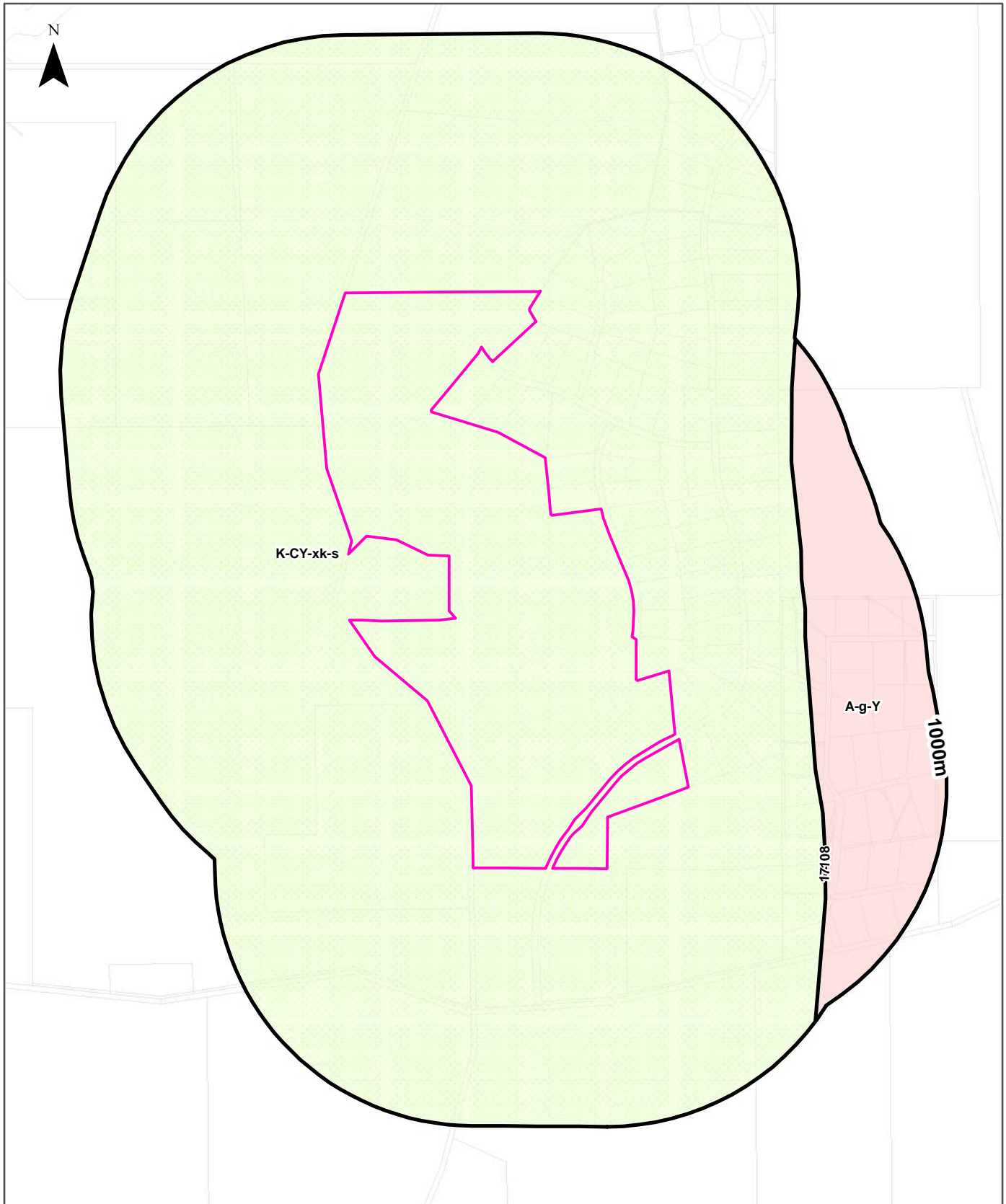
Taxon	WA Cons	T Rank	Change2022
Stylidium aceratum	3		No
Grevillea althoferorum subsp. fragilis	T		No
Acacia anomala	T		No
Grevillea candolleana	2		No
Oxymyrrhine coronata	4		No
Acacia cummingiana	3		No
Isotropis cuneifolia subsp. glabra	3		No
Grevillea curviloba	T		No
Adenanthos cygnorum subsp. chamaephyton	3		No
Adenanthos cygnorum subsp. chamaephyton	3		No
Diuris drummondii	T		No
Acacia drummondii subsp. affinis	3		No
Darwinia foetida	T		No
Chamaescilla gibsonii	3		No
Caustis gigas	2		No
Hibbertia glomerata subsp. ginginensis	2		No
Synaphea grandis	4		No
Schoenus griffinianus	4		No
Anigozanthos humilis subsp. chrysanthus	4		No
Verticordia lindleyi subsp. lindleyi	4		No
Chamelaucium lullfitzii	T		No
Gastrolobium nudum	2		No
Drosera occidentalis	4		No
Stylidium paludicola	3		No
Synaphea panhesya	1		No
Eryngium pinnatifidum subsp. Palustre (G.J. Keighery 13459)	3		No
Eryngium pinnatifidum subsp. Umbraphilum (G.J. Keighery 13967)	2		No
Platysace ramosissima	3		No
Hypolaena robusta	4		No
Persoonia rudis	3		No
Verticordia serrata var. linearis	3		No
Drosera sewelliae	2		No
Stylidium squamellosum	2		No
Leucopogon squarrosus subsp. trigynus	2		No
Thelymitra stellata	T		No
Ornduffia submersa	4		No
Hypocalymma sylvestre	T		No
Millotia tenuifolia var. laevis	2		No
Cyathochaeta teretifolia	3		No
Acacia anomala	T	VU	No
Acacia drummondii subsp. affinis	3		No
Adenanthos cygnorum subsp. chamaephyton	3		No
Darwinia foetida	T	EN	No
Drosera occidentalis	4		No
Grevillea althoferorum subsp. fragilis	T	CR	No
Grevillea curviloba subsp. curviloba	T	CR	No
Grevillea curviloba subsp. incurva	T	EN	No
Hibbertia glomerata subsp. ginginensis	2		No
Hypocalymma sylvestre	T	EN	No
Oxymyrrhine coronata	4		No
Persoonia rudis	3		No
Platysace ramosissima	3		No
Thelymitra stellata	T	EN	No
Verticordia lindleyi subsp. lindleyi	4		No
Verticordia serrata var. linearis	3		No



Appendix D - Lotsearch Soil Identification Map

Pre-Cenozoic Geology and Structures 1:500,000

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Legend		Linear Geological Structures		
Site Boundary	Report Buffer	Major fault, exposed	Major strike-slip fault, exposed	Major fault, concealed
Property Boundary	Fault, exposed	Strike-slip fault, exposed	Fault, concealed	Fold axial trace, exposed
				Fold axial trace, concealed
Scale: 		Data Sources: Property Boundaries, ©PSMA Australia Limited www.pdma.com.au/psma-data-copyright-and-disclaimer		Coordinate Reference System: GDA2020 MGA50
				Date: 10 February 2023

Geology

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084

Pre-Cenozoic (Bedrock) Geology 1:500,000

Pre-Cenozoic (Bedrock) Geology Units within the dataset buffer:

Map Unit Code	Name	Description	Group	Subgroup	Formation	Age From	Age To	Max Age (MA)	Min Age (MA)	Distance
K-CY-xk-s	Coolyena Group	Chalk, greensand, glauconitic sandstone, siltstone, marl; characteristically glauconitic	Coolyena Group			Albian	Maastrichtian	113	66	0m
A-g-Y	Yilgarn Craton granites	Granitic rock, undivided; metamorphosed				Mesoarchean	Neoarchean	3010	2600	497m

Geology Data Source: WA Department of Mines and Petroleum

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Linear Structures 1:500,000

Linear geological structures within the dataset buffer:

Map Code	Feature	Type	Name	Distance
17108	Fault or shear zone, major	normal, exposed, tick on downthrown side	Darling Fault	497m

Geology Data Source: WA Department of Mines and Petroleum

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Geology

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084

Cenozoic Geology 1:500,000

Cenozoic Geology Units within the dataset buffer:

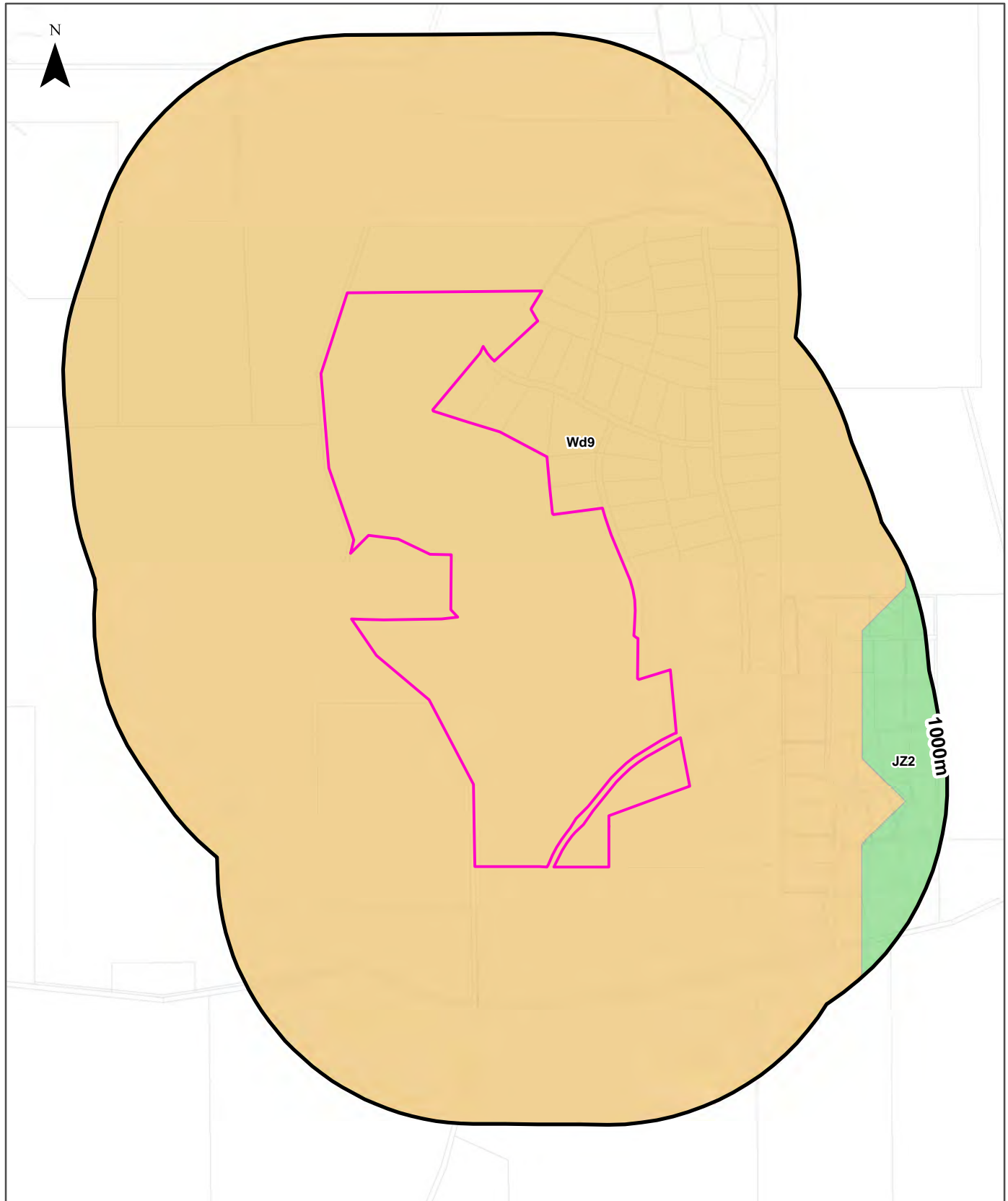
Map Unit Code	Name	Description	Group	Formation	Age From	Age To	Max Age (MA)	Min Age (MA)	Distance
N/A	No features in buffer								

Geology Data Source: WA Department of Mines and Petroleum

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Atlas of Australian Soils

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Legend		Australian Soil Classification Orders					
Site Boundary	Anthrosol	Dermosol	Kandosol	Podosol	Tenosol	No Data	
Report Buffer	Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol		
Property Boundary	Chromosol	Hydrosol	Organosol	Sodosol	Lake		

Scale: 	Data Sources: Property Boundaries, ©PSMA Australia Limited www.pdma.com.au/psma-data-copyright-and-disclaimer	Coordinate Reference System: GDA2020 MGA50	Date: 10 February 2023
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Soils

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

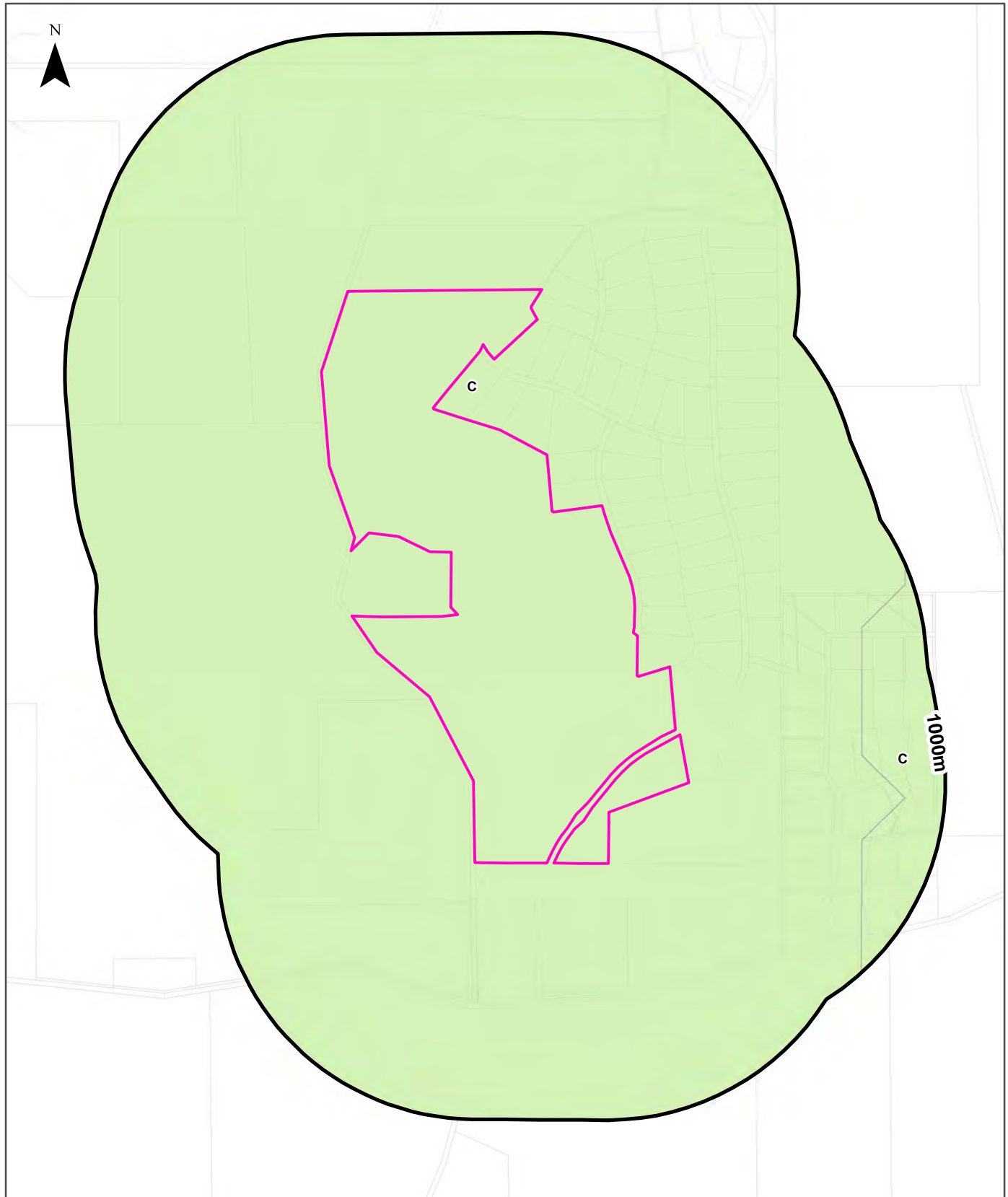
Map Unit Code	Soil Order	Map Unit Description	Distance
Wd9	Chromosol	Broad valleys and undulating interfluvial areas with some discontinuous breakaways and occasional mesas; lateritic materials mantle the area: chief soils are sandy acidic yellow mottled soils, (Dy5.81) containing much ironstone gravel 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 slope.	0m
JZ2	Tenosol	Dissected plateau having a gentle to moderately undulating relief, and with broad swampy drainage-ways and basins. It is characterized by lateritic gravels and block laterite: the chief soils are ironstone gravels with sandy and earthy matrices (KS-Uc4.2), (KS-Uc4.11), (KS-Gn2.24), and (KS-Uc2.12). They overlie duricrusts of recemented ironstone gravels and/or vesicular laterite, and/or mottled-zone and/or pallid-zone material. These soils cover ridges and slopes where some (Dy3.81 and Dy3.82) soils containing ironstone gravels also occur. Leached sands (Uc2.2 and Uc2.3) are a feature of the drainage-ways and basins. Areas of (Dy5.41) and (Dy5.82) soils occur on pediments in some areas of this unit where it merges with unit Tf3.	676m

Atlas of Australian Soils Data Source: ABARES

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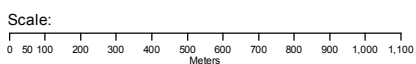
Atlas of Australian Acid Sulfate Soils

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084



Legend

- | | | | |
|-------------------|--|-------------------------|---------|
| Site Boundary | Probability of occurrence of Acid Sulfate Soils | | |
| Report Buffer | A. High (>70%) | C. Extremely Low (1-5%) | No Data |
| Property Boundary | B. Low (6-70%) | D. No Chance (0%) | |



Data Sources:
Property Boundaries, ©PSMA Australia Limited
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Coordinate Reference System:
GDA2020 MGA50

Date: 10 February 2023

Acid Sulfate Soils

Lot 9001, 88 Caladenia Close, Lower Chittering, WA 6084

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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Appendix E – Dust Management Plan



SERS
Site Environmental and
Remediation Services

Dust Management Plan

Lot 9001 (88) Caladenia Close, Lower Chittering

Western Australia 6084



Prepared for:

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Project: Dust Management Plan



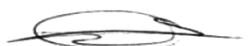
Title: Dust Management Plan – Lot 9001 (88) Caladenia Close, Lower Chittering 6084

Reference: 166898

Status: Final

Report Date: 7th February 2023

Document Production Record

Issue Number	1	Name	Signature
Prepared By		Darcie Cluney	
Checked By		Matt Campbell	
Approved By		Matt Campbell	

Document Revision Record

Issue Number	Date	Revision Details
1	7 th February 2023	Issue

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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 have 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 μm (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 μm or less (<10 μm). These smaller particles tend to remain suspended in the air for long periods and can penetrate into the lungs.

The PM₁₀ fraction (coarse fraction) is termed 'thoracic particles' of 'inhalable dust'. These particles are inhaled into the upper part of the airways and lungs. 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.

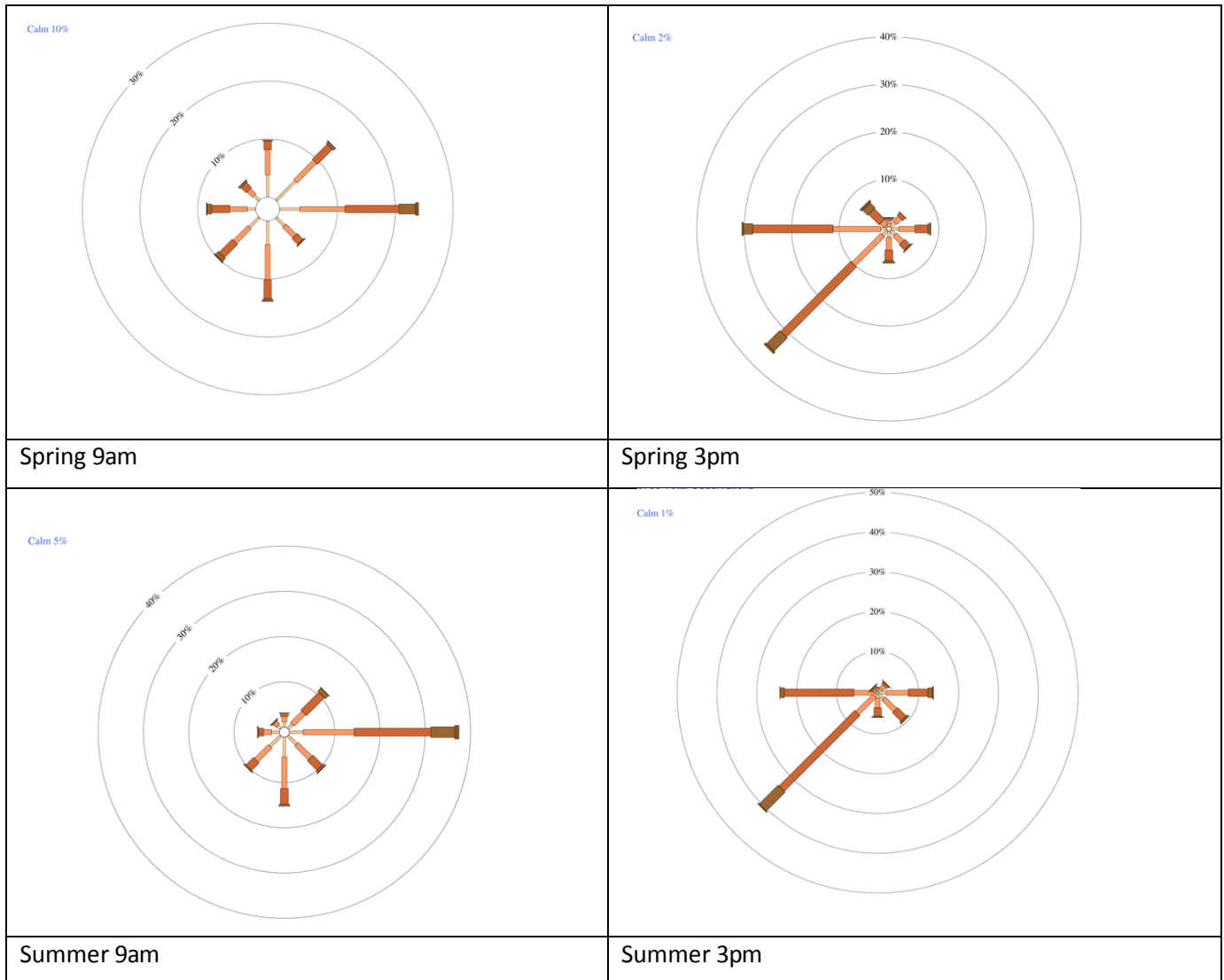
The site is not registered on the Contaminated Sites Database, indicating it does not have a classification of Contaminated - restricted use, or, Remediated for restricted use, or, Contaminated - remediation required. A contaminated land search is attached in **Appendix B**.

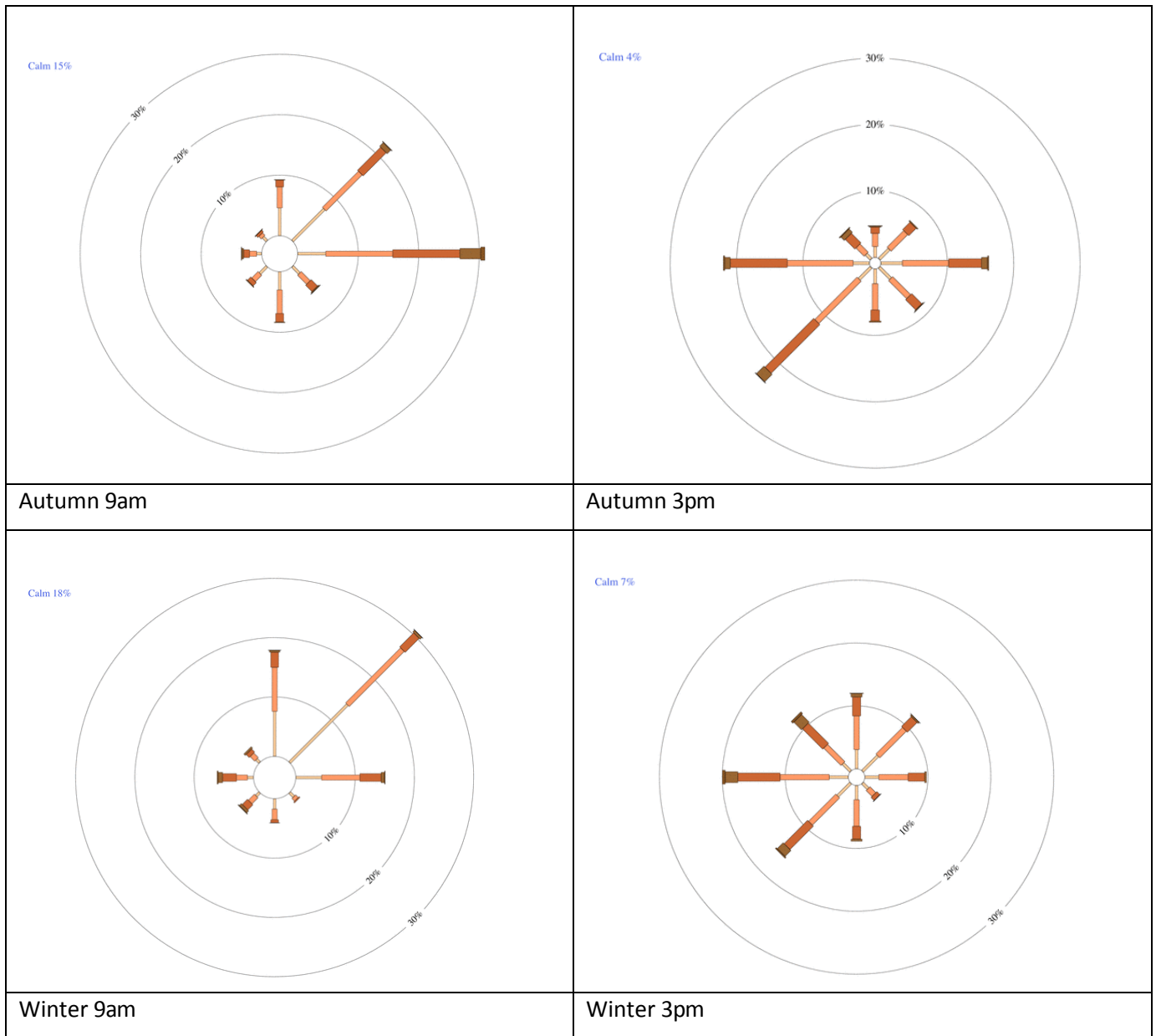
4. Meteorological conditions

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>
	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. 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.
5	<i>Feedback</i>
	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. 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. 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.

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 any of 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	<i>Access-ways</i>
	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.
10	<i>Stockpiles</i>
	<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.</p> <p>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	<i>Access ways</i>
	<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	<i>Off-loading</i>
	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-
	risk dust creation. Designated staff will water down the material while being offloaded to suppress dust formation
13	<i>Vehicle exhaust</i>
	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.

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

14	<i>Monitoring</i>
	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	<i>Copolymer</i>
	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 stormwater retention ponds and the water tank supplied by the groundwater extraction bore at the west of the site. Should there be any risk of stormwater having become contaminated from on-site spills or leaks, water for dust suppression shall not be sourced from the stormwater retention ponds but from the bore or tinkered in from off-site. The reticulation system shall run off the bore, and the water cart shall be fillable from both these sources.

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 – PM(sub)10(/sub) dichotomous sampler - Gravimetric method

AS 3580.9.8-2001 Method for sampling and analysis of ambient air - Determination of suspended particulate matter - PM(sub)10(/sub) 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.

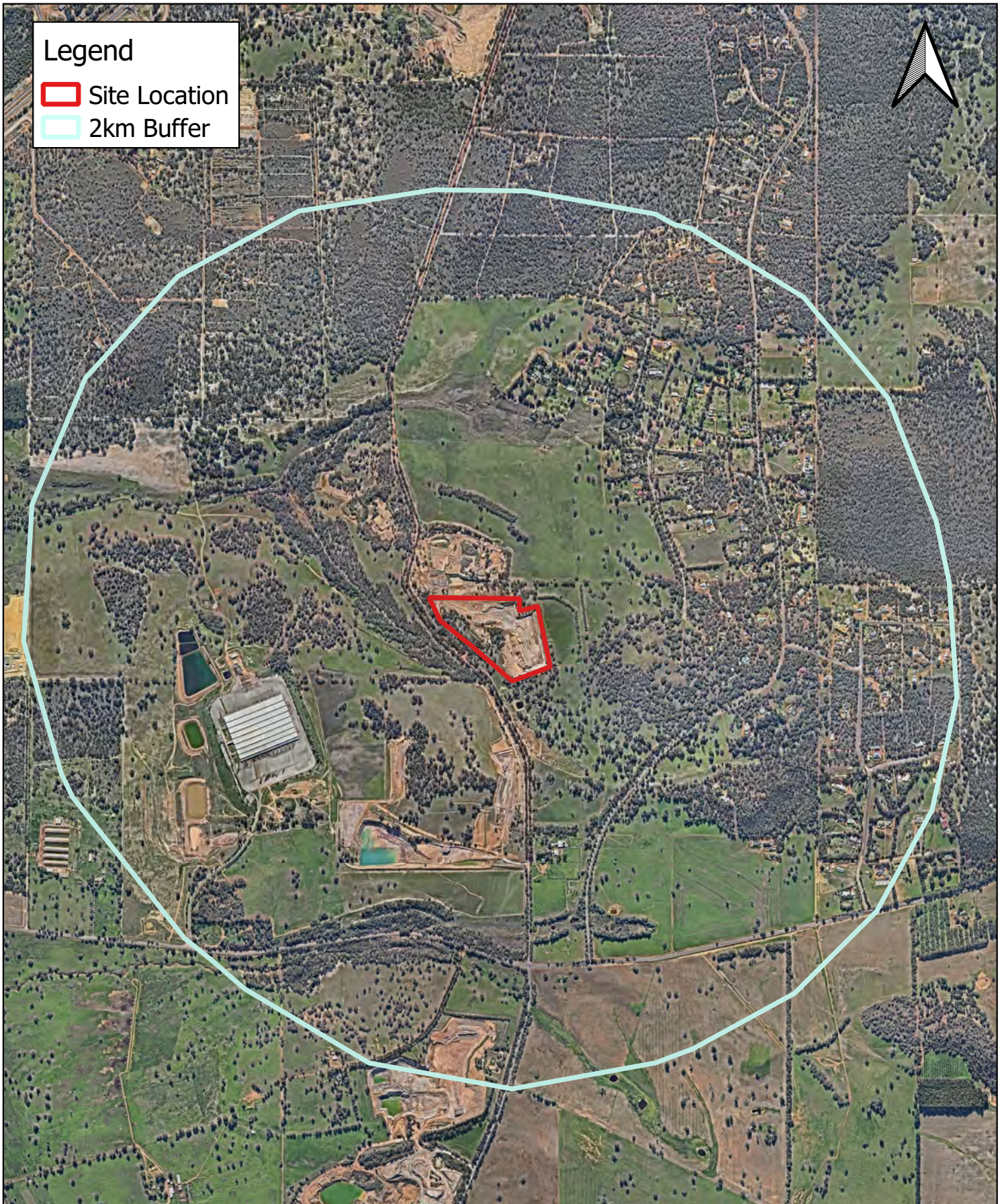
8. Conclusion



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




TITLE					
Figure 1. General Site Location					
PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE 166898			
CLIENT					
DESIGN/DRAW DC	APPROVED BY MC	VERSION 00	DATE 21/10/2022		
		SERS Site Environmental and Remediation Services		SCALE 0 250 500 m 	
				SOURCE Coordinate System GDA2020. Basemap 1: Google Maps. Google Terrain	



TITLE		Figure 2. 2km Buffer		 SERS Site Environmental and Remediation Services
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT	VERSION 00	DATE 21/10/2022	SCALE 0 250 500 m 	
DESIGN/DRAW DC	APPROVED BY: BD	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.		



TITLE			Figure 3. Topographical Contours		 SERS Site Environmental and Remediation Services					
PROJECT		88 Caladenia Close, Lower Chittering		PROJECT CODE		166898				
CLIENT		Insert		VERSION	00	DATE	27/10/2022	SCALE	0 50 100 m	
DESIGN/DRAW		DC		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 Sollya 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



Your ref: LS
Our ref: DMO 12380
Enquiries: Registrar
Phone: 1300 762 982
Fax: (08) 6364 7001
Email: info@dwer.wa.gov.au

Emily Munday
Lotsearch
68 Alfred St South Level 3
Milsons Point NSW 2061

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 Cl, 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

Penny Woodberry, Manager

CONTAMINATED SITES REGULATION
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

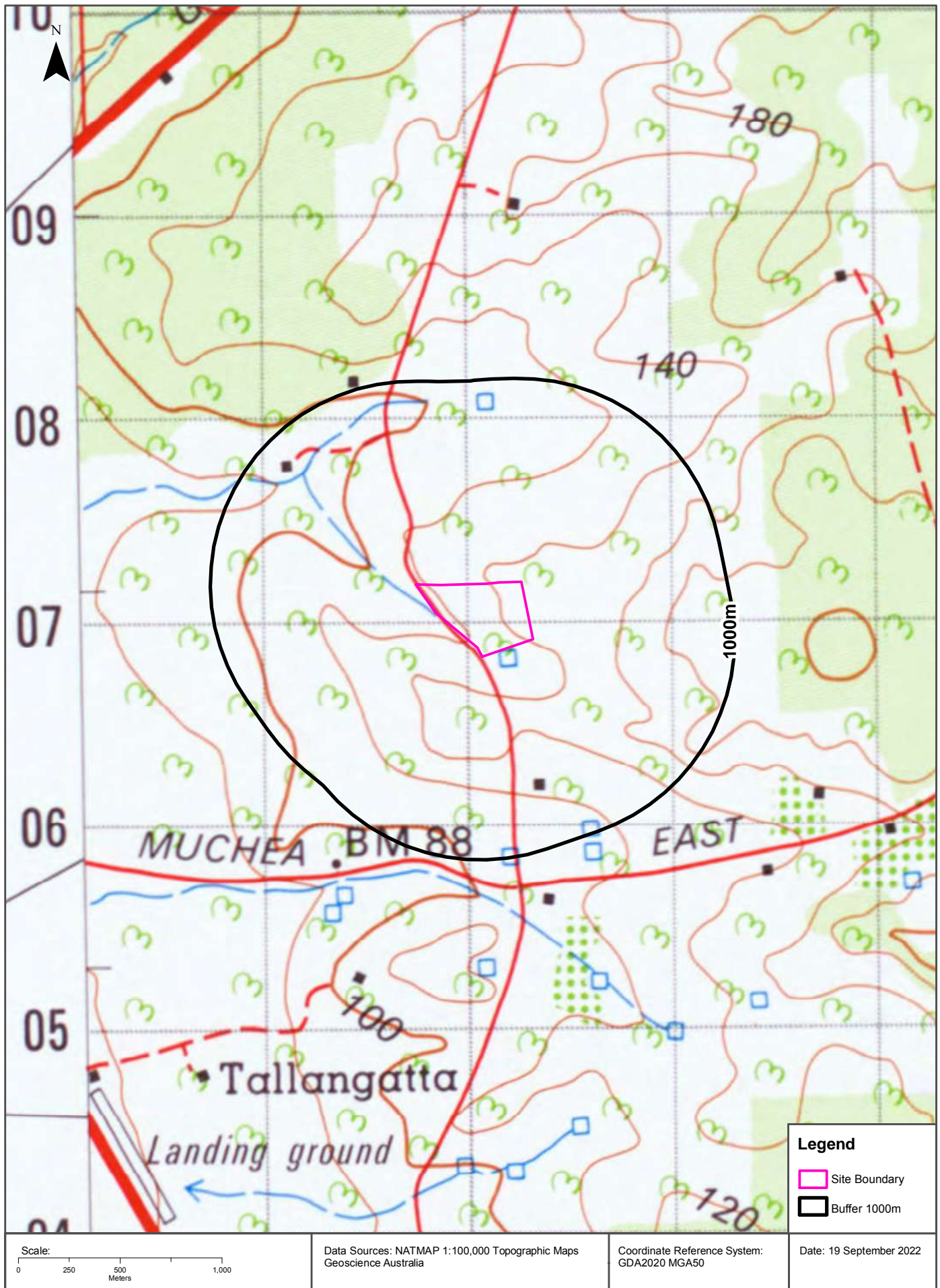
19/10/2022

Enc. Receipt Number RR030309

Appendix C – Historical Contours

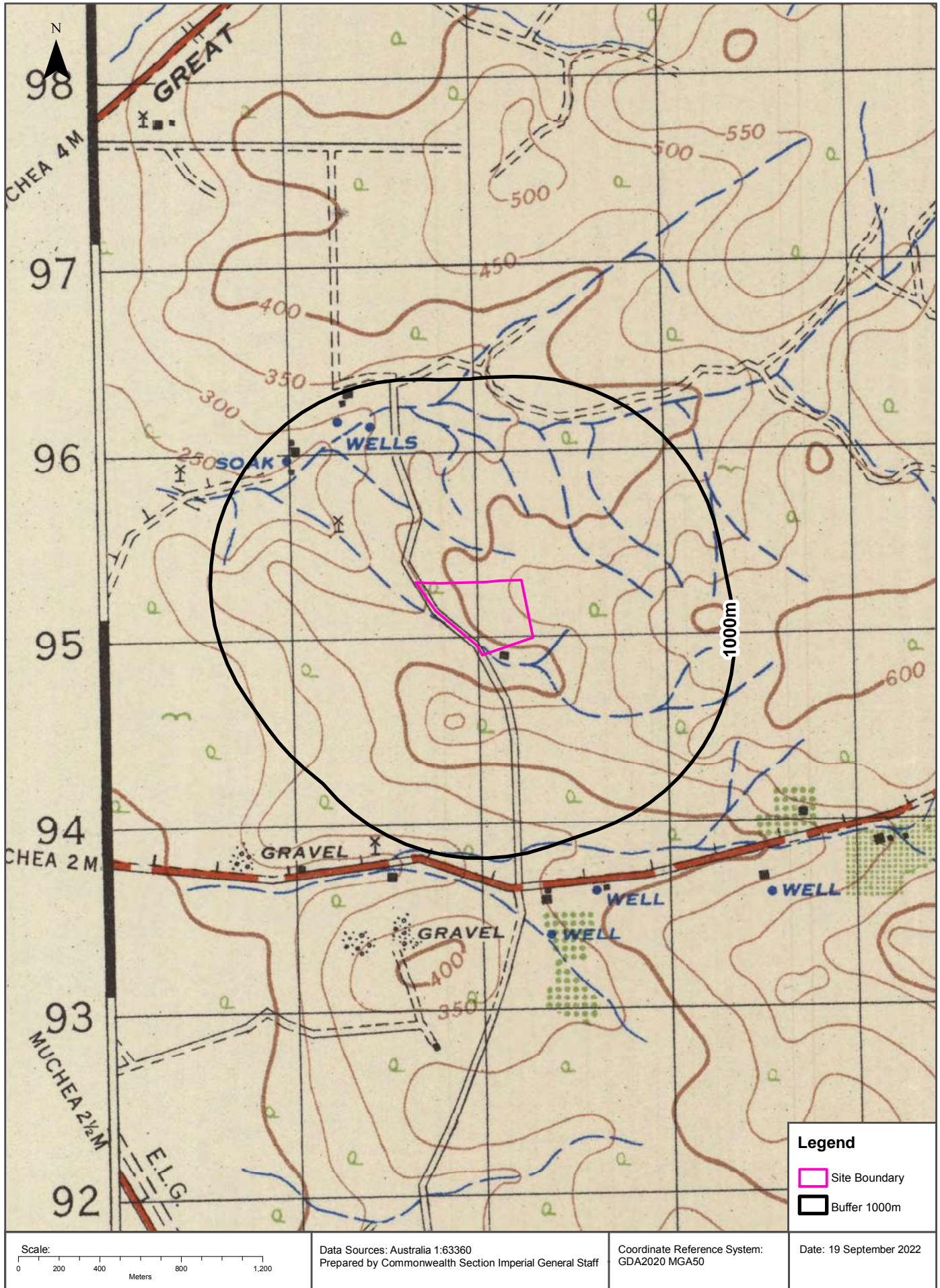
Historical Map 1977

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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Appendix F - Noise Management Plan

Noise Management Plan
Lot 9001 (88) Caladenia Close, Lower Chittering
Western Australia 6084



Prepared for:
Brajkovich Landfill & Recycling Pty Ltd

Prepared by:
Site Environmental and Remediation Services
Pty Ltd (SERS)
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T: +61 8 9220 2000
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2.	Applicable regulations, standards, and codes of practice.....	5
3.	Methods	6
3.1	Screening procedure to establish the significance of noise emissions	6
4.	Assigned Level criteria.....	11
5.	Conclusion	12
	Figures.....	13

1 Introduction

Site Environmental and Remediation Services (SERS) have been engaged by the proponent to develop a Noise Management Plan (NMP) 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**.

Noise assessments are undertaken as part of an environmental impact assessment to ensure that noise emissions comply with the Environmental Protection (Noise) Regulations 1997. Such an assessment includes both audible vibration (sound) and non-audible vibration, experienced as a physical sensation. Both forms have the capacity to cause discomfort, and long-term environmental noise exposure has been linked to community health impacts.

Movement of materials, disturbance of stockpile surfaces, have the potential to contribute to noise emissions, potentially impacting human health 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 Noise Regulations 1987, and Shire of Chittering Policies and Bylaws.

The nearest residential building (house on Lot 118) is located 769 meters from the Lot 9001 property boundary.

From the proposed landfill boundary within Lot 9001, the nearest residential buildings lie within the distances below:

- 769m – Lot 118 to the east of the site
- 852m - Lot 52 to the south of the site
- 820m - Lot 120 to the south-west of the site
- 840m - Lot 101 to the east of the site

There are, however, no noise-sensitive premises within a one-hundred-and-fifty metre radius of the area proposed as an inert landfill. The area for Phase 1 of the landfill is located between five hundred and sixty-five and six hundred and seventy-five metres from the nearest four residences (both on- and off- site).

1.1 Objectives of noise management

Objectives of managing noise include

- Prevention of noise pollution
- Prevention of impact on residents of neighbouring properties
- Prevention of impact on the amenity of the area

2. Applicable regulations, standards, and codes of practice

Environmental Protection (Noise) Regulations 1987

The Noise Regulations govern the following areas of noise management:

- Allowable noise emissions
- Noise measurement

EPA Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) - Environmental Noise Draft 2007

Provides guidance to protect the environment as defined by the EP Act 1986 with a focus on noise emissions from premises; ensures noise emissions from premises comply with the Regulations 1997; addresses the factor of noise emissions from all types of proposals that result in noise emissions; and, to present the EPA position on noise emissions from premises to ensure adverse impacts are prevented.

It is used to conduct a screening procedure for deciding whether a detailed assessment of noise is required. It then provides the methodology to carry out a detailed assessment, should the screening process have identified that one was necessary.

Australian Standard - Guide to noise and vibration control on construction, demolition, and maintenance activities (AS 2436:2010)

Provides guidance on noise and vibration control with respect to construction, demolition, and maintenance sites as well as for the preparation of noise and vibration management plans, work method statements, and environmental impact studies.

National Standard and National Code of Practice -Occupational Noise NOHSC (2000)

Objectives of the above Standard comprise the reduction of the incidence and severity of an occupational noise-induced hearing loss. The Code of Practice provides practical guidance on achieving the above objective by providing a framework for the management of exposure to noise at work and minimising the effects of such exposure.

3. Methods

Noise can be controlled via a combination of machinery-specific and ambient methods.

Machinery-specific methods:

- De-activating reversing beepers during more sensitive times of the day
- Negating the need for reversing beepers by using a one-way traffic system
- Ensuring machinery is well-maintained
- Using mufflers on machinery where possible

Ambient methods:

- Restricting vehicle speeds
- Restricting the use of airbrakes
- Prohibiting excess revving
- Prohibiting entry of excessively noisy trucks and reporting them for service
- Restricted operating hours

3.1 Screening procedure to establish the significance of noise emissions

The screening procedure detailed in Guideline for the Assessment of Environmental Factors No. 8 - Environmental Noise (WA EPA, 2005) was utilised to decide whether predicted noise levels are significant enough to warrant a detailed investigation, comprised of five questions:

Is the proposal particularly sensitive within the community?

Excavation works have been undertaken at the site over the past forty years. Signage has advertised the use of the site throughout this period and council reports record no incidence of complaints.

Proposed works differ from those that have historically occurred at the site, consisting of the delivery of waste material, its crushing, and then placement of material to re-level the site or release off-site for re- use. The use of the land as a landfill is consistent with the Town Planning Scheme land use of 'Landscape'.

Mitigation measures incorporate best practice measures outlined in AS 2436-2010 Guide to noise and vibration control on construction, demolition, and maintenance sites. Additionally, bunding is intended for attenuation of noise generated by site activities as part of DA349-11, to be used as topsoil upon completion of site activities.

Are there any noise-sensitive premises within the buffer distances indicated in Guidance Statement No. 3 for this type of proposal?

Table 1 of *Guidance for the Assessment of Environmental Factors No. 3 - Separation Distances between Industrial and Sensitive Land Uses (WA EPA, 2005)* includes the following applicable category:

a) Waste disposal – inert landfill site (Class 1)

Table 1. Separation distances between industrial and sensitive land use.

Industry	Description of industry	Buffer distance (meters)
Waste disposal	An inert landfill site (Class 1) - site only accepting inert waste, contaminated solid waste (meeting criteria for Class 1), and special wastes (type 1), as specified, for burial.	150 with 25m internal site buffer

There are no noise-sensitive premises (residential buildings) within a 150m buffer of the Lot 9001 boundary, as shown in **Figure 2**.

Is operational noise likely to be above the relevant screening criterion?

Operational noise sources shall consist of the following:

- Arrival at and departure from the site - light vehicle movements
- Tipping of material - engine noise of trucks and impact noise
- Placement of material into cells - engine noise of excavator
- Dust suppression - engine noise of water cart
- Heavy equipment use is predicted below:
 - 2no loaders (one for sand excavation, one for landfilling)
 - 1no excavators
 - 1no water cart
 - 3no semi tipper trucks

EPA Guidance Note 8 - Environmental Noise (2007) states the screening procedure as follows:

- 1) Identify a point on the proposed site where the noise sources could be said to be concentrated.
- 2) Estimate a total A-weighted sound power level for all noise sources.
- 3) Identify the locations of all nearby residences not owned by the proponent and estimate their distances from the source point on site.
- 4) Plot the sound power level(s) for day/night operations for the nearest residence or residences.
- 5) If below the lines for daytime and night-time operations, then operational noise is not likely to be significant

Typical sound levels of operating machinery are listed below, as taken from Table A1 of Appendix A, Guide to noise and vibration control on construction, demolition, and maintenance sites (AS 2436:2010) Table 12. Typical sound levels from construction, maintenance, and demolition plant

Table 2. A-weighted sound power level typical range.

Plant Description	A-weighted sound power level – typical range L_{wA} (Db x 10^{-12} W)	A-weighted sound power level – typical mid-point L_{wA} (Db x 10^{-12} W)
Wheeled loader	99-111	105
Truck >20 tonne	107	107
Excavator	97 – 117	107
Water cart	106 – 108	107

More accurate values were calculated by Herring Storer Acoustics for some of the machinery to be used on-site, shown below.

Table 3. A-weighted sound power level mid-points.

Plant Description	A-weighted sound power level – typical mid-point L_{wA} (Db x 10^{-12} W)
Wheeled loader Komatsu 320 FEL	105
Large semi-tipper at 60km/h	98
Small Excavator (PC300 etc)	98

Total sound power levels originating from the site were added using the table below.

Table 4. Addition of Total Sound Pressure Levels (AS 2436:1020)

Difference between the two levels (dB)	In addition to higher level (dB)
0	3
1	3
2	2
3	2
4	1
5	1
6	1
7	1
8	1
9	1
10	0

As a conservative estimate, all machinery was estimated to be in operation concurrently.

Table 5. Conservative estimations of the cumulative sound power level of noise from individual operational activities

Quantity	Equipment/ Process	Indicative Sound Power Level (mid-point)	Cumulative sub-total of sound power level
	Criteria for noise-sensitive premises: highly sensitive area between 0700 to 1900 Mon-Sat	dB (A)	
1	Water cart (AS2436:2010)	107	114 + 105 = 115
2	Wheeled loader (Herring Storer Acoustics)	105	115
1	Excavator (Herring Storer Acoustics)	98	
3	Large semi-tipper (Herring Storer Acoustics)	98	
Estimated total sound power level at source			115

Is construction noise likely to be above the relevant screening criterion?

No construction is proposed in this area of the site, however noise levels generated by this activity are not expected to differ from predicted levels as the machinery in use shall be the same.

Is the proposal likely to involve blasting?

No blasting is proposed.

As no residences were identified within 150m of the site, a detailed noise assessment was not conducted.

4. Assigned Level criteria

Environmental Protection (Noise) Regulations 1997 Summary of the Regulations (1997) defines Assigned noise levels as 'the levels of noise allowed to be received at premises at a particular time of the day or night.

They apply at the premises receiving the noise and consider the impact of surrounding land uses on noise levels received at each premise. They comprise the integration of a transport factor and a consideration of the proportion of surrounding land occupied by land uses with the potential to generate ambient noise i.e., commercial, and industrial.

The transport factor is calculated according to the number of major and minor roads within a 100m buffer of the premises, and the number of major roads within a 450m buffer of the premises. Proportions of 100 and 450m buffers of the site occupied by commercial and industrial premises are calculated based on zoning displayed on a combination of metropolitan regional schemes and local town planning maps.

5. Conclusion

As shown above, there are three sets of criteria applied to the cumulative sound pressure levels received by sensitive receptors within a one thousand metre buffer of the proposed landfill area.

Predicted noise levels only exceed applicable criteria at two properties, the nearest residences to the proposed area of landfill operations.

The values calculated did not, however, factor in natural elevations or added noise attenuation by buffers located between the source and the receptors. Several buffers will exist between site works and receptors, comprised of attenuation bunds and screens of mature trees and riparian vegetation. Such buffers can decrease A-weighted sound pressure levels by up to 15dB, and more at greater distances, with a conservative estimation of reduction by 7-10dB (AS 2436:2010). With this decrease, sound pressure levels at the receiver distance are shown below.

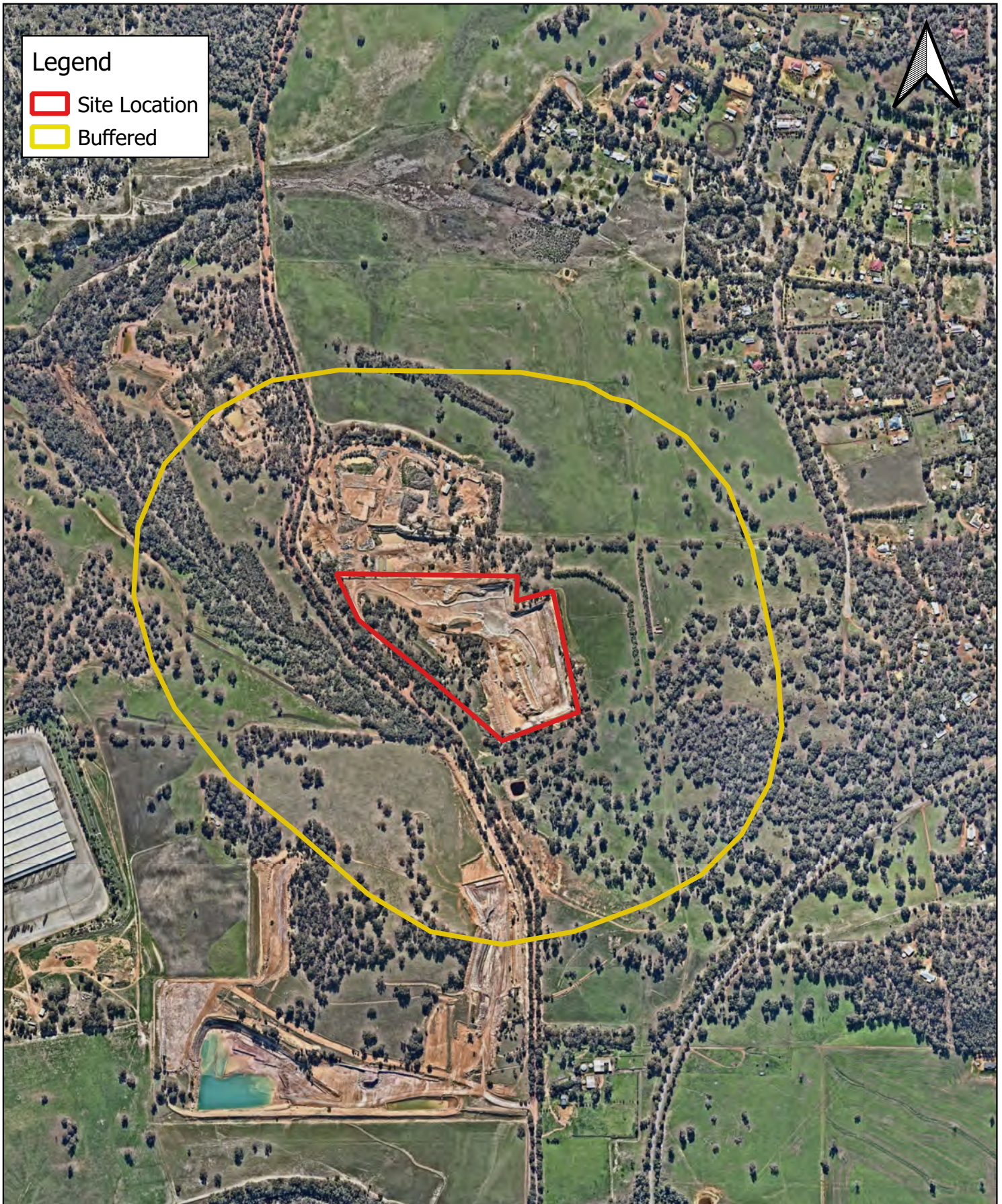
Figures



Legend


- Site Boundaries
- Geographic Location

TITLE				
Figure 1. General Site Location				
PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE 166898		
CLIENT				
DESIGN/DRAW DC	APPROVED BY MC	VERSION 00	DATE 21/10/2022	
 SERS Site Environmental and Remediation Services		SCALE		
		0 250 500 m 		
SOURCE				
Coordinate System GDA2020. Basemap 1: Google Maps. Google Terrain				



Legend

- Site Location
- Buffered

TITLE Figure 2. 500m Buffer		 SERS Site Environmental and Remediation Services					
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering			PROJECT CODE	166898		
CLIENT		VERSION	00	DATE	21/10/2022	SCALE	0 100 200 m
DESIGN/DRAW	DC	APPROVED BY:	BD	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.			

End of Document

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Appendix G – Landfill Closure Plan

Landfill Closure and Rehabilitation Plan
Lot 9001 (88) Caladenia Close, Lower Chittering
Western Australia 6084



Prepared for:
Brajkovich Landfill & Recycling Pty Ltd

Prepared by:
Site Environmental and Remediation Services
Pty Ltd (SERS)
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Client:

Project: Landfill Closure and Rehabilitation Plan




Title: Landfill Closure and Rehabilitation Plan – Lot 9001 (88) Caladenia Close, Lower Chittering 6084

Reference: 166898

Status: Final

Report Date: 7th February 2023

Document Production Record

Issue Number	1	Name	Signature
Prepared By		Darcie Cluney	
Checked By		Matt Campbell	
Approved By		Matt Campbell	

Document Revision Record

Issue Number	Date	Revision Details
1	7 th February 2023	Issue

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1. Introduction

Site Environmental and Remediation Services (SERS) have been engaged by the proponent to develop a Landfill Closure and Rehabilitation 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**. Post-closure management is subject to regulatory change prior to being instituted, thus will require updating as the landfill progresses.

1.1 Objectives of site rehabilitation

Rehabilitation of the site will be carried out with the following objectives in mind:

- Contain buried waste material
- Restore sufficient material to emulate natural pre-excavation hill contours
- Install a capping able to minimise infiltration of rainwater and thus reduce leachate generation
- Facilitate the construction of long-term drainage systems requiring little to no future maintenance
- Replace topsoil suitable for supporting vegetative growth
- Re-planting capping to a mixture of pasture and some vegetation endemic to the area
- Provide a suitable platform for the re-use of the site as pasture
- Comply with licence conditions to implement site rehabilitation and maintenance measures

The post-closure management measures outlined below shall be subject to ongoing updates throughout the tenure of the project.

1.2 Applicable local government specifications

Western Australia Specification 273 - Landscape Construction

Provides specifications for vegetation of slopes and drains, the vegetation of slopes of 3:1 or flatter, vegetation of slopes steeper than 3:1, and vegetation of open drains, including the timing of works, materials, seeding, stolonisation, and turfing.

Provides specifications for landscape planting including the timing of works, materials, planting, and care of

landscape works.

Provides specifications for limits and tolerances of topsoil, turf, vegetative mulch, topsoiling, straw mulching, planting, and mulch.

Provides specifications for measurement and payment for vegetation of slopes 3:1 or flatter, the vegetation of slopes steeper than 3:1, vegetation of open drains, landscape planting, and supply of imported topsoil.

2. Historic rehabilitation measures

Works at the site aim to restore land levels approximating those present prior to excavation of the hill. Excavation works progressed in rough stages and as early stages were completed, they were left as is.

Some areas were deliberately built up and actively revegetated to preserve the visual amenity of the site. Vegetation in these areas appears densely planted and healthy and has successfully stabilised banks and bunds.

Active rehabilitation of the site will take place on completion of the surface of each cell, an approximately two thousand five hundred square metre area. Once surface levels are achieved, topsoil will be spread and seeded. The area will then be cordoned off to allow the effective establishment of native vegetation.

2.1 Site restoration and reinstatement

From the outset, Extraction Licences were granted on the basis that rehabilitation is conducted upon completion of excavation works. Initially, rehabilitation referred to reverting the land to pasture. Later, emphasis began to be placed on the re-institution of native vegetation, along with the vegetation of banks and bunds put in place for the purpose of retaining visual amenities of the site from the road.

2.2 Capping

Waste material shall be overlain with a topsoil layer capable of supporting vegetation allowing for effective use of the land following completion and posing no future risk to land users. The whole structure, however, must be anticipated to settle over a period of approximately five years by up to 30%. As such, 'final finished levels' are subject to change and must be established to allow for settling. Settling can be minimised by secure compaction of waste material, and compaction of cover material once in place.

The final capping should consist of a layered structure. It should be noted that this layer shall not be placed until the final levels have been achieved. Rehabilitation shall commence at the completion of each phase to allow for periodic reclamation of land. As a minimum of five years is expected to elapse before this is achieved for the first phase, the design of the final capping layer is anticipated to be updated prior to implementation.

Over the top of waste material shall be placed the following:

- Seal-bearing surface: gradient <5% towards defined drainage points
- Sealing layer of clay: >500mm permeability 10^{-8} m/s
- Infiltration drainage layer: >300mm of permeability $>10^{-5}$ m/s
- Topsoil layer: >100mm

2.3 Finished topography

Indicative proposed levels have been formulated using an interpolation of levels from adjacent areas of Lot 9001 that did not undergo excavation. They are provided in **Figure 2**. Contours have been smoothed to ensure an even rise from west to east, with a gentle gradient in keeping with the topography of neighbouring properties.

3. Potential offset area

Offset areas are environmental activities which deliver positive environmental benefits to counteract the residual environmental impacts or risks of a project. Unlike mitigation which occur on-site to reduce the immediate direct impacts of the project, offsets are undertaken outside the project area and counterbalance effects.

The objectives of establishing an offset area include the following:

- Securing the offset area for long-term conservation
- Enhancing flora and fauna habitats within the offset area
- Promoting existing native vegetation and providing supplementary planting with species characteristic of the Guildford complex
- Implementing the offset under the conditions established in the Clearing Permit Decision Report.

Measures to be taken to enact the above objectives include:

- Long-term management of the offset area to achieve vegetation in 'good' or better condition
- Plants proposed to be used in the rehabilitation program incorporating species in alignment with the Shire of Lower Chittering *Local Biodiversity Strategy 2022* complex to offset vegetation loss
- Use of tree guards around supplementary planting tube stock species susceptible to grazing by rabbits and kangaroos
- Control of access to the offset area to prevent disturbance as well as weed and pathogen spread
- Installation of delineation fencing around the 2.5ha offset site
- Installation of signage identifying the area as a conservation zone
- Weed management
- Fire management by avoiding or reducing potential ignition sources and too-frequent fire events
- Access management
- Provision of education and training to site-based staff in the form of an environmental induction on the values and requirements of the offset site.

4. Revegetation works

Topsoil shall be returned to its area of origin as much as possible, with overburden being placed before topsoiling up to surface level.

Planting is to occur during autumn and winter as appropriate for each species.

The second round of revegetation is to occur should high mortality rates be experienced during the first round.

5. Weed control

Weed control measures will comprise the following:

- Control of access
- Monitoring of new weed populations
- Early detection and eradication of new weeds
- Application of herbicide where the appropriate and safe application can be ensured
- Manual control of small infestations or where chemical control is unviable, ensuring gross soil disturbance does not lead to weed replacement.

6. Aftercare Management

6.1 Post-closure monitoring

Closure of the landfill is not expected to occur for approximately twenty years, by which time land management measures are expected to have changed, thus only provisional measures are proposed here. Current management practices stipulate ongoing monitoring of surface water, leachate, groundwater, and landfill gas. As landfill gas is not expected to be generated by a landfill of inert material, it is not proposed for monitoring either throughout the life of the landfill or post-closure.

Ongoing monitoring of groundwater and surface water is proposed for a period of two years on a six-monthly basis of a limited suite of analytes, listed below:

- Ammonium, Calcium, Iron, Manganese, Magnesium, Potassium, Sodium
- Chlorine, Fluorine, Nitrate, Sulphate

Field testing shall be conducted for the same characteristics listed previously.

7. Post Closure Use

Due to its location, the post closure use of the site is expected to be rural agricultural land. However, relevant regulatory authorities should be consulted toward the end of the landfill's lifespan, as community needs have the potential to change over time.

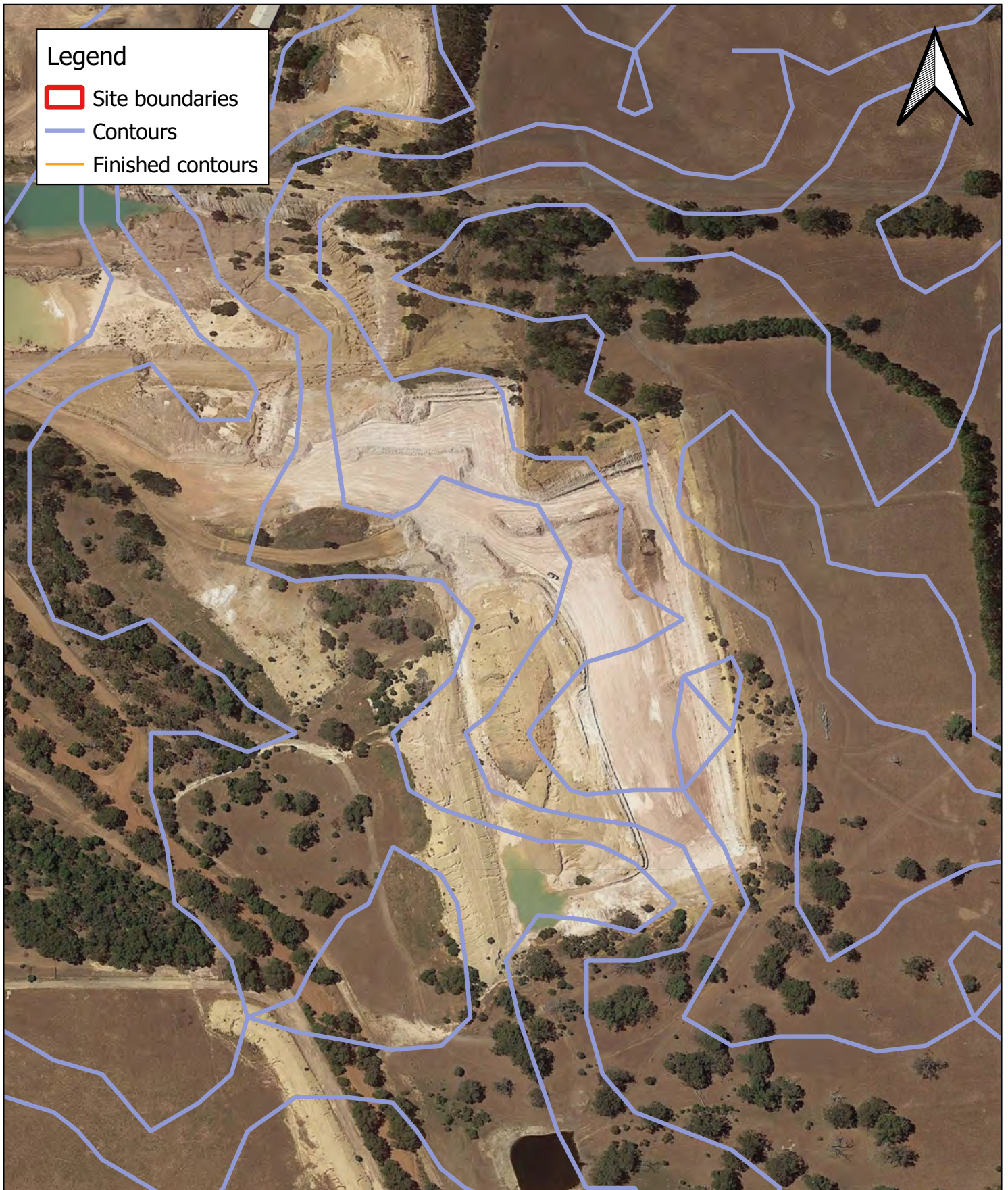
Other potential uses could include:


- A public open space
- A waste precinct (non-landfill operations)

Figures



TITLE				
Figure 1. General Site Location				
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT				
DESIGN/DRAW	APPROVED BY	VERSION	DATE	
DC	MC	00	21/10/2022	
 SERS Site Environmental and Remediation Services			SCALE 0 250 500 m 	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps. Google Terrain



TITLE			Figure 3. Finished Topographical Contours		 SERS Site Environmental and Remediation Services
PROJECT		88 Caladenia Close, Lower Chittering		PROJECT CODE 166898	
CLIENT		VERSION	DATE	SCALE	
Insert		00	27/10/2022		
DESIGN/DRAW	APPROVED BY:	SOURCE			
DC	BD	Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.			

End of Document

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Attachment 1

Asbestos Handling Procedure



SERS
Site Environmental and
Remediation Services

Asbestos Management Plan
Lot 9001 (88) Caladenia Close, Lower Chittering
Western Australia 6084



Prepared for:
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Document Control Sheet

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Client:

Project: Dust Management Plan




Title: Dust Management Plan – Lot 9001 (88) Caladenia Close, Lower Chittering 6084

Reference: 166898

Status: Final

Report Date: 7th February 2023

Document Production Record

Issue Number	1	Name	Signature
Prepared By		Darcie Cluney	
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Document Revision Record

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Executive Summary

Site Environmental & Remediation Services Pty Ltd (SERS) were engaged by the proponent to prepare an Asbestos Management Plan (AMP). This has been developed in support of the landfill operation proposed at Lot 9001 (88) Caladenia Close, Lower Chittering WA (hereafter referred to as 'the site'). This document was prepared to aid the identification and management of asbestos onsite during waste acceptance and burial operations of the above-mentioned works.

Methods and procedures to identify, contain and dispose of suspected ACM are recommended for application throughout the transport and onsite processes. The objectives of these procedures and controls are to ensure that all work is carried out to minimise occupational emissions as best as can be reasonably practiced to negate any risk to human or environmental health.

1.0 Introduction

Site Environmental and Remediation Services (SERS) have been engaged by the proponent to develop an AMP for the proposed landfill operations at Lot 9001 (88) Caladenia Close, Lower Chittering WA to aid in the application process for a proposed landfill at the site, **Figure 1**. The site has previously operated as a clay extraction quarry. It is proposed to fill the extracted areas with inert construction and demolition waste to return the land to its original contours prior to rehabilitation. This is classified as a Category 63 Prescribed Premise (Class 1 inert landfill site) and will require a licence from the DWER.

This licence category does not allow for the burial of asbestos. Therefore, measures will need to be implemented to ensure any Asbestos Containing Materials (ACM) are identified and removed prior to burial. This AMP outlines the measures proposed for each stage of the operation. Additionally, asbestos can pose a significant risk to human health when inhaled as it is a known carcinogen. As such, this AMP also details the handling procedures, training requirements, the correct Personal Protective Equipment (PPE), incident management and record keeping requirements.



1.1 Site Details

A summary of the site identification information is presented within the table below (**Table 1.1**).

Table 1.1. Summary of Site Information

Aspects of Site	Summary of Characteristics
Address	Lot 9001 (88) Caladenia Close, Lower Chittering WA
Site size	10.6ha
Local Government Authority	Shire of Chittering
Neighbouring land use	Rural
Metropolitan Regional Scheme Land Use Zoning	Beyond the scope of the MRS
Prescribed premise categories	63
Onsite operations	Transport of materials to and from site Clay Extraction (Current) Landfill (Proposed) Rehabilitation
Hours of operation	07.00-19:00 Monday to Saturday
Number of Staff	5
Equipment	Loader Water cart Roller (as required)

1.2 Locality

The site is located 55km northeast of the Perth CBD **Figure 1**. Access to the site is along a small, unsealed access road (Wandena road) **Figure 2**.

The area is characterised by rural landscapes along with industry and rural residents. There are residential and industrial properties are located within a 1km buffer zone of the site (**Figure 3**). The identified sensitive residential receptors are located east and south of the site, with the closest approximately 769m away.



1.3 Activities undertaken on site.

Previous clay resources were extracted from the site. This operation has been active since 1993 resulting in 40% 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 then directly deposited into the landfill.

1.4 Objectives

Asbestos management methods are proposed with the objective of minimising the risk of harm to human and environmental health through preventing the exposure to airborne fibres. Operational methodologies thus ensure material is heavily scrutinised at every step of processing. The AMP additionally intends to minimise the potential risk of asbestos contamination within the remainder of the site.



2.0 Asbestos Containing Material

Asbestos has been used historically as an integral component of many structures in Western Australia due to its fire-proof properties. It exists in structures across a wide-ranging area in both friable and bound forms and is particularly commonly encountered as ceiling and wall panels, fascias, eaves, verandah soffits, fencing, roof sheeting, kitchen tilux, vinyl floor tiles (DHW, 2008), as well as drainage and flue pipes, roofing shingles and flexible building boards (Villaboard, Hardiflex, Wundaboard, Flexiboard).

Construction and demolition waste often have the potential to include asbestos-containing material (ACM). ACM is not always found in the more obvious forms listed above and can have been historically covered over with an impermeable layer such as concrete or can be hidden in interior walls that may be inaccessible during hazardous materials inspections conducted prior to demolition. As such, inspections will need to be conducted along all stages of the demolition and disposal process.



3.0 Applicable regulations

3.1 Health (Asbestos) Regulations 1992

The Asbestos Regulations govern the following areas of the Health Act: asbestos cement product; material containing asbestos; and disposal of material containing asbestos.

3.2 Code of Practice: How to Manage and Control Asbestos in the Workplace (WHSC, 2022)

Developed to assist in the control of the risks of ACM in workplaces by setting out steps to be taken to eliminate or otherwise minimise the risks of exposure to airborne fibres including identification of ACM, risk assessments and the implementation of control measures with the aim of reducing incidences of mesothelioma, asbestosis, and lung cancer.

3.3 Code of Practice: How to Safely Remove Asbestos (WHSC, 2022)

Advice is provided for the safe removal of asbestos and ACM from buildings and structures, equipment, machinery and other vehicles.

3.4 Guidelines for the Assessment, Remediation and Management of Asbestos-contaminated Sites in Western Australia May 2021

Provides guidance on sampling requirements to verify that work practices are as effective as documented.

3.5 Guidelines for managing asbestos at construction and demolition waste recycling facilities (DWER April 2021)

These guidelines provide a framework for C&D waste recycling facilities to work within in relation to the asbestos. The expectations of the former Department of Environment and Conservation (DEC) (currently reinstated as the DWER) are laid out in relation to waste acceptance, testing and monitoring and management procedures and practices at the site. This document is specific to Prescribed Premise's 13 and 62; therefore, it does not specifically cover landfill operations, however much of the guidance is still relevant.

The document does not provide guidance on occupational health and safety issues associated with C&D waste recycling facilities.

3.6 Environmental Protection (Rural Landfill) Regulations 2002

This regulation provides guidance on the disposal of clinical waste and material containing asbestos within a category 65 and 89 landfill site. As above, this document does not specifically cover the category 63 inert landfill, however much of the advice is still relevant.



4.0 Site Operations

4.1 Description of Proposed Works

It is proposed to be operated as a Class 1 inert 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 or hazardous waste, and then directly deposited into the landfill.

4.2 Equipment and Machinery

The equipment and machinery that will be utilised as part of the landfill operation include:

- 1) Loader
- 2) Water cart
- 3) Trucks

This equipment must undergo regular maintenance. Ancillary equipment may be brought to site from time to time as required. This will include fuel tankers, water carts and occasionally loaders in the event of onsite equipment malfunction.

4.3 Site Management and Staffing

The daily operations will be overseen by the site supervisor. The site supervisor is directly responsible for management of activities at the site including:

- 1) Directing Staff
- 2) Coordinating all incoming and outgoing material
- 3) Dust controls
- 4) Noise controls
- 5) Asbestos controls
- 6) Documentation
- 7) Staff training/inductions.

The on-site training that they will undertake will include detailed familiarisation with this Asbestos Management Plan, as well as other associated management plans for noise and dust submitted in conjunction with this document. Each employee will be provided with a copy of these plans and will be required to agree to work within the methodologies detailed in each document. Records of this process shall be retained on-site.



The site supervisor will be responsible for all on-site document control and management. Drivers to the site shall be required to have with them a relevant docket issued at the source site for the load they are carrying. Responsibility lies with the Site Supervisor to ensure that all dockets remain on the site every week. Dockets will be collected from the site each Friday and filed at the main office.

4.4 Water Supply

The water source for the site will be a groundwater extraction bore, located on site. This bore will have a licensed capacity of 10,000kL per annum which will cover all on site water requirements. Water will be pumped from the bore to a water cart as required. This watering cart will operate on a permanent basis during operational hours to dampen haul roads throughout the site. The watering cart will also act as a pumper truck and will have a fire hose application fitted which will be utilised for additional dust and asbestos control in areas not covered by the reticulated water network (if any) and in the event of a fire.

4.5 Complaints

All off-site complaints are taken and treated very seriously. It is the aim to handle all these complaints without delay. Contact will be made with the complainant and an investigation will occur into the nature and cause of the complaint and a corrective action solution will be devised to mitigate a future similar occurrence. Individual complaint forms and a complaints register will be compiled by SERS incorporating all future known complaints from this site. A template complaint form can be seen in **Appendix A**.

4.6 Possible locations of asbestos on site

The pre-acceptance and acceptance procedures which will be put in place on site are expected to ensure that asbestos and ACM do not enter the site. However, it is possible for asbestos to be present on site. The following locations have the potential to contain asbestos:

- 1) The landfill tipping area
- 2) Non-conforming waste area

All members of staff will be trained in the identification of asbestos and will inspect the material at all stages of the recycling process. Should asbestos be identified on site it will be transferred to a quarantine area, pending its final disposal at an appropriately licence facility.



4.7 Records for Inspection

Records will be maintained on site for inspection should they be required by the DWER. The on-site records will include the following:

- 1) For all rejected loads, the following will be recorded.
 - a. Waste producer.
 - b. Waste carrier.
 - c. Registration number of the carrier vehicle.
 - d. Date of rejection.
- 2) Complaints received and the management response (**Appendix A**).
- 3) Details of incidents of asbestos identification on site and the actions taken in response to the non-conformance (**Appendix B**).
- 4) Record of the visual inspections (**Appendix C**).
- 5) Details of audits which have been undertaken in relation to the implementation of procedures on site.

All records will be kept in a centralised location within the administration of the proponent. All records will be made available for inspection by the DWER, DoH and WorkSafe upon request.



5.0 On Site Asbestos Management Procedures

5.1 Source Procedures

The risk of encountering asbestos must be managed throughout the landfill process. All source C&D contractors has a duty to operate under an auditable asbestos management plan detailing the management process from pre-demolition inspection through to demolition and loading of C&D waste for transport from a C&D waste site. This is regulated by WorksafeWA and the DEWR.

At point of origin, asbestos should be managed by a C&D waste contractor in the following way:

Pre-demolition

- 1) Training.
- 2) Pre-Demolition Inspection.
- 3) Removal of Asbestos (where present).
- 4) Clearance Inspection.

Demolition

- 5) Mechanical Demolition – Visual Inspection by Site Supervisor and Demolition Crew.

Transport

- 6) Loading of C&D material – Visual Inspection by Truck Driver and Excavator Operator.
- 7) All trucks to be covered during transport.

All asbestos material encountered should be managed in accordance with the following documents:

- 1) Work Health and Safety Act 2020 (Western Australia)
- 2) Work Health and Safety (General) Regulations 2022 (Western Australia)
- 3) Code of Practice: How to Safety Remove Asbestos (WHSC, 2022)
- 4) Code of Practice: How to Manage and Control Asbestos in the Workplace (WHSC, 2022)
- 5) Health (Asbestos) Regulations 1992 (Western Australia)
- 6) AS 2601-2001 Demolition of Structures
- 7) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (Department of Health, 2021)
- 8) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]
- 9) Landfill Waste Classification and Waste Definitions 1996 (as amended December 2019)



5.2 Training

All landfill employees are to attend a training session and receive training on the below as a part of their company induction process:

- 1) Types of Asbestos.
- 2) Friable and Non-Friable Asbestos.
- 3) Products containing Asbestos.
- 4) Health hazards of Asbestos.
- 5) Exposure Standards for Asbestos.
- 6) Risks from Asbestos Exposure.
- 7) Regulations relating to removing Asbestos.
- 8) Codes of Practice relating to Asbestos.
- 9) Personal Protective Equipment.
- 10) Public Awareness.

Records are kept of all employees with the above accreditation. Refresher training courses are provided to onsite employees where appropriate to ensure they have a clear understanding and awareness of the environmental and asbestos related issues.

5.3 Pre-Acceptance Procedures

Landfill operations are being undertaken by backfilling excavated areas with waste materials conforming to the proposed DWER Licence category. However, loads arriving at the site for final disposal may contain asbestos and/or soil outside the Landfill Classification.

The following procedure has been implemented for all materials arriving onsite:

- 1) Advise all customers (potential and existing) that any asbestos containing materials are not permitted and will not be accepted onto site, and a no asbestos clause will be included in any contracts with C&D suppliers.
- 2) A 'No Asbestos' sign will be installed at the entrance to the site.
- 3) All drivers are required to sign a declaration that the load contains no ACM.
- 4) Staff are to record the details of all loads accepted onto site including the producer, carrier, vehicle registration number, date, and time.
- 5) All vehicles will be visually inspected at the weighbridge to determine the risk of a load containing asbestos or ACM. This is in accordance with the risk classification procedure as outlined in the DDWER 2021 *Guidelines for managing asbestos at construction and demolition waste recycling facilities*. This has been attached as **Table 5.1** below.



Table 5.1 DWER Risk Classification Matrix

Risk Classification Matrix			
	Type of Load		
Material Type	Commercial	Public, utes, cars and trailers	Skip bins
Clean concrete (without formwork)	Low	High	High
Clean brick	Low	High	High
Clean bitumen / Asphalt	Low	High	High
Mixed construction waste	High	High	High
Mixed demolition waste	High	High	High

6) Loads containing visibly identifiable ACM will be rejected from site and recorded in a registry to be always kept on site. Details to be recorded include the waste producer, carrier, registration number, time, date, and reason for rejection. This register will be available for inspection if requested.

5.4 Post-Acceptance Inspection.

Loads accepted onto site will be directed to a sorting area where any non-conforming materials are removed from the loads and placed in a separate non-conforming waste pile to be removed from site within 4-6 weeks. Following this, the remaining waste will continue through the landfill tip face where it will be tipped and visually inspected by a trained staff member to identify any remaining ACM before burial. All loads will be wet down before any loading or unloading of material to minimise airborne dust.

5.5 Containment of Identified ACM

In instances where ACM is identified, work will immediately cease until the material is removed and the area is deemed free of ACM. Where possible, ACM will be removed from the affected area by manual hand picking by a qualified staff member wearing appropriate PPE. All ACM will be wetted down to avoid loose fibres becoming airborne. Following this, it will be immediately bagged in a heavy duty, impermeable, polyethylene bag, which will then be sealed and clearly marked with 'CAUTION ASBESTOS'. The area will then be inspected by a competent site supervisor. If any further ACM is identified, the above procedure will be repeated until the area is declared free of any ACM. In instances where the material is fibrous, friable or asbestos fines, the area will remain cordoned off until a qualified environmental consultant has inspected the area.

If manual hand-picking is deemed unsafe due to large levels of contamination or other concerns, the area will be treated as asbestos-contaminated and barricaded off with adequate signage and barriers. The area will be sprayed with water and mechanically loaded directly onto a semi-tipper for immediate transport to a licensed ACM facility.



This loading and transport will be in accordance with the Code of Practice: How to Safety Remove Asbestos (WHSC, 2022). Once the material has been removed, the area will then be inspected, and the process repeated until the area is deemed ACM free. All employees involved in this process will be suitably qualified and utilising all appropriate PPE and RPE.

5.6 Storage and Removal of ACM

All ACM identified will be removed from site as soon as practicably possible in accordance with the Code of Practice: How to Safety Remove Asbestos (WHSC, 2022). This will involve disposal of the ACM at a suitable licensed landfill facility as per the Health (Asbestos) Regulations 1992. The nearest landfill site licensed to accept ACM in the area include:

1. Gingin Tip

Lot 10 Cockram Rd

Gingin

2. Walyunga Landfill

Walunga Road Bullsbrook

In instances where it cannot be removed immediately, it will be stored in a dedicated ACM skip bin, lined with heavy duty plastic sheeting, and kept damp until a time it can be safely removed.

5.7 Decontamination

Once all the ACM has been removed, employees shall instigate the following procedure:

- 1) All visible asbestos dust/residue is removed from the disposable protective clothing by wet wiping all clothing.
- 2) The disposable protective clothing is taken off (while still wearing a respirator) and placed in an asbestos bag.
- 3) Clothing and footwear worn during the removal shall be vacuumed using an asbestos vacuum cleaner and then the footwear shall be wet wiped.
- 4) Disposable respirators shall then be discarded as asbestos waste.
- 5) Workers shall wash their face and hands, paying particular attention to their fingernails.



6.0 Sampling and Monitoring

6.1 Sampling and Analysis

As no materials are being processed or stockpiled on site, the sampling and analysis methods outlined in the DWER “Guidelines for Managing Asbestos at Construction and Demolition Waste Recycling Facilities, 2021” are not required.

6.2 Qualitative Monitoring

All employees will conduct visual assessments for the presence of asbestos or excess airborne dust. This will be conducted at all stages of the landfill operation. A record will be kept of any additional visual inspections (Attachment 3) and any incidents of asbestos identification will be recorded using the supplied form (Attachment 2).

6.3 Quantitative Monitoring

As there will be no processing of materials on site, it is not proposed to have any dust or asbestos fibre monitoring on site. This will be reviewed if in occurrence of any concerns or complaints regarding dust generation.



7.0 General Management

7.1 Audits

Auditing shall be undertaken on a regular basis to ensure the correct implementation and effectiveness of the proposed management measures.

The audits carried out on site will include the following inspections and observations.

- A visual inspection of the site.
- Checking of all relevant documentation on the first visit and then on a random/ judgemental basis subsequently.
- Observation on a random/judgemental basis of procedures associated with the identification and management of any asbestos material.
- Put forward any actions which should be implemented to resolve any deficiencies on site practices or if any asbestos is identified as part of the audit process.

7.2 Review of Asbestos Management Plan

The methods set out in the AMP are the most up to date at this time. Should management practices, technologies, guidelines or operating procedures change, this AMP will be revised as a matter of urgency to reflect the revised practices. Before any changes are put into practice on site approval will be sought from the DWER and DoH.



8.0 References

Department of Water and Environmental Regulation. (2021). Managing Asbestos at Construction and Demolition Waste Recycling Facilities.

EPA. (2002). Environmental Protection (Rural Landfill) Regulations 2002.

Work Health and Safety Act 2020 (Western Australia)

Work Health and Safety (General) Regulations 2022 (Western Australia)

Code of Practice: How to Safety Remove Asbestos (WHSC, 2022)

Code of Practice: How to Manage and Control Asbestos in the Workplace (WHSC, 2022)

Health (Asbestos) Regulations 1992 (Western Australia)

AS 2601-2001 Demolition of Structures

Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (Department of Health, 2021)

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]

Landfill Waste Classification and Waste Definitions 1996 (as amended December 2019)

Adopted National Exposure Standards for Atmospheric Contaminates in the Occupational Environment [NOHSC:1003(1995)];

Atmospheric Contaminates in the Occupational Environment [NOHSC:1003(1995)];



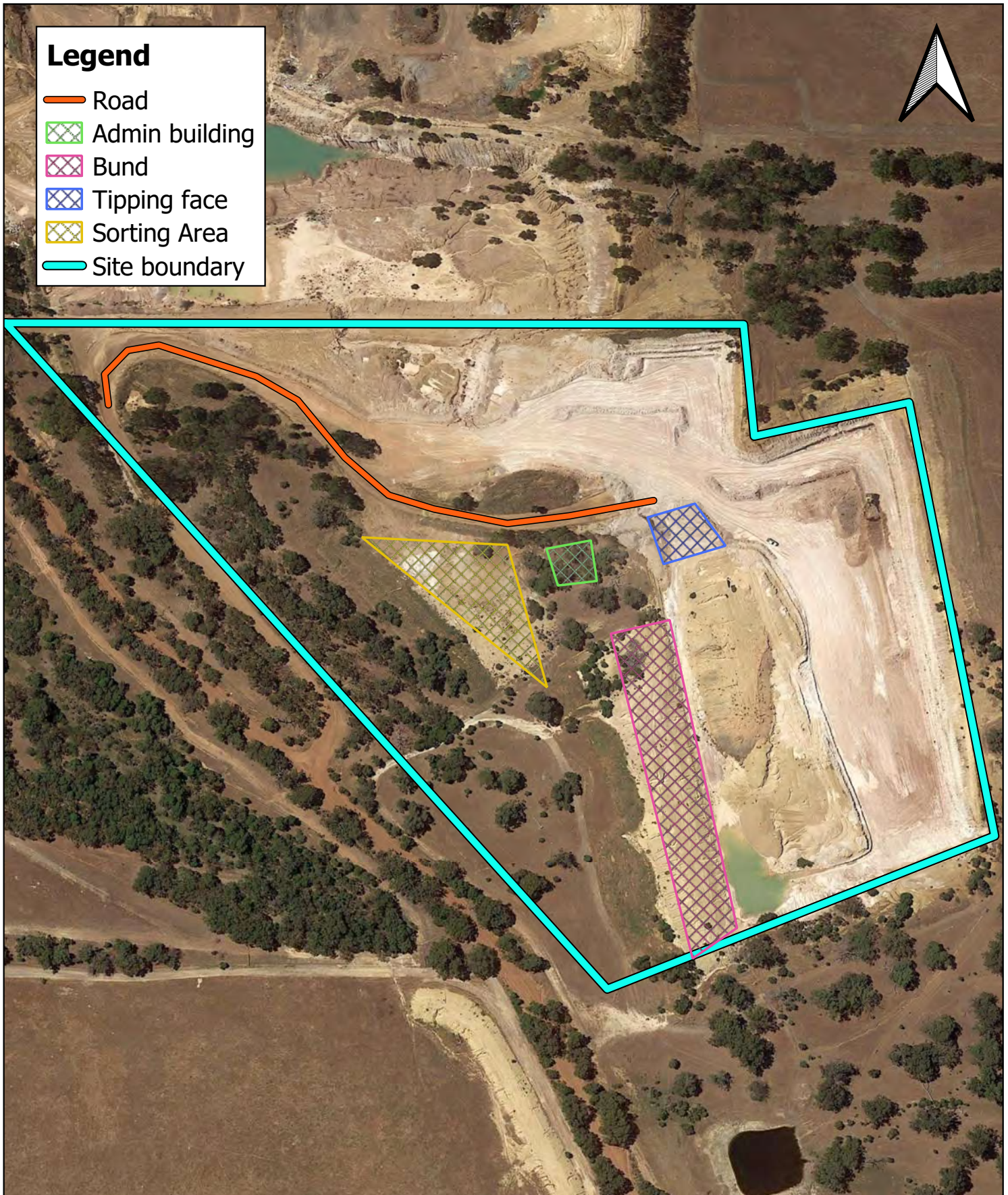
Figure 1: Site Location



TITLE				
Figure 1. General Site Location				
PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering		PROJECT CODE 166898		
CLIENT				
DESIGN/DRAW DC	APPROVED BY MC	VERSION 00	DATE 21/10/2022	
 SERS Site Environmental and Remediation Services		SCALE 0 250 500 m 		SOURCE Coordinate System GDA2020. Basemap 1: Google Maps. Google Terrain



Figure 2: Site Layout





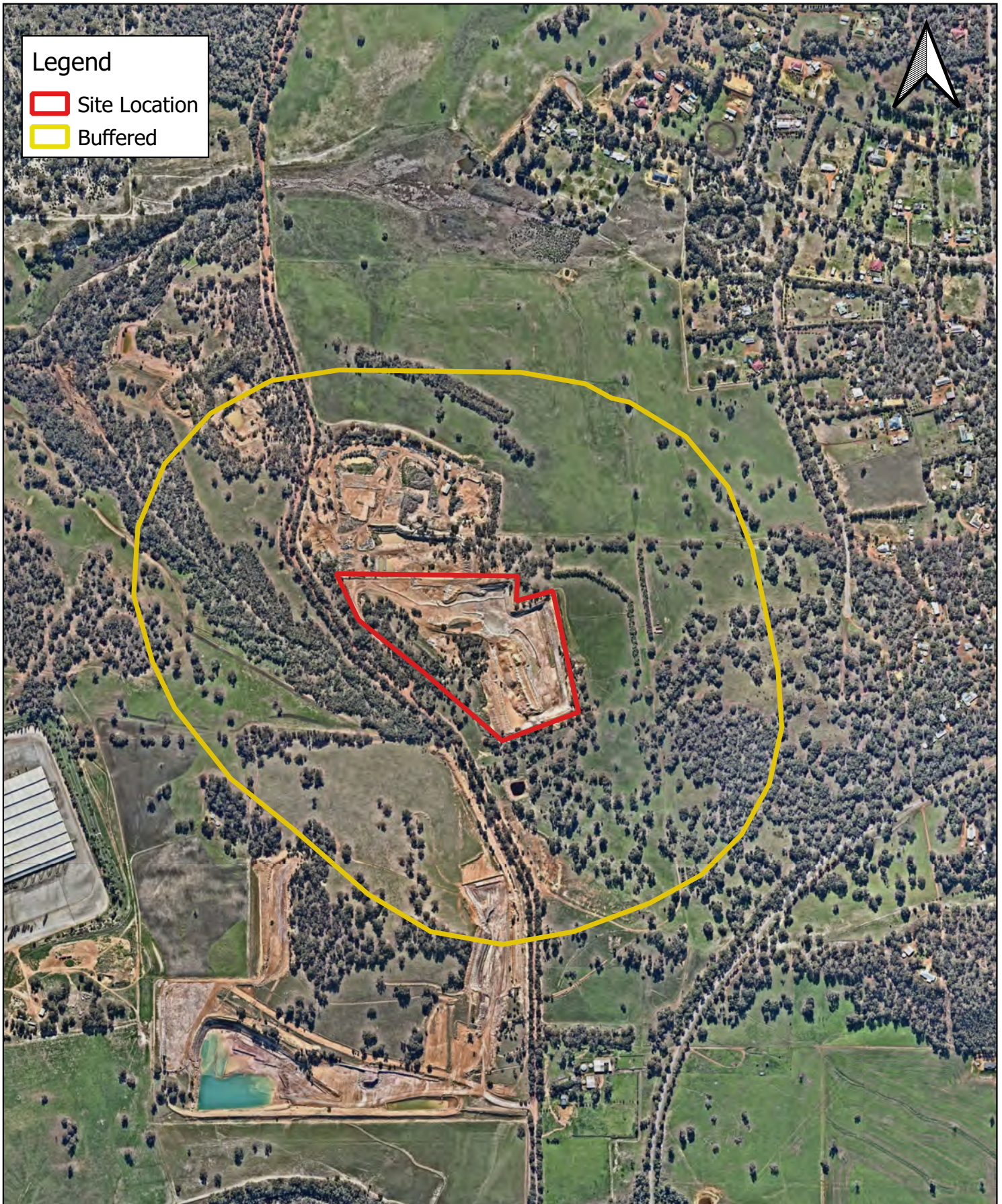
TITLE Figure 9. Infrastructure & Operations Layout			
PROJECT Lot 9001 (88) Caladenia Close, Lower Chittering	PROJECT CODE 166898		
CLIENT Brajkovich Landfill and Recycling Pty Ltd	VERSION 00	DATE 31/10/2022	SCALE 0 25 50 m 
DESIGN/DRAW DC	APPROVED BY: MC	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	





Figure 3: Site 500m Buffer



Legend

- Site Location
- Buffered

TITLE		Figure 2. 500m Buffer		 SERS Site Environmental and Remediation Services
PROJECT	Lot 9001 (88) Caladenia Close, Lower Chittering	PROJECT CODE	166898	
CLIENT		VERSION	00	SCALE 0 100 200 m
		DATE	21/10/2022	
DESIGN/DRAW	DC	APPROVED BY:	BD	SOURCE Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.



Appendix A: Complaints Form



Appendix B: Incidents of Asbestos Identification

Asbestos Incident Record Sheet

Appropriate PPE and RPE should always be used where asbestos is present or thought to be present.

Please note this sheet should not be used as guidance for asbestos management, it should only be used for record keeping. If guidance is required in relation to the management of asbestos on site, please refer to the site supervisor or the site Asbestos Management Plan.

Please as appropriate.

Date of incident: _____

Asbestos identified in:

In coming load

In non-conforming waste area

While tipping material

Action taken:

Appropriate PPE/RPE worn

Hand picking of affected area

Load/area isolated

Mechanically loaded to skip/ semi tipper

Affected area dampened down

Whole load rejected

Decontamination:

Disposal PPE/RPE removed placed in asbestos bag

Footwear wiped down

Asbestos Landfill Details:

Name of asbestos landfill waste taken to: _____

Date of removal: _____

Landfill notified that waste contains asbestos

Any Other Comments:

Site supervisor name: _____

Date: _____

Signature: _____

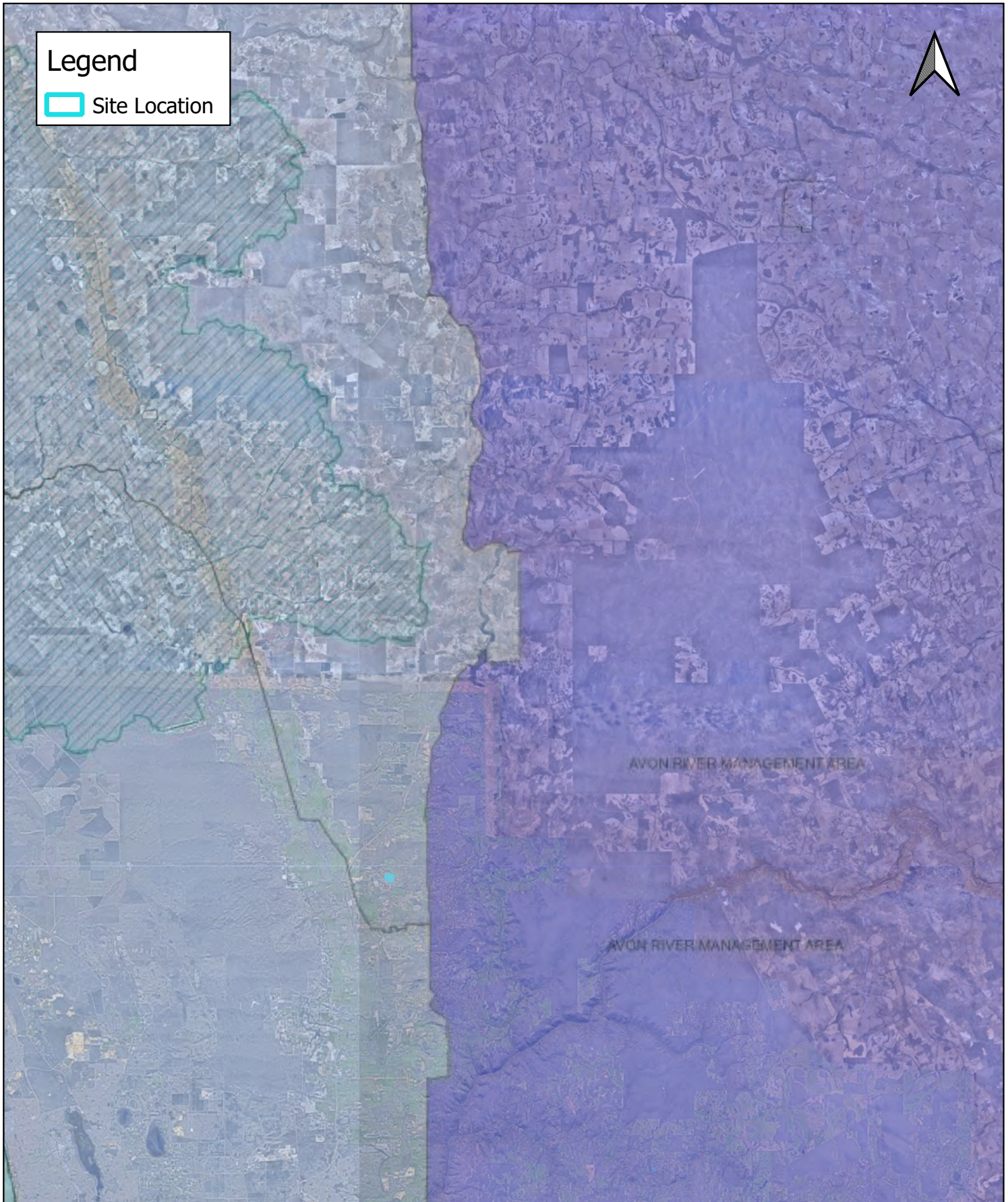




Appendix C: Record of Visual Inspections



Attachment 2

Perth Groundwater Atlas Data and Images



TITLE			 SERS Site Environmental and Remediation Services
PROJECT		PROJECT CODE	
88 Caladenia Close, Lower Chittering		165952	SCALE 0 5 10 km 
CLIENT	VERSION	DATE	
Brajkovich Landfill & Recycling Pty Ltd	00	12/10/2022	
DESIGN/DRAW	APPROVED BY:	SOURCE	
DC	BD	Coordinate System GDA2020. Basemap 1: Google Maps Terrain and Satellite.	

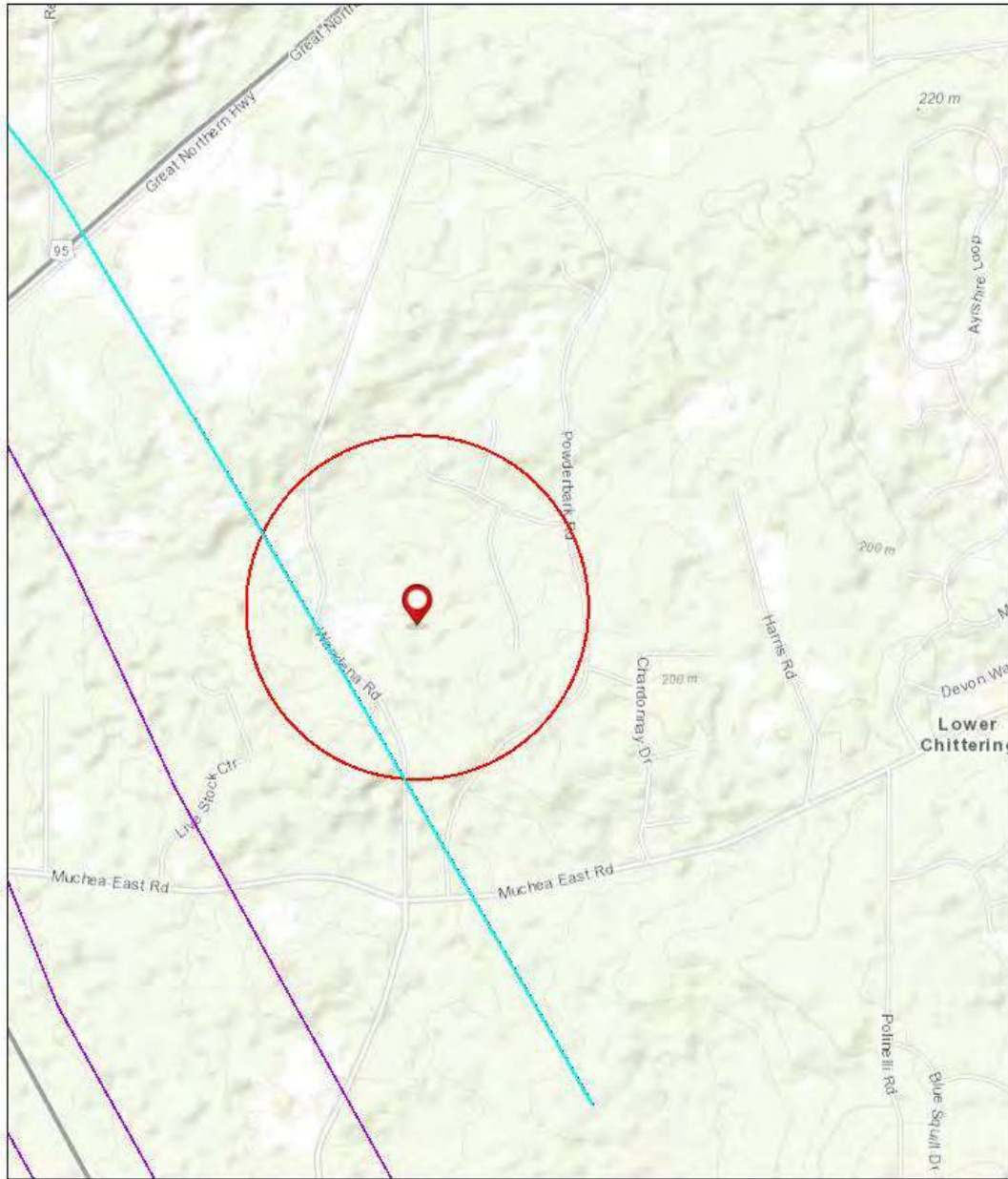


Area of Interest (AOI) Information

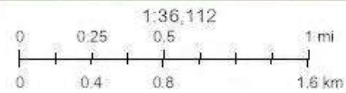
Area : 3,137,819.18 m²

Feb 7 2023 16:00:13 Australian Western Standard Time

A4 Portrait



Groundwater Contours - Minimum



Esri, HERE, Garmin, USGS, METINASA

Surface Geology

#	Surface Geology Type	Area(m ²)
1	Laterite over Mesozoic sediments and Precambrian crystalline rocks	2,315,423.30
2	Colluvium, including valley-fill deposits, variably lateritized	822,395.85

Iron Staining Risk

#	Iron Staining Risk	Area(m ²)
1	Low risk	207,821.26

Acid Sulfate Soil Risk Map

#	Acid Sulfate Class	Area(m ²)
1	No known risk	3,137,819.18

Groundwater Salinity

Fresh	0 - 500 mg/L
Marginal	501 - 1000 mg/L
Brackish	1001 - 3000 mg/L
Saline	Over 3000 mg/L

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