# Report on

# REMEDIATION ACTION PLAN
# PROPOSED SOUTH WEST ABORIGINAL MEDICAL SERVICES HEALTH HUB
# LOT 4669 FORREST AVENUE, BUNBURY

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# 1. INTRODUCTION

This report presents Galt Environmental Pty Ltd's (Galt's) remediation action plan (RAP) for earthworks associated with construction of the South West Aboriginal Medical Services (SWAMS) Health Hub located at Lot 4669 Forrest Avenue, Bunbury (the site). The site relative to the surrounding area is shown on Figure 1.

# 2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is irregular in shape and covers a total area of approximately 1.94 ha. The site is bounded by the Bunbury to Perth railway to the north and east, and Forrest Avenue to the south and west. A provided feature survey plan indicates the surface elevation ranges from about RL 5 m AHD along Forrest Avenue to a lower-lying area near the middle of the northern boundary at an elevation of RL 4.0 m AHD.

The site is currently used as a public open space (POS - Jaycee Park) and is mostly clear with scattered mature trees, a sealed car park (pavement generally in poor condition), a toilet block, and play equipment. Photographs of the site are presented in Appendix A.

An environmental assessment conducted by 360 Environmental[1] found that the site is underlain by up to about 1.8 m of mostly inert waste (glass, metal, wood, china, tiles). Asbestos containing material (ACM)[2], asbestos fines (AF) and fibrous asbestos (FA) were noted in places. According to anecdotal information, the site was a municipal landfill until about 1969.

A geotechnical study conducted by Galt Geotechnics (Ref: J1901035 001 R Rev1 dated 11 April 2019) confirmed the presence of uncontrolled fill across the site. The extent of the uncontrolled is generally consistent with that recorded during the environmental study, however there are areas around the eastern portion where the uncontrolled fill was noted to extend beyond the previously mapped boundary.

Based on the supplied drawings, we understand that the health hub will cover approximately 6,500 $m^2$, and includes a health clinic, administration offices, childcare centre, community centre, and a before and after school facility. The proposed footprints of the structures along with test locations from the geotechnical study are shown on Figure 2. We understand that the structures will be a combination of single and two storey buildings. We assume that the buildings will be of masonry construction, founded on slabs-on-ground or shallow foundations.

Supplied drawings are provided in Appendix B.

# 3. SITE CONDITIONS

## 3.1 Geology

The Bunbury sheet of the 1:50,000 scale Urban Geology series map indicates that the area is underlain by "Alluvium". The western end of the site is shown to be underlain by sand derived from the weathering of Tamala Limestone.

[1] 360 Environmental Report Ref 950AE: Lot 4469 Forest Avenue (Jaycee Park), Carey Park, Bunbury, Western Australia – Detailed Site Investigation dated 22 January 2016

[2] ACM, AF and FA are defined in the Department of Health (DoH) (2009) *Assessment, Remediation and Management of Asbestos-contaminated Sites in Western Australia* guideline document.

## 3.2 Subsurface Conditions

The subsurface conditions across the site comprise:

- TOPSOIL: SAND, fine to medium grained, sub-angular to sub-rounded, dark grey, trace fines, trace to with organics, roots and rootlets to 0.2 m
- FILL: SAND (SP): fine to coarse grained, sub-angular to sub-rounded, typically brown to pale grey, trace fines, trace rootlets present in top 0.2 m, building rubble in places, typically loose to medium dense, moist, present from the surface extending to depths of about 0.3 m to 1.2 m; overlying
- UNCONTROLLED FILL (LOCALLY PRESENT): SAND, fine to medium grained, sub-angular to sub-rounded, brown, trace fines, with waste materials (metal, wood, glass jars, plastic, ceramics, terracotta, ACM), extending from depths of about 0.3 m to 2.0 m, typically loose to medium dense, moist to wet; overlying
- SAND (SP): fine to medium grained, sub-angular to sub-rounded, typically pale brown to brown or yellow, trace fines, clayey lenses at depth, typically medium dense becoming dense with depth, moist becoming wet, extending to the maximum depth investigated (5.2 m).

**Notes:**
1. Subsurface conditions below 2.0 m are inferred from CPT data using the Robertson et. al (1986) interpretation.
2. Layers of uncontrolled fill vary throughout the site.
3. Zones of deep uncontrolled fill and zones of sand fill with inclusions of waste materials are shown on Figure 2.

## 3.3 Uncontrolled Fill Characterisation

Based on the results of the environmental and geotechnical studies, uncontrolled fill has been classified as follows:

- Type 1 – Asbestos-impacted uncontrolled fill;
- Type 2 – Uncontrolled fill with concentrations of lead exceeding health investigation levels for public open space (HIL-C); and
- Type 3 – Uncontrolled fill unlikely to be impacted by asbestos.

The location and extents of the material types is shown on Figure 3.

## 3.4 Groundwater

360 Environmental[1] noted that the groundwater flowed to the northwest from about RL 3.4 m AHD in the eastern part of the site to about RL 2.9 m AHD in the north-eastern part (May 2015 levels).

During the geotechnical investigation, groundwater was encountered at depths ranging from 1.1 m to 2.0 m below ground level across the site. Based on the surface contours on the provided feature survey plan, it was inferred that the groundwater elevations range from about RL 2.7 m AHD to 3.3. m AHD. Note that the groundwater was measured in late summer when levels are likely to be near the seasonal minimum.

The groundwater is expected to rise significantly over winter. We do not know maximum groundwater elevation and suggest that the current surface level is adopted as the maximum groundwater elevation.

# 4. DATA QUALITY OBJECTIVES

The following data quality objectives (DQOs) are consistent with the processes set out in Australian Standard AS 4482.1 and the National Environmental Protection Council (NEPC) (2013) *National Environmental Protection (Assessment of*

*Site Contamination) Measure (NEPM)* and have been incorporated into the contamination assessment as discussed throughout the remainder of this document.

## 4.1 Step 1 - The Problem

There are 3 key problems assessed as part of this RAP:

- identify areas where ACM-impacted fill is present on the site;
- where uncontrolled fill is identified, undertake remediation of the fill in accordance with a set of remedial measures; and
- assess whether material imported to the site is suitable for the proposed land use.

## 4.2 Step 2 – Identify the Decision

The key decisions for the RAP are as follows:

- Has uncontrolled fill been remediated to the extent practical?
- After remediation, does the site represent a risk to human health?

## 4.3 Step 3 – Identify Inputs to the Decision

The following inputs are required to make the decisions:

- understand site conditions as presented in previous studies; and
- tracking and validation of remedial steps.

## 4.4 Step 4 – Define the Study Boundaries

The study boundaries are the cadastral boundaries of Lot 4669 Forrest Avenue, Bunbury. The boundaries of the site are shown on Figure 1.

## 4.5 Step 5 – Develop Decision Rules

The following decision rules will be adopted for the remedial works:

- uncontrolled fill has been removed from the site to the extent practical, no further actions will be required; and
- imported fill has been fully characterised via a robust validation sampling procedure with concentrations below the adopted criteria, no further actions will be required.

## 4.6 Step 6 – Specify Limits on Decision Errors

The DQOs define how the quality of data collected through the various phases of the RAP will be assessed. These criteria are summarised in Table 1.

**Table 1: Evaluation Criteria of Each Aspect of the Investigation**

| Data Quality Objective | Evaluation Criteria |
|---|---|
| Documentation and data completeness | ⌖ Site conditions accurately described.<br>⌖ Sampling locations accurately described.<br>⌖ Completion of field notes, calibration certificates, chain-of-custody documentation and laboratory test certificates.<br>⌖ Samples collected from all areas of potential environmental concern.<br>⌖ Samples are scheduled for analysis of all COPC. |
| Data comparability | ⌖ Use of appropriate techniques for sampling, storage and transport of samples.<br>⌖ Use of National Association of Testing Authorities (NATA) accredited primary and secondary laboratories |
| Data representativeness | ⌖ Collection of representative samples from each sampling location and across the site.<br>⌖ Use of appropriate techniques for sampling, storage and transport of samples. |
| Precision for sampling and analysis | ⌖ Use of properly trained and qualified personnel.<br>⌖ Use of duplicate and triplicate samples collected at a minimum rate of 1 in 20 (i.e. 5%).<br>⌖ Assessment of the relative percentage difference (RPD) between primary, duplicate and triplicate samples. Acceptable RPD values are considered to be:<br>o ≤ 30% or;<br>o 30% to 50% when the analysis results is < LOR x 10 or;<br>o ≤ 50 when analysis result is > LOR x 10 and > LOR x 20.<br>⌖ Acceptable recovery of trip spikes and laboratory matrix spikes (70%-130%).<br>⌖ Acceptable quality of laboratory blanks, method blanks (where used).<br>⌖ Acceptable quality of rinsate blanks, trip blanks and field blanks. |

## 4.7 Step 7 – Optimise the Design

This RAP has been developed based on consultation with the civil engineer (Terpkos Engineering) and the architect (MCG Architects). Details of the proposed remedial works are presented in Section 6.

# 5. ROLES AND RESPONSIBILITIES

## 5.1 Management Structure

The roles and responsibilities for the remedial works are outlined in below.

**Table 2: Roles and Responsibilities**

| Role | Who | Responsibility | Reporting |
|---|---|---|---|
| Principal | SWAMS | ⌖ Approve remediation strategy<br>⌖ Accept outcomes of remediation | NA |
| Principal's Representative | MCG Architects | ⌖ Manage remediation contract<br>⌖ Liaison with site owner | Principal |
| Site Supervisor | TBA | ⌖ Manage remediation contract<br>⌖ Works design<br>⌖ Manage program | Principal's Representative |

| Role | Who | Responsibility | Reporting |
|---|---|---|---|
| Remediation Contractor | TBA | • Implement remediation program | Site Supervisor |
| Environmental Consultant | TBA | • Prepare RAP<br>• Prepare community consultation strategy<br>• Oversee remediation strategy<br>• Liaison with Principal<br>• Liaison with regulators<br>• Prepare remediation and validation report (RVR)<br>• Supervise and monitor environmental aspects of remediation program<br>• Undertake validation sampling<br>• Document all remedial works | Principal's Representative |

## 5.2 Lead Consultant Experience

As noted in the DoH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* document, the lead consultant is required to have a minimum of 3 years ongoing experience with investigation and remediation of asbestos. All Galt personnel involved in the supervision of the project have the necessary experience (see CVs provided in Appendix C). Furthermore, Galt is a Worksafe accredited *Restricted Asbestos Licence* holder. A copy of the Worksafe accreditation is provided in Appendix D.

## 5.3 Emergency Contacts and Response

In the event of an emergency, the Remediation Contractor will be the primary contact and will co- ordinate emergency responses. The Principal is to be notified as soon as practicable or at least within 1 hr of the emergency incident occurring. If the emergency incident has / potentially could impact the environment, then Galt is also to be notified.

# 6. REMEDIATION AND VALIDATION STRATEGY

## 6.1 Overview

The remediation and validation strategy outlined below has been developed in consultation with the Civil Engineer (Terpkos Engineering) and Architect (MCG Architects) and in accordance with the DER (2014) *Assessment and management of contaminated sites* and DoH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* documents.

## 6.2 Marking Out Areas

Prior to any remediation or validation work being undertaken, the boundary of the material requiring removal will be clearly delineated using stakes and flagging visible to personnel on the ground or operating machinery.

The extent of each material type (as defined in Section 3.3) will be delineated using marking tape visible to onsite workers and machinery. Care should be taken during all vehicle and machinery movements' onsite to not disturb or dislodge the markers.

## 6.3 Remediation and Validation

Broadly, it is proposed that all uncontrolled fill be excavated until underlying natural soils are encountered. All uncontrolled fill is proposed to be transported to suitably licenced facility for disposal.

Prior to backfilling with 'clean fill' or 'uncontaminated fill'[3], validation samples will be collected from the base of each excavation to ensure that all impacted material has been removed.

All validation samples will be analysed by a NATA-accredited laboratory for asbestos and lead.

Upon confirmation that all impacted material has been removed, site preparation and earthworks will be undertaken as outlined in the geotechnical report (Ref: J1901035 001 R Rev1).

# 7. GENERAL REQUIREMENTS

## 7.1 Approvals

We understand that there is no requirement to obtain formal statutory approval for the proposed remedial works. However, key stakeholders will be engaged in the process.

We understand that this RAP will be submitted to the City of Bunbury as part of the development application (DA) process.

A copy of the remediation and validation report (RVR) will be supplied to DWER at the completion of works to facilitate reclassification of the site under the *Contaminated Sites Act* 2003.

## 7.2 Community Consultation

The proponent will be undertaking community consultation including informing nearby residents of the various stages of the works.

The site entrance will contain signage and will include contact details for all key representatives.

A complaint register will record any dust complaints received during the works. The Remediation Contractor and Principal's Representative will be responsible for logging and responding to each complaint.

## 7.3 Contractor Risk Assessment

The Remediation Contractor will be required to prepare a management plan which addresses management of occupational health and safety, quality assurance and general environmental management during implementation of the remediation works. As a minimum, the following items are required to be addressed in that plan.

- Health and Safety Management
- Health and Safety Compliance
- Management Practices
- Site Security
- Internal Security, Signs and Barriers
- Site Induction

[3] The terms 'clean fill' and 'uncontaminated fill' are as defined in the DWER (2018) *Landfill waste classification and waste definitions 1996 (as amended 2018)* guideline document

- Safety Procedures
- Personal Protective Equipment
- Decontamination

# 8. AIR EMISSIONS MANAGEMENT

## 8.1 Legislative and Regulatory Requirements

The air emissions management strategy has been developed in accordance with the following guidelines and guidance notes:

- Department of Environment and Conservation (DEC) (2011) *Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Site Remediation and other Related Activities*;
- Department of Health (DoH) (2009) *Guideline for the Assessment and Management of Asbestos Contaminated Sites in Western Australia*;
- National Environmental Protection Council (NEPC) (2013) *National Environment Protection (Ambient Air Quality) Measure for* $PM_{10}$; and
- NOHSC:3003 (2005) *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres Membrane method.*

## 8.2 Wind Speed and Direction

Prevailing wind directions and speeds are summarised in Table 3, utilising available Bureau of Meteorology (BOM) records (1940 to 2011) for the nearest weather station at Bunbury City Centre, located approximately 3 km southwest of the Site. If remediation occurs outside the winter months specified, wind information will need to be reassessed.

**Table 3: Prevailing Wind Speed and Direction**

| Season | Time | Prevailing Wind Direction | Predominant Wind Speeds (km/h) | Comment |
|---|---|---|---|---|
| Winter | 9 am | East | 0 to < 20 | Conditions are classified as 'calm', 7% of the seasonal average. |
| | 3 pm | East | 0 to < 30 | Conditions are classified as 'calm', <0.5% of the seasonal average. |

Wind roses are presented in Appendix E.

## 8.3 Dust Management and Remediation Goals

The following dust management goals are proposed for the site:

- protection of air quality during the works; and
- ensuring excessive dust and asbestos fibres are NOT generated during the works.

The remediation goal for the site is to ensure that the works are conducted in an environmentally safe manner which does not cause any health impacts to site workers and/or nearby sensitive receptors.

## 8.4 Site Risk Assessment

The DEC (2011) *Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Site Remediation and other Related Activities* requires a site-specific risk assessment and classification to determine the level of dust control.

The risk assessment indicates that an initial site classification of 3 was appropriate due to the proximity of a sensitive land use. The risk assessment is presented in Table 4.

**Table 4: Dust Risk Assessment**

| **Part A: Nature of the Site** | | |
|---|---|---|
| **Item** | **Descriptor Selected** | **Allocated Score** |
| 1. Nuisance potential of soil when disturbed | Medium | 3 |
| 2. Topography and protection provided by Undisturbed Vegetation | Little screening | 12 |
| 3. Area of site disturbed by the works | Between 1 and 5 ha | 3 |
| 4. Type of work being done | Bulk earthworks and deep trenches | 9 |
| | **Total Score for Part A** | **27** |
| **Part B: Proximity of the Site to Other Land Uses** | | |
| 1. Distance of other land uses from the site | Less than 100 m | 18 |
| 2. Effect of prevailing wind direction on other land uses | Dense land uses affected by one wind direction | 9 |
| | **Total Score for Part B** | 27 |
| | Site Classification (A x B) | 729 |
| | **Site Classification** | **3** |

The management measures required to be implemented are outlined in the sections below.

## 8.5 Monitoring Equipment

The following dust monitoring equipment is proposed to be used during the site works.

- 2 x DustTrak aerosol/particulate monitors; and
- 4 x XR5000 personal monitoring pumps/stations.

## 8.6 Monitoring Methodology

### 8.6.1 Trigger Values

Dust and asbestos monitoring trigger values to be adopted during the works are outlined in Table 5. Monitoring will be undertaken on a daily basis during the site works.

**Table 5: Asbestos and Dust Management Trigger Values**

| Pollutant | Measured By | Average Period | Ambient Air Quality Trigger Value [A] |
|---|---|---|---|
| Asbestos fibres | XR5000 monitoring pumps | - | 0.01 fibres/mL of air [B] |
| Particles as $PM_{10}$ | DustTrak | Instantaneous | 150 µg/m$^3$ |

**Notes:**

**A** - Taken from National Environmental Protection Council (NEPC) (2013) *National Environment Protection (Ambient Air Quality) Measure for $PM_{10}$*

**B -** Based on weekly laboratory test results

### 8.6.2 Dust Monitoring

Dust monitoring at the site will be undertaken in accordance with the relevant guidelines as outlined in Section 8.1. Dust monitoring for instantaneous $PM_{10}$ concentrations will be undertaken using 2 static DustTrak monitors. A DustTrak unit will be set up on each of the eastern and western boundaries of the site with monitoring undertaken by the designated environmental consultant. Monitoring will be undertaken continuously during all the works conducted across the site. It is intended that the DustTrak units be mobile and as such, can be repositioned in the event of a significant chance of wind direction.

In the event the assessment criterion (corrective action trigger level) is exceeded, the Remediation Contractor will be advised, and all works will cease immediately. A review of the control measures and site operations will be undertaken, and works will not be permitted to resume until the source of the exceedance is satisfactorily identified and mitigated. All exceedances will be documented, and the Principal will be advised immediately of any exceedances.

### 8.6.3 Asbestos Fibre Monitoring

Asbestos fibre monitoring will be conducted in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* (NOHSC, 2006), the *Code of Practice for the Safe Removal of Asbestos* (NOHSC, 2005) and *Occupational Health and Safety Regulations 1996*.

A monitoring pump will be placed at each of the boundaries of the site adjacent to a DustTrak monitoring station. Additional units will be used as personal monitors on ground personnel or within machinery cabs. The location of the personal monitors will be determined on a daily basis based on specific site conditions and works planned. The monitors will be set up to monitor for any asbestos fibres generated during the works.

Samples collected in the monitoring pumps will be sent to a NATA accredited laboratory on a weekly basis for fibre counting. In the event that the number of fibres per millilitre exceeds the assessment criterion of 0.01 f/mL, samples will be further analysed using the scanning electron microscopy (SEM) or phase contrast microscopy (PCM) methods to determine the origin of the fibres.

Results of laboratory analysis will be received approximately 2-3 days from the date of delivery. In the event results exceed the adopted assessment criteria, the Remediation Contractor and Principal's Representative will be advised, and alternative control measures will be undertaken across the site.

Due to the time constraints with receiving the asbestos fibre results, the trigger levels for the dust monitoring for $PM_{10}$ concentrations (corrective action trigger levels) are based on a more conservative value of 150 µg/m$^3$. This is to ensure that any excessive dust generation is monitored and mitigated as soon as practicable.

### 8.6.4 Equipment Calibration

The asbestos monitoring pumps will be calibrated on a daily basis, each morning, prior to works starting. The calibration will be completed using a Dry Cal Defender primary standard calibrator with flow rates set between 2 L/min and 4 L/min. The pumps will run for the duration of the activities undertaken each day with sampling volumes to be approximately 500 L to 1,000 L per day

The DustTraks will be calibrated prior to monitoring works starting and checked on a daily basis.

### 8.6.5 Monitoring Data Abstraction

Data from the DustTrak will be downloaded in real-time excel format and provided to the Principal on a weekly basis. Email and SMS alerts will be enabled to ensure that adequate management measures will be carried out depending on results and trigger values encountered.

## 8.7 Dust Management and Mitigation Measures

Works are proposed to be undertaken in the winter months when dry and windy conditions are at a minimum. Dust management will include the following:

- ongoing dust monitoring during the works;
- all material will be wetted down prior to ploughing;
- all internal access tracks will be wetted with a water cart if visible dust is noted; and
- a cover will be placed on each truck load to ensure no dust is generated during transport to the landfill facility.

Further mitigation measures that will be implemented across the site in the event excessive dust and/or exceedances are identified are outlined in Table 6.

**Table 6: Mitigation Measures**

| Trigger for Action | Mitigation Measure |
|---|---|
| Visual observation of dust generation by Galt Environmental and/or the remediation contractor | • Increase dust management measures (water truck and wetting the site)<br>• Wait until wind conditions improve |
| Air quality exceeding trigger values (Corrective Action Trigger Level) | • Advise the Remediation Contractor<br>• Advise the Principal's Site Supervisor<br>• Cease works until the determination of the cause of the exceedance<br>• Wait until wind conditions improve<br>• Increase dust management measures (water truck and wetting the site) |
| Air quality exceeding trigger values (Stop Work Trigger Level) | • Cease works immediately until determination of the cause of the exceedance is identified<br>• Advise the Principal's Site Supervisor |

| Trigger for Action | Mitigation Measure |
|---|---|
| Airborne concentrations of asbestos above recommended concentration | ➢ Advise the Principal's Site Supervisor<br>➢ Advise the Remediation Contractor<br>➢ Wait until wind conditions improve<br>➢ Increase dust management measures (water truck and wetting the site)<br>➢ Remove any known contaminant source from the site<br>➢ Cease works until the determination of the cause of the exceedance is identified |
| A dust complaint is received | ➢ Increase dust management measures (water truck and wetting the site)<br>➢ Advise the Principal's Site Supervisor<br>➢ Investigate the reason for the complaint<br>➢ Cease works until the determination of the cause of the exceedance is identified |

## 8.8 General Requirements

The Remediation Contractor will be responsible for the following:

- Maintaining strict control of works with dust-creating potential and conducting regular inspections of the works to assess the effectiveness of dust control measures. Where the nature of the works or weather conditions is conducive to dust formation, additional dust control measures should be implemented.
- Undertaking remediation works in stages to avoid the creation of large areas of disturbance, which represent a source of dust emissions.
- No burning is permitted on the Site.
- Implementation of an air-monitoring program as directed by the Environmental Representative as described in Section 8.6.
- Water truck(s) must be available for the duration of the site works, particularly during bulk earthworks activities, screening and times of high numbers of truck movements.
- Water sprays must be used to minimise dust emissions in dry or windy conditions but not in a manner that could cause surface runoff. The application of water is also required to be considered in the context of the remediation works and whether wetting the soils will compromise the effectiveness of the screening exercise.
- Appropriate speed limits will be imposed on internal access tracks to reduce dust generation.
- Internal tracks will be wetted down to minimise dust generation in transport areas. Water will be applied to the access tracks in the morning prior to each day or activity. Additional water will be applied to the tracks throughout the day, as required.
- Any complaint from a member of the public about dust or other air emissions from the Site should be managed in accordance with the following protocol:
- A visual inspection of the Site will be made within 30 minutes of receipt of the complaint in normal working hours and four hours out of normal working hours.
- Where the complaint is substantiated, the work practice leading to the complaints will cease immediately until additional dust control measures have been implemented or weather conditions improve (e.g. reduction in wind speed or change in wind direction) to the extent that dust emissions are not excessive.
- Where it is determined that unacceptable air emissions are being generated, work will cease immediately until the source of the emissions is contained/ameliorated satisfactorily.

- Internal reporting of incidents and exceedances will be undertaken whenever unacceptable air emissions are being generated. Reporting of these events to the DWER and DoH may be undertaken where necessary.

## 8.9 Performance Standards

Dust emissions will be managed in accordance with the trigger levels outlined in Section 8.6.1. A fundamental qualitative performance standard will be the requirement for no visible dust to be noted crossing the development site boundary.

# 9. WASTE MANAGEMENT

The transport and disposal of asbestos waste must comply with the relevant legislation. Any removal of ACM shall be undertaken in accordance with NOHSC: 2002 [1988]) and Western Australian Environmental Protection (Controlled Waste) Regulations 2004. ACM disposal shall be in conformance with the DWER (2018) *Landfill Waste Classification and Waste Definitions 1996 (as amended)*. Approval for transport of waste is required in most jurisdictions.

# 10. NOISE MANAGEMENT

In order to ensure compliance and to minimise the impact on adjacent land users, the following management measures will be implemented:

- machinery will generally operate only during daylight hours;
- all equipment will be in good working order with effective silencers; and
- occupational noise exposure will be in compliance with WorkSafe WA requirements.

If work is required outside of the defined working hours, the remediation contractor will be required to comply with Regulation 13(3) of *Environmental Protection (Noise) Regulations* 1997.

Any complaints regarding noise and vibration shall be recorded on an Environmental Incident and Hazard Form. Reporting of incidents and exceedances will be undertaken whenever unacceptable noise emissions or vibration is generated. Reporting of these events to the DWER will be undertaken where necessary.

On-going quantitative noise monitoring for the duration of the works is not envisaged, however, qualitative descriptions of noise levels will be recorded as part of the daily report kept by the Remediation Contractor.

A noise monitoring program may be implemented by the proponent if a complaint is received concerning off-site impacts of noise originating from the Site, or if it is determined that the off-site impacts of noise are unacceptable.

The monitoring program should determine if the noise is within the guidelines of the *Environmental Protection (Noise) Regulations* 1997 and AS2436 and whether corrective measures are required. Corrective action may include a modification of work practices, re-assessment of equipment used on-site and rescheduling of Site works.

# 11. REPORTING

The progress and management of Site works will be reviewed by the Principal's Representative, Remediation Contractor and Environmental Representative on a weekly basis and will include:

- a summary of incidents and incident investigation results and proposed actions for mitigation of related potential environmental impacts;
- compliance of the site works with established performance standards;
- total area remediated;

- volume of uncontrolled fill excavated;
- validation testing results; and
- dust and air quality results.

At the completion of works, an RVR will be produced confirming that the environmental aspects of the remediation works were undertaken in accordance with this plan. The RVR will be prepared by the environmental consultant for review by the Principal and subsequently Environmental Regulators.

The RVR will be prepared in accordance with

The remediation validation management report will be prepared in accordance with DWER and DoH guidelines.

Broadly, the RVR will include the following elements:

- scope of works performed;
- daily site records;
- materials tracking information (including all onsite movements of material, trucking and landfill dockets for material imported / disposed of off-site);
- evidence of compliance with environmental management measures and plans during remedial works;
- stockpile, excavation and sample location plans;
- validation results; and
- chain of custody laboratory analysis documentation; tabulated analytical results and detailed review of QA/QC results.

## 12. LIMITATIONS

We draw your attention to Appendix F of this report, "Understanding Your Report". The information provided within is intended to inform you as to what your realistic expectations of this report should be. This information is provided not to reduce the level of responsibility accepted by Galt, but to ensure that all parties who rely on this report are aware of the responsibilities each assumes in so doing.

**GALT ENVIRONMENTAL PTY LTD**

| | |
|---|---|
| Brad Palmer | Michael Carmichael |
| Environmental Scientist | Environmental Scientist |

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# Figures

**Legend**

- Site Boundary
- Proposed Building Footprint

N

0 10 20 30 40 50
Meters

***NOTES***
*Aerial Imagery and Cadastre sourced from Landgate/SLIP*

| | | |
|---|---|---|
| SCALE | 1:1,000 | (A3) |
| DRAWN | DAC | |
| DATE DRAWN | 19/06/2019 | |
| CHECKED | BP | |
| DATE CHECKED | 19/06/2019 | |
| PROJECTION | GDA 1994 MGA Zone 50 | |

Galt Environmental Pty Ltd
ACN : 161 708 998
Tel : +61 (0)8 6272-0200
Address : 50 Edward Street
Osborne Park WA 6017

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| | |
|---|---|
| CLIENT | **TERPKOS ENGINEERING** |
| PROJECT | SOUTH WEST ABORIGIONAL MEDICAL SERVICES (SWAMS) |
| LOCATION | LOT 4669 FORREST AVENUE<br>CAREY PARK |
| TITLE | SITE AND LOCATION PLAN |
| Job No | J1901035 |
| Fig No | FIGURE 1 |
| Rev | **A** |

**Legend**

- Site Boundary
- Proposed Building Footprint

**Test Locations**

- Cone Penetration Test
- Infiltration Test
- Test Pit

N

0 10 20 30 40 50
Meters

***NOTES***
*Aerial Imagery and Cadastre sourced from Landgate/SLIP*

| | | |
|---|---|---|
| SCALE | 1:1,000 | (A3) |
| DRAWN | DAC | |
| DATE DRAWN | 19/06/2019 | |
| CHECKED | BP | |
| DATE CHECKED | 19/06/2019 | |
| PROJECTION | GDA 1994 MGA Zone 50 | |

Galt Environmental Pty Ltd
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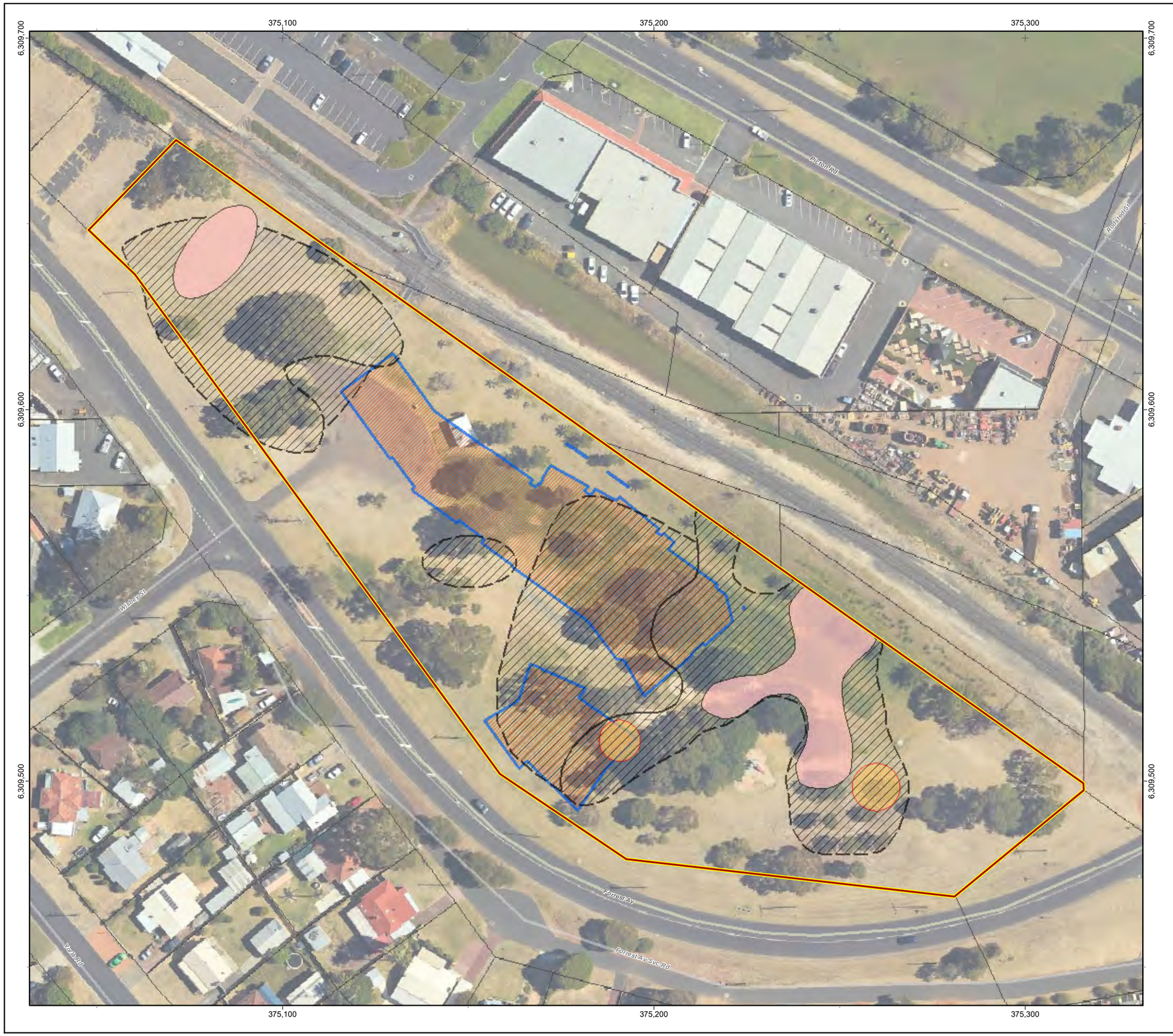
| | |
|---|---|
| CLIENT | **TERPKOS ENGINEERING** |
| PROJECT | SOUTH WEST ABORIGIONAL MEDICAL SERVICES (SWAMS) |
| LOCATION | LOT 4669 FORREST AVENUE<br>CAREY PARK |
| TITLE | TEST LOCATION PLAN |
| Job No | J1901035 |
| Fig No | FIGURE 2 |
| Rev | **A** |



**Legend**

- Site Boundary
- Proposed Building Footprint
- Type 1 Material - Areas Indicating Asbestos (AF/FA) Above DOH Criteria
- Type 2 Material - HIL C Exceedances in Soil
- Type 3 Material - Amended area of Anthropogenic waste following Geotechincal fieldwork

N

0 10 20 30 40 50
Meters

***NOTES***
*Aerial Imagery and Cadastre sourced from Landgate/SLIP*

| | | |
|---|---|---|
| SCALE | 1:1,000 | (A3) |
| DRAWN | DAC | |
| DATE DRAWN | 2/07/2019 | |
| CHECKED | BP | |
| DATE CHECKED | 19/06/2019 | |
| PROJECTION | GDA 1994 MGA Zone 50 | |

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| | |
|---|---|
| CLIENT | **TERPKOS ENGINEERING** |
| PROJECT | SOUTH WEST ABORIGIONAL MEDICAL SERVICES (SWAMS) |
| LOCATION | LOT 4669 FORREST AVENUE<br>CAREY PARK |
| TITLE | ZONES OF WASTE MATERIALS |
| Job No | J1901035 |
| Fig No | FIGURE 3 |
| Rev | **A** |

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# Appendix A: Site Photographs

**Photograph 1: Facing northwest along the fence boundary adjacent to the railway**

**Photograph 2: Amenities block in the middle of the site**

**Photograph 3: Asbestos cement fragments recovered from test pit TP15**

**Photograph 4: Facing south towards TP05**

# Appendix B: Supplied Drawings

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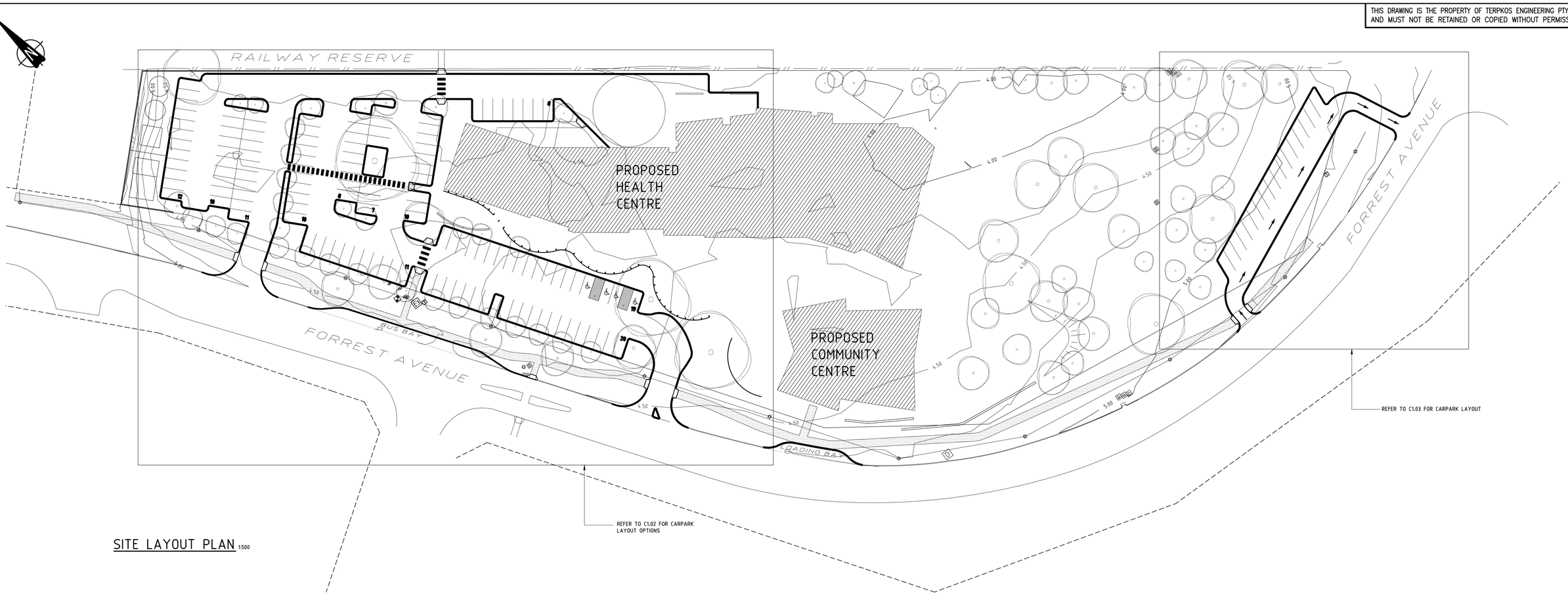


## SITE LAYOUT PLAN 1:500

**TOTAL CAR BAYS - 143**

| REV No. | DATE | DESCRIPTION | BY | APPR. |
|---|---|---|---|---|
| 2 | 03.05.19 | ISSUED FOR REVIEW | N.T. | P.T. |
| 1 | 01.05.19 | PRELIMINARY ISSUE | V.A. | N.T. |

terpros - ENGINEERING -

ph. (08) 9389 7228 | f. (08) 9389 7221 Unit 10/18 Stirling HWY Nedlands Perth, WA 6009

CLIENT: MCG ARCHITECTS

PROJECT: S.W.A.M.S. HEALTH HUB
FORREST AVENUE
BUNBURY

TITLE: SITE LAYOUT PLAN

| | | | | | |
|---|---|---|---|---|---|
| DESIGNED: | P.T. | DATE: | FEB 2019 | PROJECT No: | 13332 |
| DRAWN: | J.V. | SCALE: | 1:500 | DRAWING No: | C1.01 |
| CHECKED: | | CAD REF: | User 13332C101.dwg 3/05/2019 1:47 PM | REVISION No: | 2 |
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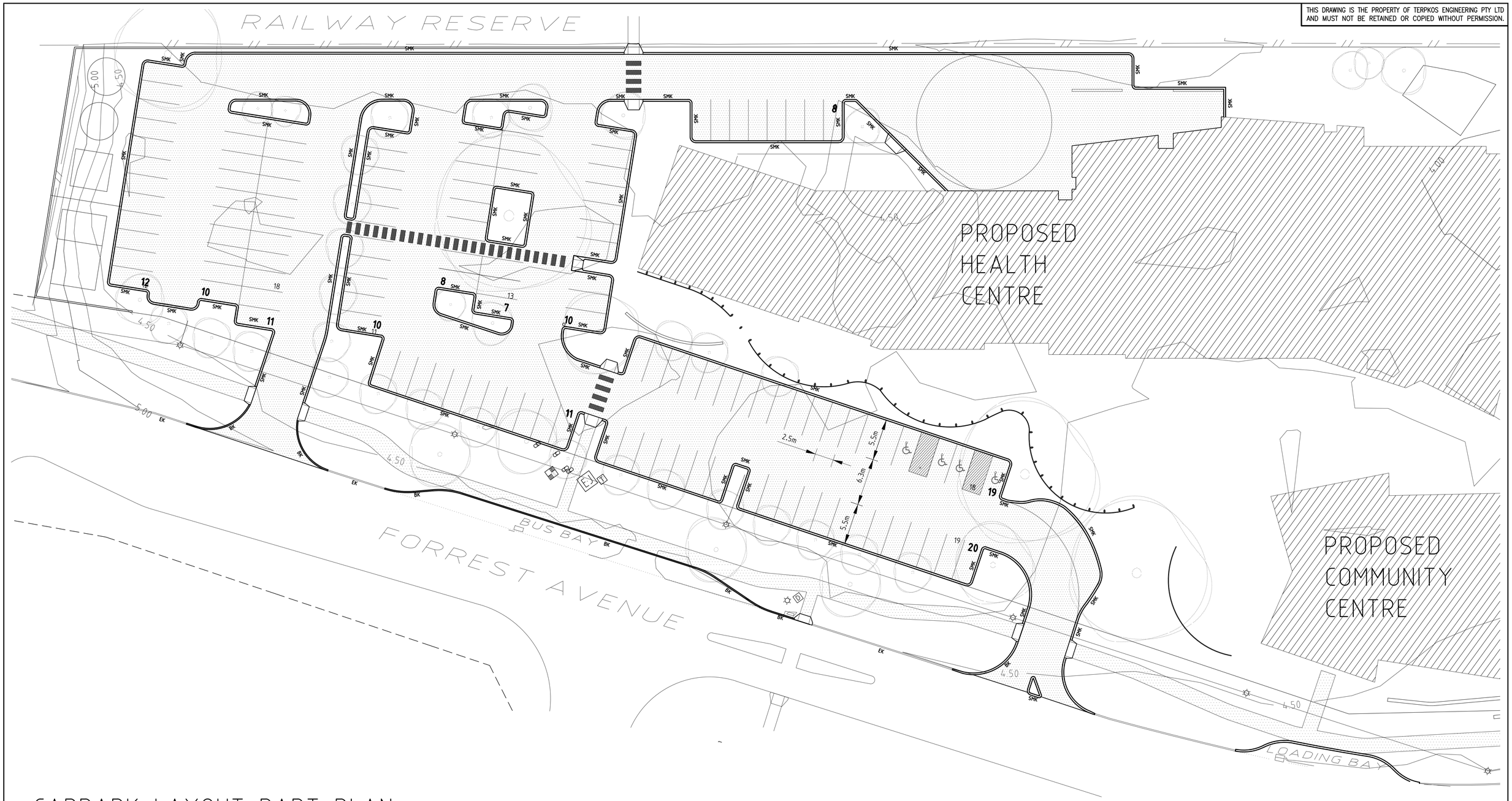


# CARPARK LAYOUT PART PLAN 1:250

| REV No. | DATE | DESCRIPTION | BY | APPR. |
|---|---|---|---|---|
| 2 | 03.05.19 | ISSUED FOR REVIEW | N.T. | P.T. |
| 1 | 01.05.19 | PRELIMINARY ISSUE | V.A. | N.T. |

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CLIENT: MCG ARCHITECTS

PROJECT: S.W.A.M.S. HEALTH HUB
FORREST AVENUE
BUNBURY

TITLE: CARPARK LAYOUT
PART PLAN

| | | | | | |
|---|---|---|---|---|---|
| DESIGNED: | P.T. | DATE: | FEB 2019 | PROJECT No: | 13332 |
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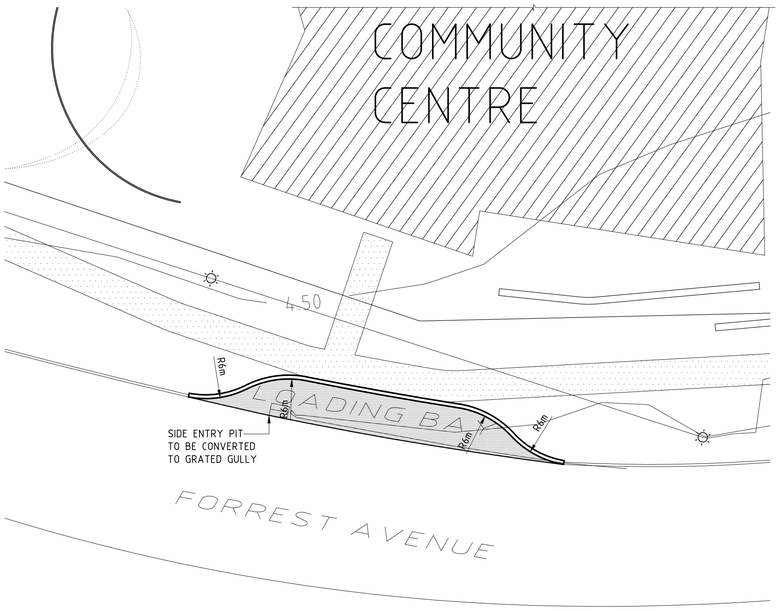
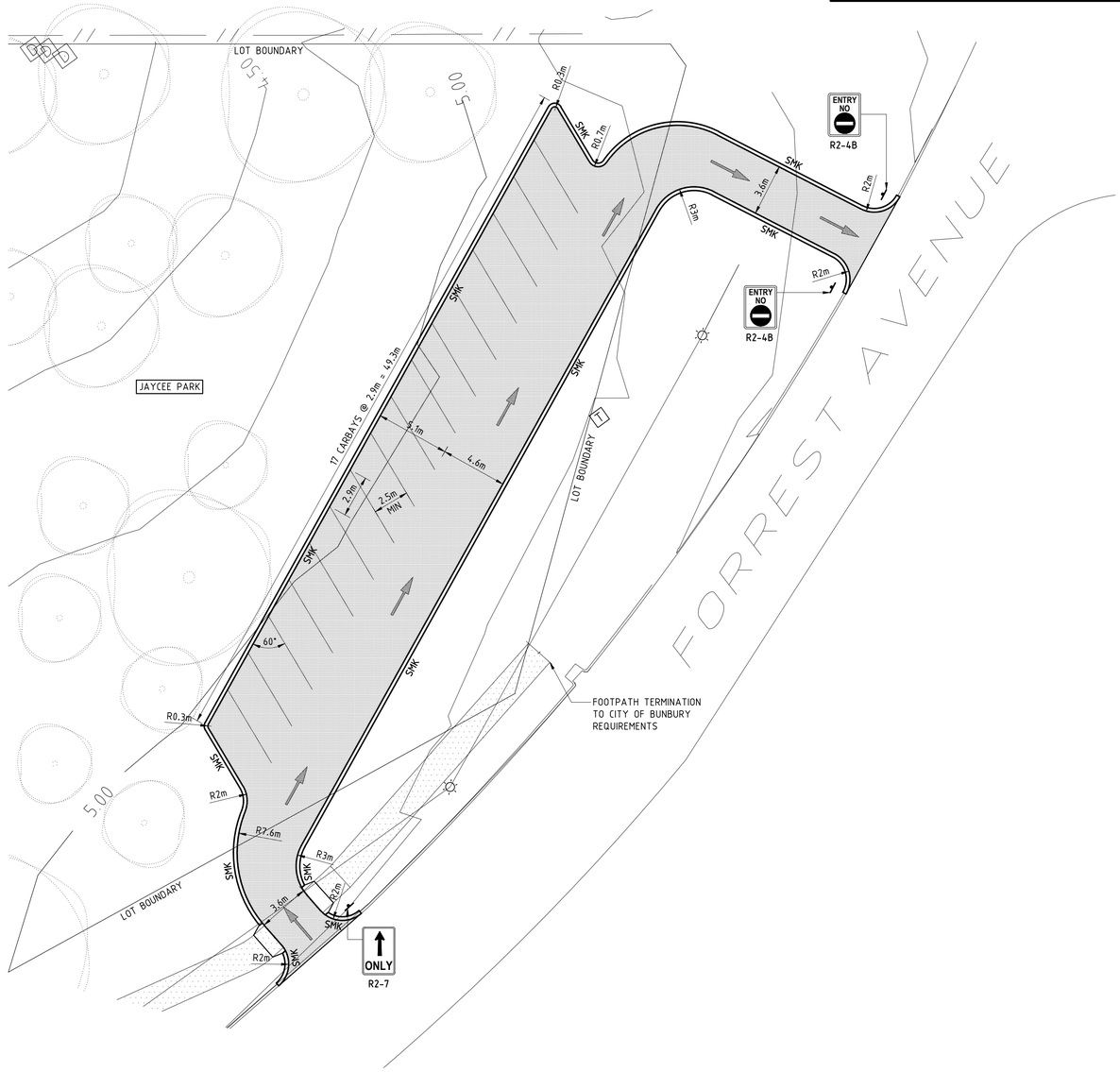



LOADING BAY PART PLAN 1:200




JAYCEE PARK CARPARK PART PLAN 1:200

| REV No. | DATE | DESCRIPTION | BY | APPR. |
|---|---|---|---|---|
| 2 | 03.05.19 | ISSUED FOR REVIEW | J.V. | N.T. |
| 1 | 01.05.19 | PRELIMINARY ISSUE | V.A. | N.T. |

terpkos ENGINEERING

ph. (08) 9389 7228 | f. (08) 9389 7221 Unit 10/18 Stirling HWY Nedlands Perth, WA 6009

CLIENT: MCG ARCHITECTS

PROJECT: S.W.A.M.S. HEALTH HUB FORREST AVENUE BUNBURY

TITLE: LOADING BAY AND JAYCEE PARK PART PLANS

| | | | | | |
|---|---|---|---|---|---|
| DESIGNED: | P.T. | DATE: | FEB 2019 | PROJECT No: | 13332 |
| DRAWN: | J.V. | SCALE: | 1:200 | DRAWING No: | C1.03 |
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# Appendix C: Personnel CVs

# CURRICULUM VITAE

## Brad Palmer

BMarSc (Hons)
ENVIRONMENTAL SCIENTIST
Perth, Western Australia

| | |
|---|---|
| **Education** | Bachelor of Science majoring in Marine Science (Honours), University of Western Australia, 2003 |
| **Professional Membership** | Past President, Australian Contaminated Land Consultants Association – Western Australia (ACLCA WA)<br>Member, Australasian College of Toxicology and Risk Assessment (ACTRA)<br>Member, Australian Land and Groundwater Association (ALGA)<br>Member, Australasian Remediation Industry Cluster (ARIC) |
| **Languages** | English |

## 1 CURRENT POSITION

Brad Palmer is the Director of Galt Environmental Pty Ltd. He has been working in the environmental field in Australia and Europe since 2001. Brad's key skills include contaminated site assessment, implementation of site remediation programs, acid sulfate soil investigation and dewatering management, dust and air quality assessment, marine environmental management and geographic information systems. Brad's experience has been gained while working as an environmental consultant predominantly in the mining, construction and land development industries.

In his current role, Brad is responsible for the design and implementation of assessment and remediation projects, preparation of proposals, staff scheduling, engaging and managing subcontractors, project management, staff mentoring and training, report review, invoicing and financial reporting. Brad is also responsible for all aspects of business development and marketing and contributes strongly to the development and implementation of corporate marketing plans and strategies.

# 2 SPECIFIC PROJECT EXAMPLES

## 2.1 CONTAMINATED SITE ASSESSMENTS

### FORMER FUEL STORAGE FACILITY, CAPE LAMBERT, WESTERN AUSTRALIA

Groundwater contamination assessment of a former fuel storage facility at Rio Tinto Iron Ore's Cape Lambert operations. Hydrocarbon impacted soils were detected in previous investigations and a detailed groundwater assessment was required. A strategic review of previous studies was undertaken and detailed hydrological model developed to model fate and transport of contaminants of concern. A quantitative health risk assessment was also undertaken to develop site specific target levels for onsite workers.

### CAR DUMPER AND CRUSHER, CAPE LAMBERT, WESTERN AUSTRALIA

Soil and groundwater investigation undertaken at Rio Tinto Iron Ore's Cape Lambert operations. Port expansion works required the decommissioning of a rail car dumper and crusher and an investigation into the potential human health risks of known contaminants was undertaken. A series of soil bores were advanced to determine the nature and extent of contamination around the car dumper. Based on the results of the investigation, suitable procedures were implemented to remediate the area.

### DETAILED SITE ASSESSMENT, SERVICE STATION, DAWESVILLE, WESTERN AUSTRALIA

Groundwater contamination assessment at a 0.3 hectare (ha) former service station. All site infrastructure was demolished and removed between February and April 2007. Previous investigations undertaken between 1998 and 2007 identified hydrocarbon impacted soil at various locations with soil remedial works undertaken during 2007. An assessment of groundwater quality beneath the site was not undertaken during previous site investigations.

### FORMER ELECTROPLATERS, WELSHPOOL, WESTERN AUSTRALIA

Multiphase contaminated site investigation comprising data gap analysis, soil assessment, groundwater assessment including vertical profiling, soil remediation and development of a site management plan.

### ALBANY SPINNING MILLS, WESTERN AUSTRALIA

Multiphase soil and groundwater assessment at the Albany Spinning Mill site prior residential development. Investigations conducted at the site identified areas of tetrachloroethene (TCE), lead and total petroleum hydrocarbon (TPH) impacted soils and/or groundwater. Initial involvement included review of previous information including Auditor comments on an initial draft and provision of a final report to improve inconsistencies particularly with regards to the requirements under the contaminated sites management series. Further works were designed to provide additional information regarding the vertical and lateral extent of groundwater impact.

Recent input involved in providing expert input into the soil, groundwater and vapour assessment, risk assessment and scoping of a remediation action plan for works required at the site.

## FORMER POWER STATION, BUNBURY, WESTERN AUSTRALIA

Peer review of a DSI report prepared by Coffey Environments for the Former Western Power Bunbury Power Station. The review focused on an evaluation of whether the assessment was undertaken in accordance with appropriate regulations and guidelines; an evaluation of the contamination status of the site; an assessment of whether the contamination status of the site poses or potentially poses a risk of harm to human health, the environment or any environmental value; an assessment of whether the contamination status of the site has, or potentially has, a detrimental effect on the beneficial use of the site, including surface and/or groundwater resources; an assessment of whether any further investigation/ remediation is required; an evaluation of the suitability of the site for current or proposed land uses and a recommendation of any restrictions relating to the use of the site.

## FREMANTLE PORT DREDGING AND RECLAMATION PROJECT, FREMANTLE, WESTERN AUSTRALIA

Independent environmental advice as to the level of risk, (discernible from the Fremantle Port Authority (FPA) and the Environmental Protection Authority (EPA) reports), of contaminants entering Cottesloe waters, that may unduly or unnecessarily impact the aesthetic, recreational or other uses of the waters as a result of the dredging of the Fremantle Inner Harbour, Entrance Channel and the Deep Water Channel. Included preparation of a briefing document for presentation to the Town of Cottesloe Committee, draft letters for the Town of Cottesloe to send to the Fremantle Port Authority, Federal Minister for the Minister for the Environment, Heritage and the Arts and Department of Environment and Conservation.

## CONTAMINATED SITE ASSESSMENT, FORMER PRINTER, CANNINGTON, WESTERN AUSTRALIA

Phased Contamination Assessment of a former printing facility. The site was historically used as a market garden for over 20 years until approximately 1965, and then as a printing facility from 1967 until 2004. The site currently serves as a distribution depot for white good products and is proposed to be subdivided and redeveloped into smaller lots for commercial/industrial purposes. Works included preliminary site investigation, detailed site investigation, remediation action plan and remediation and validation works.

## DATA GAP ANALYSIS AND HEALTH RISK ASSESSMENT, NORTH COOGEE, WESTERN AUSTRALIA

Data Gap Analysis and Health Risk Assessment (HRA) across the northern portion (north of Rollinson Road) of WAPC Reserve 44945 (Lot 2110) in North Coogee in order to determine the nature and extent of soil contamination, potential for unacceptable risks to human health in the context of the proposed site use and requirements for further works including the need for remediation.

## CONTAMINATED SITE ASSESSMENT, MUNDARING, WESTERN AUSTRALIA

Phased assessment including PSI, DSI and remediation action plan (RAP) of the DEC Mundaring District Offices proposed to be developed for use by Water Corporation for the Mundaring Water Treatment Plant (MWTP). Investigations confirmed the presence of impacted soils and a RAP was prepared to outline strategies and methods to be followed to remediate the site.

## PRELIMINARY SITE INVESTIGATION, WESTERN AUSTRALIA

PSI, including groundwater assessment, of an operational service station. The site has been classified as "Possibly Contaminated – Investigation Required" due to hydrocarbon impacted groundwater migrating off-site impacting the groundwater beneath neighbouring sites. Accordingly the DEC has identified the Site as a "Source" site. Previous investigations undertaken at the site, confirmed hydrocarbon impacted groundwater beneath the site, migrating off site. Included design of assessment program and completion of a PSI report including review of historical information and desktop resources, development of a conceptual site model (CSM), data assessment and reporting with reference to the DEC guidelines.

## CONTAMINATION SITE ASSESSMENT, BAYSWATER, WESTERN AUSTRALIA

Phased contamination assessment at a former non-putrescible landfill. The site was historically used as a dumping ground for building rubble and other non-putrescible wastes until around the early 1980's. The site is located immediately adjacent to the Swan River and is currently vacant and accessible to the public. The site is proposed to be handed to the City of Bayswater for management as Parks and Reserve, in line with the surrounding land.

## PRELIMINARY SITE INVESTIGATION, GERALDTON, WESTERN AUSTRALIA

Engaged by the Geraldton Port Authority to conduct a preliminary site investigation (PSI) for the Geraldton Port site bordered by Marine Terrace, Ian Bogle Road and Connell Road, Geraldton. The site consists of a six-berth inner harbour, a fishing boat harbour, associated land-side leases, port-related infrastructure and storage sheds. A wide range of products have been handled through the current port site and as such a PSI was required to provide information on the potential contamination status of the land. Works included a detailed site inspection, review of historical land uses using title information, historical aerial photography and interviews, review of previous reports and supporting documentation, search of DEC databases and a Freedom of Information (FOI) search through the Department of Mines and Petroleum, development of a Sampling and Analysis Plan (SAP) for further works and Health, Safety and Environment Plan (HSEP), determination of a net present value (NPV) talking into account the cost for remediation of the site and assessment and reporting with reference to the DEC Contaminated Sites Management Series (2001-2010).

## PRELIMINARY SITE ASSESSMENT, WELSHPOOL, WESTERN AUSTRALIA

PSI with limited soil and groundwater sampling of a bituminous products facility. The objectives of the PSI were to identify the potential for contamination to be present on the site, and to determine whether further investigation and/or remediation works are required prior to redevelopment of the rear portion of the site to include permanent asphalt mixing and car parking. Contaminants of concern included TPH and PAHs.

## CONTAMINATED SITE ASSESSMENT, WOODVALE, WESTERN AUSTRALIA

Phased contaminated site assessment of a former poultry farm classified as "Possibly Contaminated – Investigation Required". The site is proposed to be transferred to DEC to enable its inclusion into the Yellagonga Regional Park.

Investigations indicated elevated nutrient levels in groundwater and soils attributable to the discharge of wastewater generated from poultry shed clean-outs into a sump.

Included design of the sampling and analysis plan for additional investigations in order to fully characterise the nature and extent of contamination, DSI report and design of the remediation action plan (RAP) with ongoing senior advice throughout the project.

## DUE DILIGENCE ASSESSMENT, LIME INDUSTRIES, OSBORNE PARK, WESTERN AUSTRALIA

Limited due diligence contamination and environmental assessment of a 1.1 ha operational lime manufacturing facility with associated offices and workshops. The site is classified as a prescribed premise within Schedule 1 of the Environmental Protection Act 1987 (Category 43, Cement and Lime Manufacture) and operates under a licence containing a number of air pollution and water pollution control conditions plus the need for an annual audit compliance report. The objectives of the due diligence assessment was to identify the potential sources of contamination, associated contaminants of concern and locations of contamination that may be present. Included detailed site inspection, review of the lime manufacturing processes utilised on site and identification of potentially contaminating activities/areas and final report.

## INGLEWOOD SERVICE STATION, INGLEWOOD, WESTERN AUSTRALIA

Engaged by the land owner to undertake a detailed soil and groundwater investigations at a former service station site to facilitate the development of the land into residential units. Hydrocarbon impacts to soil and groundwater were identified and successfully remediated. Community consultation was undertaken throughout the assessment process resulting in all stakeholders formally approving a site management plan.

## REDCLIFFE BUS DEPOT, REDCLIFFE, WESTERN AUSTRALIA

Engaged by the land owner to undertake soil and groundwater investigations at a former bus depot. The works included a detailed site history study, intrusive soil and groundwater investigations and a health risk assessment. Remediation of hydrocarbon impacted soil was undertaken in an area former used for fuel storage.

## ROYDHOUSE STREET INDUSTRIAL WAREHOUSE, SUBIACO, WESTERN AUSTRALIA

Engaged by the land owner to undertake a detailed site investigation at a light industrial premises in Subiaco. Limited soil impact from pesticides historically used across the site was identified and remediated. During demolition works, asbestos was identified in slab construction materials. An asbestos investigation was undertaken at the site with limited soil remediation works required to mitigate potential health risks. The site was subsequently classified as 'Decontaminated' by the Department of Environment and Conservation.

## MANGLES BAY REDEVELOPMENT, MANGLES BAY, WESTERN AUSTRALIA

Engaged by joint venture partners to undertake a strategic detailed site investigation to characterise the nature and extent of potential contaminants across the site and develop a detailed scope of work for future investigations. The site contained a range of potentially contaminating activities and was in close

proximity to sensitive land uses. A health risk assessment was undertaken subsequent to detailed soil and groundwater investigations and formed the basis for further works.

### FORMER SERVICE STATION SITE, DAWESVILLE, WESTERN AUSTRALIA

Groundwater contamination assessment at a 0.3 hectare (ha) former service station. All site infrastructure was demolished and removed between February and April 2007. Previous investigations undertaken between 1998 and 2007 identified hydrocarbon impacted soil at various locations with soil remedial works undertaken during 2007.

## *2.2 ASBESTOS INVESTIGATIONS*

### FORMER SWAN BREWERY, BAILE ROAD, CANNING VALE – INDUSTRIAL DEVELOPMENT

Galt environmental was commissioned to undertake an asbestos investigation across the former Swan Brewery Site in Canning Vale. The scope of works included a detailed asbestos investigation across the site during and upon completion of the demolition phase of works. All asbestos works were undertaken in accordance with the Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009).

### MIDLAND BRICK WORKS SITE – RESIDENTIAL DEVELOPMENT

Galt Environmental was commissioned to undertake a detailed asbestos investigation in accordance with the Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009) for Stage 2 and Stage 3 of the Midland Brick Works residential development. The scope of works include the development of test pits across the site and collection of 10L samples at various intervals down the soil profile to a nominated depth.

### RESIDENTIAL DEVELOPMENT, MADDINGTON

Galt Environmental was commissioned to undertake a preliminary and detailed site investigation along with supervision of the remediation and validation of the asbestos clean-up works across the site. During the remediation and validation works, daily asbestos fibre monitoring was undertaken using static monitors and a dustrak. Results and reporting where then compared with relevant guidelines and undertaken in accordance with the DoH, 2009 guidelines. This site has since been assessed and reviewed by an accredited Contaminated Site Auditor.

### COMMERCIAL DEVELOPMENT – KATANNING

Engaged by the developer, Galt Environmental undertook a detailed asbestos investigation across a former industrial site in Katanning. Works included a detailed systematic asbestos walkover, systematic raking across the site and asbestos fibre monitoring. Monitoring was undertaken during topsoil stripping and was in accordance with the DoH 2009 guidelines.

## COMMERCIAL DEVELOPMENT, SUBIACO, WESTERN AUSTRALIA

The site was a former light industrial premise in the heart of Subiaco. During the clearing and the demolition of the site, asbestos was identified in slab construction materials. A detailed asbestos investigation was undertaken at the site with limited soil remediation works required to mitigate potential health risks. Limited asbestos fibre m monitoring was also undertaken during the finalisation of the demolition works. The site was subsequently classified as 'Decontaminated' by the Department of Environment Regulation.

## PUBLIC OPEN SPACE, BAYSWATER, WESTERN AUSTRALIA

The site was a former non-putrescible landfill and was historically used as a dumping ground for building rubble and other non-putrescible wastes until around the early 1980's. A detailed asbestos investigation was undertaken as part of the phased works required as part of the detailed site investigation works. A specific asbestos management plan was developed to manage and remove the asbestos across the site.

## MUNSTER – RESIDENTIAL DEVELOPMENT

Commissioned by the developer, a phased contamination assessment was undertaken across the site. As part of the phased works, an asbestos investigation was conducted to assess the sits soils as a portion of the site was previously used as a landfill area. All works were undertaken in accordance with the

## CONTAMINATED SITE ASSESSMENT, MUNDARING, WESTERN AUSTRALIA

The site was a former industrial area with a detailed asbestos investigation conducted across the whole site. The initial investigation indicated that asbestos containing material (ACM) may have only been present on the sites surface, however following the first stage of the investigations which comprised of test pitting to various depths across the site, further ACM contamination was identified at depth. Following the development of a site-specific management plan the remedial works included extensive top soil stripping and removal offsite, and ongoing dust and asbestos fibre monitoring over a 2 month period.

## PERSONAL DUST MONITORING, TROPICANA MINE SITE AND MADDINGTON CORE YARD, WA

Conducted personal dust sampling and analysis for a range of workers during dust generate activities for exploration mining on a quarterly basis. This was undertaken at exploration drilling camps and at the core cutting yard. Asbestiform fibrous hydrated silicate minerals occur naturally throughout Western Australia's Pilbara region. Regulations state that employers have a duty to ensure that the exposure of workers to airborne fibrous minerals is within regulatory standards and as low as reasonably practicable. This was achieved using appropriate strategies to recognise, evaluate and control such hazards to workers. Ongoing management was facilitated through development of project-specific management plans written in consultation with the Client and HSE representatives.

## 2.3 CONTAMINATED LAND AUDITS

### PERTH CITY LINK RAIL PROJECT, PERTH, WESTERN AUSTRALIA

Auditor's representative for the Perth City Link Rail Project to sink the Perth rail link between Northbridge and Perth CBD. The role includes document review included multiple PSI, DSI and groundwater studies, client and regulator liaison, inspection of site works and correspondence preparation..

### COLLEGE GROVE LAND DEVELOPMENT, BUNBURY, WESTERN AUSTRALIA

Auditor's representative for a 1.3 ha former landfill site being developed for residential use. The site was used as a municipal landfill in the late 1970's and had undergone a range of environmental investigations including soil, groundwater and soil gas studies.

### MULTIPLE SCHOOL SITES, WESTERN AUSTRALIA

Auditor's representative for three separate residential development sites comprising former primary schools. Role included liaison with Department of Health regarding expectations and changes in the evolving asbestos guidelines, planners, engineers and the City of Belmont.

## 2.4 ACID SULFATE SOIL ASSESSMENTS

### BELGRAVIA CENTRAL LAND DEVELOPMENT, BERTRAM, WESTERN AUSTRALIA

Acid sulfate soil assessment and ongoing management for a large land development in Bertram. Soil and groundwater investigations were required to characterise the nature and extent of acid sulfate soil material across the site and develop management strategies to the satisfaction of the DEC. Dewatering works were also undertaken and dewatering management plan prepared for various regulatory agencies. Post construction monitoring of groundwater has been undertaken to facilitate the development of closure plans for each stage land release.

### ROSSMOYNE SENIOR HIGH SCHOOL, ROSSMOYNE, WESTERN AUSTRALIA

An acid sulfate soil investigation was undertaken to facilitate the redevelopment of portions of the site and the realignment of sewerage and water services. Minor dewatering works were also required and an acid sulfate soil and dewatering management plan was developed to manage these works.

### BUNBURY HOSPITAL EXTENSION, BUNBURY, WESTERN AUSTRALIA

Soil and groundwater investigations were required to characterise the nature and extent of acid sulfate soil material across the site and develop management strategies to the satisfaction of the DEC. Minor dewatering works were also required and an acid sulfate soil and dewatering management plan was developed to manage these works.

## BROWN STREET REDEVELOPMENT, EAST PERTH, WESTERN AUSTRALIA

An acid sulfate soil investigation was undertake at an inner-city site proposed for medium density residential development. An extensive dewatering program was also required to facilitate the construction of a basement car park. An acid sulfate soil and dewatering management plan was prepared to the satisfaction of the DEC, DoW and local councils to enable discharge water to be disposed in the local stormwater system.

## BURTONIA GARDENS LAND DEVELOPMENT, FORRESTDALE, WESTERN AUSTRALIA

Acid sulfate soil assessment and ongoing management for a large land development in Forrestdale. Soil and groundwater investigations were required to characterise the nature and extent of acid sulfate soil material across the site and develop management strategies to the satisfaction of the DEC. Dewatering works were also undertaken and dewatering management plan prepared for various regulatory agencies. Post construction monitoring of groundwater has been undertaken to facilitate the development of closure plans for each stage land release.

O:\Administration\Marketing\CVs\GEPL\Brad Palmer Detailed CV.docx

# CURRICULUM VITAE

## Michael Carmichael

BEnvSc

ENVIRONMENTAL SCIENTIST

Perth, Western Australia

**Education** Bachelor Environmental Science, Murdoch University

**Languages** English

## 1. CURRENT POSITION

Michael Carmichael is an environmental scientist at Galt Environmental Pty Ltd. He has been working in the environmental field in Western Australia since mid-2013. Michael's key skills include contaminated site assessment, implementation of site remediation programs, acid sulfate soil investigation and dewatering management, geotechnical investigations and earthworks verification. Michael's experience has been gained while working as an environmental scientist predominantly in the mining, construction and land development industries.

In his current role, Michael is responsible for the implementation of geotechnical and environmental investigations, environmental remediation projects, preparation of proposals and project reports and general project management.

## 2. SPECIFIC PROJECT EXAMPLES

### 2.1. ACID SULFATE SOIL ASSESSMENT

#### PROPOSED COMMERCIAL DEVELOPMENT, TREENDALE, WA

Acid sulfate soil investigations and management for Phase 1 works.

#### PROPOSED ROAD CONSTRUCTION, REDCLIFFE, WA

Acid sulfate soil investigations and management for Phase 1 works.

#### PROPOSED COMMERCIAL DEVELOPMENT, GREENFIELDS, WA

Acid sulfate soil investigations, groundwater monitoring, development and implementation of a management plan in accordance with DEC guidelines.

#### SEWER ALIGNMENT, HARRISDALE, WA

Acid sulfate investigations, dewatering monitoring and ongoing management for deep sewer re-alignment works.

### SEWER ALIGNMENT, AUSTRALIND, WA

Acid sulfate soil investigations for proposed residential development.

### PROPOSED RESIDENTIAL DEVELOPMENT, NEDLANDS, WA

Acid sulfate soil investigations and management for phase one works.

### COMMERCIAL SITE, HARRISDALE, WA

Acid sulfate soil investigation, monitoring and management for a commercial development.

### PROPOSED RESIDENTIAL DEVELOPMENT, DUNSBOROUGH, WA

Acid sulfate soils investigation and management, for a proposed residential development requiring dewatering management and monitoring.

### VARIOUS - PROPOSED RESIDENTIAL DEVELOPMENTS, LANDSDALE, WA

Acid sulfate soil investigations and management for Phase 1 works, including groundwater monitoring and dewatering management.

### OLD SWAN BREWERY SITE, CANNING VALE, WA

Acid sulfate soil investigation, monitoring and management for an industrial re-development.

### PROPOSED RESIDENTIAL DEVELOPMENT, WITCHCLIFFE, WA

Acid sulfate soil investigations for proposed residential development.

## 2.2. CONTAMINATED SITE ASSESSMENT

### PROPOSED COMMERCIAL DEVELOPMENT, BALDIVIS, WA

Soil investigation to assist in identifying past land use impacts and contamination to the surrounding environment.

### PROPOSED RESIDENTIAL DEVELOPMENT, LANDSDALE, WA

Preliminary site investigations, development of a sampling and analysis plan and detailed site investigations for a proposed residential development.

### PROPOSED RESIDENTIAL DEVELOPMENT, BRABHAM, WA

Preliminary site investigations, development of a sampling and analysis plan and detailed site investigations for a proposed residential development.

### PROPOSED INDUSTRIAL DEVELOPMENT, CANNING VALE, WA

Preliminary site investigations, development of a sampling and analysis plan and detailed site investigations including soil and water sampling for the proposed industrial re-development. Soil and groundwater were targeted for contamination of potential concern. This project also included sediment sampling.

### PROPOSED COMMERCIAL DEVELOPMENT, GREENFIELDS, WA

Preliminary site investigations, development of a sampling and analysis plan for a proposed commercial development.

### PROPOSED SPORT RECREATION FACILITY, CANNINGTON, WA

Soil and groundwater investigation to assist in identifying past land use impacts and contamination to the surrounding environment.

### WATER MAIN REMEDIATION, BURSWOOD WA

Dust and asbestos monitoring along a section of Victoria Park Avenue where sinkholes were forming around a water main. The remediation occurred in an area where asbestos impacted soils are known to be present. Dust and asbestos air quality monitoring was implemented throughout the duration of the project.

### PROPOSED HEALTH CARE FACILITY, KALGOORLIE

Ground gas monitoring undertaken for a former landfill site as part of a detailed site investigation.

### VEHICLE DISMANTLING FACILITY, WELSHPOOL, WA

Soil and groundwater investigation of a registered contaminated site visually impacted by hydrocarbon products.

## 2.3. WATER QUALITY ASSESSMENT

### SEWER ALIGNMENT, HARRISDALE, WA

Daily water quality monitoring and management of dewatering works associated with deep excavation for a sewer alignment project. This is an ongoing project.

### PROPOSED COMMERCIAL DEVELOPMENT, GREENFIELDS, WA

Water quality monitoring and sampling for potential contaminants based on land use history records.

### PROPOSED RESIDENTIAL DEVELOPMENT, LANDSDALE, WA

Monitoring of groundwater quality using low flow apparatus for contaminants of potential concern, and subsequent sampling.

### PROPOSED INDUSTRIAL DEVELOPMENT, CANNING VALE, WA

Groundwater well installation, water quality monitoring and sampling targeting areas that may have become contaminated during existing industry operations.

### GROUNDWATER ASSESSMENT, DENHAM, WA

Groundwater monitoring, assessment and reporting at a site known to be impacted by petroleum hydrocarbons adjacent to the World Heritage Listed Shark Bay.

## 2.4. ASBESTOS IDENTIFICATION ASSESSMENT

### PROPOSED RESIDENTIAL DEVELOPMENT, LANDSDALE, WA

Asbestos survey and site walkover, test pitting, sieving, collection and disposal with reference to Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009).

### PROPOSED RESIDENTIAL DEVELOPMENT, MADDINGTON, WA

Asbestos survey and site walkover, test pitting, sieving, collection and disposal with reference to Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009).

### PROPOSED RESIDENTIAL DEVELOPMENT, LANDSDALE, WA

Asbestos survey and site walkover, test pitting, sieving, collection and disposal with reference to Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009).

### PROPOSED ROAD WIDENING, BALANNUP, WA

Asbestos survey and site walkover, test pitting, sieving, collection and disposal along existing road reserve and private property (where historical uncontrolled filling was noted) in accordance with Department of Health (DoH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009).

## 2.5. GEOTECHNICAL INVESTIGATION

### PROPOSED RE-DEVELOPMENT, CORAL BAY, WA

Geotechnical borehole drilling including standard penetration tests (SPTs), core logging and sample collection.

### VARIOUS PROPOSED RESIDENTIAL LAND DEVELOPMENT, WELLARD, WA

Combined geotechnical and environmental investigations at multiple adjacent sites, including drilling, soil profile logging and sample collection.

### PROPOSED RE-DEVELOPMENT, NORTHAMPTON, WA

Geotechnical test pitting, soil profile logging and sample collection (also included HAZMAT assessment).

# Appendix D: Worksafe Accreditation

# Restricted Asbestos Licence

WORKSAFE

## GALT ENVIRONMENTAL PTY LTD

Licence Number WARA1195

This Restricted Asbestos Licence is issued pursuant to Regulation 5.44(2) of the *Occupational Safety and Health Regulations 1996* and authorises **GALT ENVIRONMENTAL PTY LTD** to carry out Restricted asbestos work in accordance with the *Occupational Safety and Health Act 1984, the Occupational Safety and Health Regulations 1996* and in accordance with the conditions endorsed on the reverse side of the Licence.

**Date of Expiry:** 7 June 2019

Robyn Parker
**Director, Business Services**
**WORKSAFE DIVISION OF COMMERCE**

I agree and will adhere to the conditions of the Restricted Asbestos Licence as detailed below:

(1) All removal of asbestos containing materials is carried out in accordance with the *Occupational Safety and Health Act 1984*, the *Occupational Safety and Health Regulations 1996* and Part 9 of the *Code of Practice for the Safe Removal of Asbestos – 2nd Edition [NOHSC: 2002 (2005)]*.

(2) A record of the training provided to each person who carries out asbestos removal work is kept for a minimum period of five (5) years and must be produced at the request of an Auditor.

(3) A copy of the Safe Work Method Statement for each asbestos removal job is kept for a minimum period of five (5) years and must be produced at the request of an Auditor.

(4) A copy of the receipt issued by the waste disposal facility, to which asbestos material is transported for disposal, is kept for a minimum period of five (5) years and must be produced at the request of an Auditor.

(5) The holder of the Restricted Asbestos Licence will report to the WorkSafe Commissioner any asbestos removal incidents where a person was (or was likely to have been) exposed to asbestos fibres at levels above the exposure standard.

(6) The holder of the Restricted Asbestos Licence is subject to auditing and must co-operate with officers of WorkSafe, including answering questions and allowing full access to all documents relating to the carrying out of asbestos removal work which includes, but is not limited to, the documents referred to in Conditions (2), (3), and (4).

(7) If the licence holder is a company, and the applicant/nominee is no longer engaged with the company, the Commissioner must be advised immediately. The licence holder must apply for the approval of another applicant/nominee.

(8) Variations or additions to these conditions, as made by the WorkSafe Western Australia Commissioner, are complied with.

## DECLARATION OF HOLDER OF ASBESTOS REMOVALIST LICENCE

This form **must be signed by the Nominee/Competent person**. This is a person who is authorised to sign documents and is responsible for the overall Restricted Asbestos removal work.

.....Bradley Palmer.....
.....
(print name of holder of the Restricted Asbestos Licence as appearing on the Restricted Asbestos Licence)

accepts and agrees to comply with the conditions listed above and understands that a conviction against the *Occupational Safety and Health 1984* or *Occupational Safety and Health Regulations 1996* or non-compliance with any of the conditions listed above or an inability to comply with any of these may result in the Restricted Asbestos Licence being suspended or cancelled.

**Signature:** .....
(signature of person holding Restricted Asbestos Licence or person authorised to sign if Restricted Asbestos Licence is in the name of a Pty Ltd company)

Date: .....13/6/2016.....

# Appendix E: Wind Roses

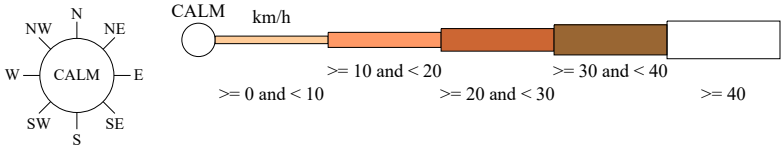
# Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 10 Aug 2018)

Custom times selected, refer to attached note for details

## BUNBURY

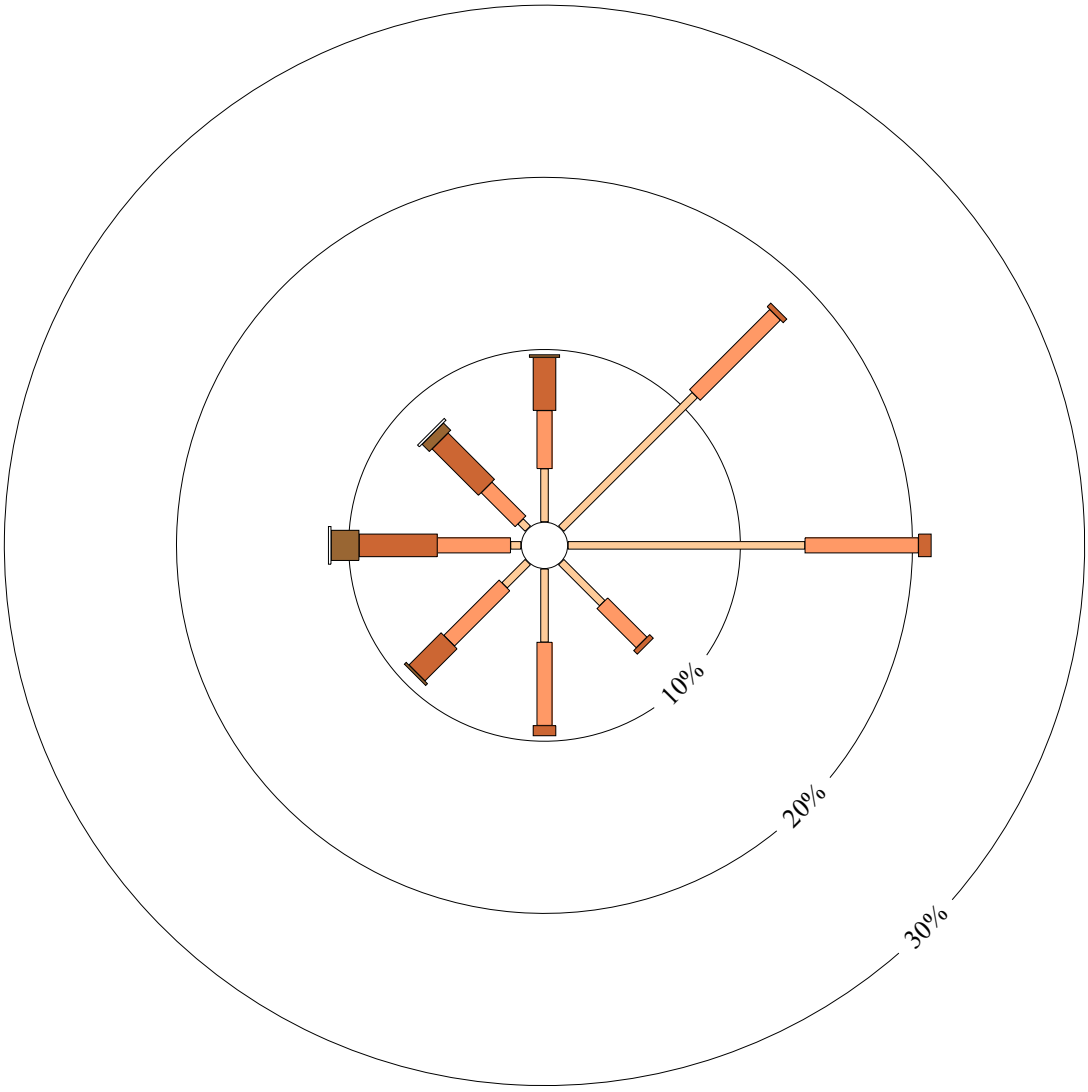
Site No: 009965 • Opened Nov 1995 • Still Open • Latitude: -33.3567° • Longitude: 115.6447° • Elevation 5.m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.




9 am Aug
684 Total Observations

Calm 7%




Australian Government
Bureau of Meteorology

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*Prepared by the Bureau of Meteorology.*
*Contact us by phone on (03) 9669 4082, by fax on (03) 9669 4515, or by email on climatedata@bom.gov.au*
*We have taken all due care but cannot provide any warranty nor accept any liability for this information.*

# Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 10 Aug 2018)

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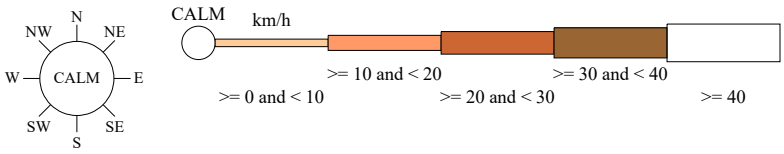
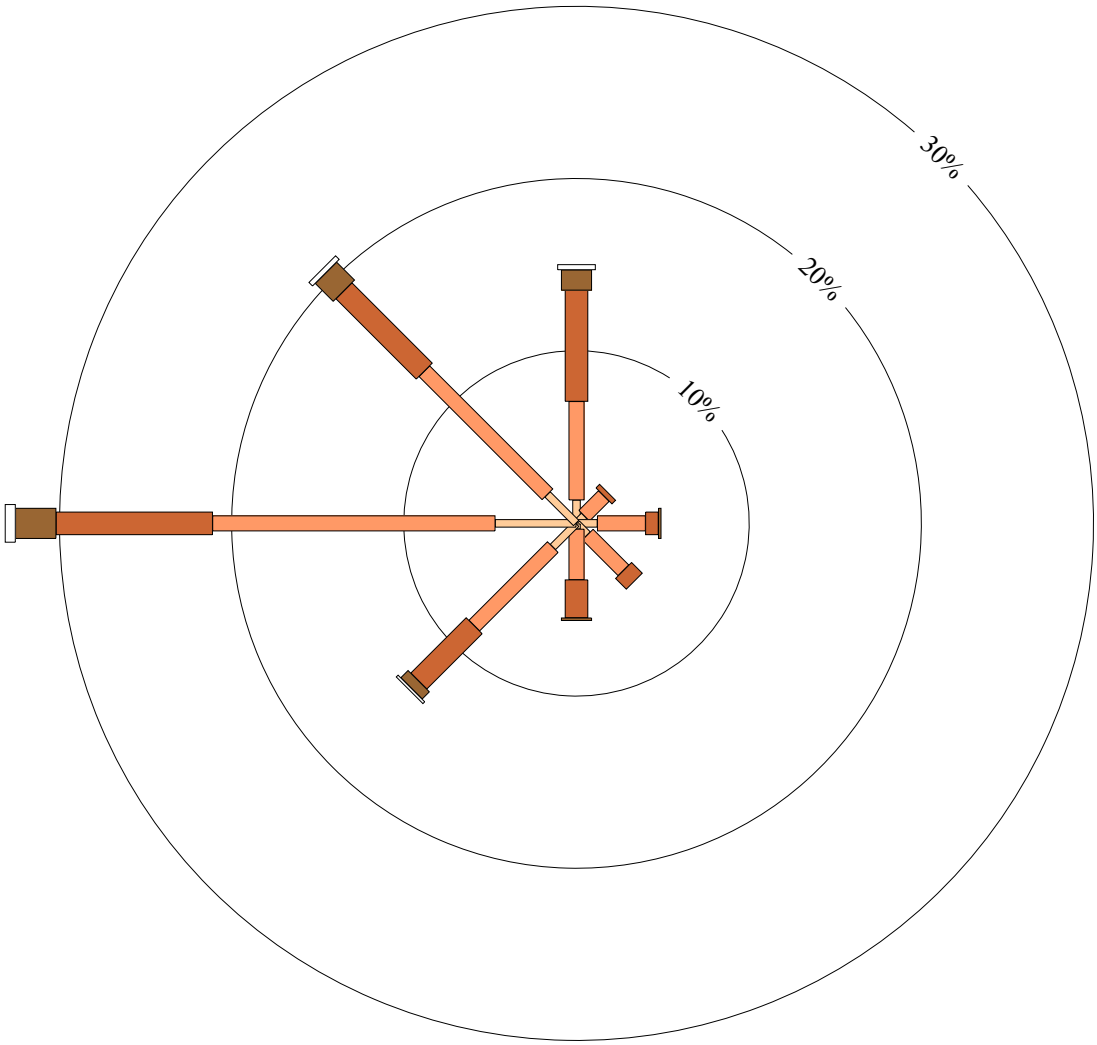



3 pm Aug
683 Total Observations

Calm *




Australian Government
Bureau of Meteorology

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*We have taken all due care but cannot provide any warranty nor accept any liability for this information.*

# Appendix F: Understanding Your Report



www.galtenv.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 96 520 810 622

# UNDERSTANDING YOUR REPORT

GALT FORM PMP29 Rev3

## 1. EXPECTATIONS OF THE REPORT

This document has been prepared to clarify what is and is not provided in your report. It is intended to inform you of what your realistic expectations of this report should be and how to manage your risks associated with the conditions on site.

Geotechnical engineering and environmental science are less exact than other engineering and scientific disciplines. We include this information to help you understand where our responsibilities begin and end. You should read and understand this information. Please contact us if you do not understand the report or this explanation. We have extensive experience in a wide variety of projects and we can help you to manage your risk.

## 2. THIS REPORT RELATES TO PROJECT-SPECIFIC CONDITIONS

This report was developed for a unique set of project-specific conditions to meet the needs of the nominated client. It took into account the following:

- the project objectives as we understood them and as described in this report;
- the specific site mentioned in this report; and
- the current and proposed development at the site.

It should not be used for any purpose other than that indicated in the report. You should not rely on this report if any of the following conditions apply:

- the report was not written for you;
- the report was not written for the site specific to your development;
- the report was not written for your project (including a development at the correct site but other than that listed in the report); or
- the report was written before significant changes occurred at the site (such as a development or a change in ground conditions).

You should always inform us of changes in the proposed project (including minor changes) and request an assessment of their impact.

Where we are not informed of developments relevant to your report, we cannot be held responsible or liable for problems that may arise as a consequence.

Where design is to be carried out by others using information provided by us, we recommend that we be involved in the design process by being engaged for consultation with other members of the project team. Furthermore, we recommend that we be able to review work produced by other members of the project team that relies on information provided in our report.

## 3. SOIL LOGS

Our reports often include logs of intrusive and non-intrusive investigation techniques. These logs are based on our interpretation of field data and laboratory results. The logs should only be read in conjunction with the report they were issued with and should not be re-drawn for inclusion in other documents not prepared by us.

## 4. THIRD PARTY RELIANCE

We have prepared this report for use by the client. This report must be regarded as confidential to the client and the client's professional advisors. We do not accept any responsibility for contents of this document from any party other than the nominated client. We take no responsibility for any damages suffered by a third party because of any decisions or actions they may make based on this report. Any reliance or decisions made by a third party based on this report are the responsibility of the third party and not of us.

## 5. CHANGE IN SUBSURFACE CONDITIONS

The recommendations in this report are based on the ground conditions that existed at the time when the study was undertaken. Changes in ground conditions can occur in numerous ways including anthropogenic events (such as construction or contaminating activities on or adjacent to the site) or natural events (such as floods, groundwater fluctuations or earthquakes). We should be consulted prior to use of this report so that we can comment on its reliability. It is important to note that where ground conditions have changed, additional sampling, testing or analysis may be required to fully assess the changed conditions.

## 6. SUBSURFACE CONDITIONS DURING CONSTRUCTION

Practical constraints mean that we cannot know every minute detail about the subsurface conditions at a particular site. We use professional judgement to form an opinion about the subsurface conditions at the site. Some variation to our evaluated conditions is likely and significant variation is possible. Accordingly, our report should not be considered as final as it is developed from professional judgement and opinion.

The most effective means of dealing with unanticipated ground conditions is to engage us for construction support. We can only finalise our recommendations by observing actual subsurface conditions encountered during construction. We cannot accept liability for a report's recommendations if we cannot observe construction.

## 7. ENVIRONMENTAL AND GEOTECHNICAL ISSUES

Unless specifically mentioned otherwise in our report, environmental considerations are not addressed in geotechnical reports. Similarly, geotechnical issues are not addressed in environmental reports. The investigation techniques used for geotechnical investigations can differ from those used for environmental investigations. It is the client's responsibility to satisfy themselves that geotechnical and environmental considerations have been taken into account for the site.

Geotechnical advice presented in a Galt Environmental report has been provided by Galt Geotechnics under a sub-contract agreement. Similarly, environmental advice presented in a Galt Geotechnics report has been provided by Galt Environmental under a sub-contract agreement.

Unless specifically noted otherwise, no parties shall draw any inferences about the applicability of the Western Australian state government landfill levy from the contents of this document.

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