NSW Site Auditor Scheme

# Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

## Part I: Site audit identification

Site audit statement no. SAS164-2

This site audit is a:

☑ statutory audit

☐ ~~non-statutory audit~~

within the meaning of the *Contaminated Land Management Act 1997*.

### Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

| | |
|---|---|
| Name | Rebeka Hall |
| Company | Geosyntec Consultants Pty Ltd |
| Address | Suite 1, Level 9, 189 Kent St SYDNEY NSW |
| | Postcode 2000 |
| Phone | 02 9251 8070 |
| Email | rebeka.hall@geosyntec.com |

### Site details

| | |
|---|---|
| Address | 2 Rhodes Street, Meadowbank NSW |
| | Postcode 2114 |

## Property description

(Attach a separate list if several properties are included in the site audit.)

Lot 10 in DP1232584

Local government area City of Ryde

Area of site (include units, e.g. hectares) 3.3ha

Current zoning SP2 infrastructure

## Regulation and notification

To the best of my knowledge:

☐ ~~**the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*, as follows: (provide the no. if applicable)~~

- ☐ ~~Declaration no.~~
- ☐ ~~Order no.~~
- ☐ ~~Proposal no.~~
- ☐ ~~Notice no.~~

☑ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

☐ ~~the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*~~

☑ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

## Site audit commissioned by

Name Matthew Metlege, Assistant Project Director

Company Department of Education School Infrastructure NSW

Address Level 8, 259 George Street, Sydney NSW

Postcode 2000

Phone 0436 282 867

Email matthew.metlege@det.nsw.edu.au

**Contact details for contact person** (if different from above)

| | |
|---|---|
| Name | Phillipa Aiken (Colliers) |
| Phone | 0414 248 005 |
| Email | Phillipa.Aiken@colliers.com |

**Nature of statutory requirements** (not applicable for non-statutory audits)

☐ ~~Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)~~

☐ ~~Requirements imposed by an environmental planning instrument (please specify, including date of issue)~~

☑ Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

Condition D31 of Stage Significant Development (SSD) 9343, issued by Minister for Planning and Public Spaces (21 May 2020)

**Site Audit Statement**

D31. Prior to the commencement of operation, the Applicant must submit a Site Audit Report and Section A Site Audit Statement for the site prepared by a NSW EPA accredited Site Auditor. The Site Audit Report and Section A Site Audit Statement must verify the site is suitable for the educational establishment land use and be provided for the information of the Planning Secretary and the Certifier.

In addition, Early Works and Remediation consent, Conditions 3 and 5 of Development Approval LDA2019/0436 (13 May 2020) issued by City of Ryde Council state that:

3. **Remediation of land**. The land must be remediated to the extent necessary for the proposed use and a copy of the site validation report must be submitted to Council for consideration. The site validation report must comply with the Guidelines for Reporting on Contaminated Land (EPA, 2020) the *DECCW (2010) UPSS Technical Note: Site Validation Reporting* and demonstrate that the site is suitable for the proposed use.

   If requested by Council, a site audit statement and a site audit summary report from an accredited site auditor under the *Contaminated Land Management Act 1997* must be submitted to Council verifying the information contained in the site validation report.

   Where the ongoing land use suitability and release of the Site Audit Statement is dependent upon the implementation of an Environmental Management Plan (EMP) in relation to any residual contamination remaining onsite, the EMP must be approved by the Site Auditor and the Council prior to the issue of the Site Audit Statement.

   The owner of the land is required to comply with the ongoing obligations of any EMP which forms part of the Site Audit Statement for the site.

5. **Remediation work**. All remediation work must be carried out in accordance with the requirements of:

   a) The Section B Site Audit Statement (SAS) and accompanying report dated 20 March 2020 prepared by ZOIC Environmental Pty Ltd.

   b) The Remedial Action Plan prepared by Alliance Geotechnical dated 18 March 2020, Reference No 9692-ER-1 REV3.

   c) *State Environmental Planning Policy No. 55 - Remediation of Land*;

   d) Any relevant guidelines published by the NSW Environment Protection Authority; and

   e) Any council policy or development control plan relating to the remediation of land.

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☐ ~~Requirements under other legislation (please specify, including date of issue)~~

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**Purpose of site audit**

☐ **A1** To determine land use suitability

Intended uses of the land:

OR

☑ **A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan

Intended uses of the land: primary school and high school

OR

(Tick all that apply)

☐ **B1** To determine the nature and extent of contamination

☐ **B2** To determine the appropriateness of:

☐ an investigation plan

☐ a remediation plan

☐ a management plan

☐ **B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

☐ **B4** To determine the compliance with an approved:

☐ **voluntary management proposal** or

☐ **management order** under the *Contaminated Land Management Act 1997*

☐ **B5** To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.

Intended uses of the land:

## Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Alliance Geotechnical (AG)

Titles of reports reviewed:

- Alliance Geotechnical (AG) (11 October 2019a) Meadowbank Education and Employment Precinct Schools Project Stage 1 Preliminary Site Investigation (PSI) (Ref: 6179-ER-1-1 REV5).

- AG (11 October 2019b) Meadowbank Education and Employment Precinct Schools Project Stage 2 Detailed Site Investigation (DSI) (Ref: 6179-ER-1-2 REV6).
- AG (11 October 2019c) Meadowbank Education and Employment Precinct Schools Project Supplementary Contamination Assessment (SCA) (Ref: 9280-ER-1-1 REV1).
- AG (11 October 2019d) Meadowbank Education and Employment Precinct Schools Project Supplementary Asbestos Assessment (SAA) (Ref: 9692-ER-1-1 REV1).
- AG (18 March 2020) Meadowbank Education and Employment Precinct Schools Project Remedial Action Plan (RAP) (Ref: 9692-ER-1-2 REV3).
- AG (10 June 2020a) Data Gap Assessment, 2 Rhodes Street, Meadowbank NSW, Schools Meadowbank Employment Education Precinct (SMEEP) (Ref: 10834-ER-1-1).
- AG (15 September 2020) Remedial Action Plan, 2 Rhodes Street, Meadowbank NSW, Schools Meadowbank Education Employment Precinct (SMEEP) (Ref: 10834-ER-1-2_Rev03).
- AG (12 November 2020) Interim Site Validation Report Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street, Meadowbank, NSW (Ref: 10834-ER-4-1_Rev01).
- AG (22 June 2021) Interim Site Validation Report No. 2, Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street, Meadowbank NSW (Ref: 10834-ER-4-2_Rev01).
- AG (10 February 2022) Final Site Validation Report, Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street Meadowbank NSW (Ref: 10834-ER-4-3_Rev01).
- AG (11 February 2022) Long Term Environmental Management Plan, Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street, Meadowbank NSW (Ref: 10834-ER-5-1_Rev02).

Other information reviewed, including previous site audit reports and statements relating to the site:

Zoic Environmental (20 March 2020) Section B Site Audit Statement and Report (Ref: 20013 SAS/SAR164-1 20Mar20) produced by Rebeka Hall, Site Auditor.

## Site audit report details

Title Section A2 Site Audit Report: Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW 2114

Report no. 20013 SAR164-2 Date 16 February 2022

# Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
    - (B1) the nature and extent of contamination, and/or
    - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
    - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
    - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
    - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

## Section A1

**I certify that, in my opinion:**

The **site is suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

_____

**OR**

☐ I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.

Overall comments:

_____

_____

_____

_____

_____

# Section A2

## I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ ~~Residential, including substantial vegetable garden and poultry~~

☐ ~~Residential, including substantial vegetable garden, excluding poultry~~

☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

☑ Day care centre, preschool, primary school

☐ ~~Residential with minimal opportunity for soil access, including units~~

☑ Secondary school

☐ ~~Park, recreational open space, playing field~~

☐ ~~Commercial/industrial~~

☐ ~~Other (please specify):~~

## EMP details

Title Long-Term Environmental Management Plan, Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street, Meadowbank, NSW Ref108-ER-5-_Rev02

Author Alliance Geotechnical Pty Ltd

Date 11 February 2022 No. of pages 95

## EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

☐ ~~requires operation and/or maintenance of **active** control systems~~[3]

☑ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

Purpose of the EMP:

Section 1.2 states that the objectives of the EMP are:

- To provide a summary of the status of residual contamination;
- Document the site containment infrastructure (capping layer system);
- To outline roles and responsibilities for implementation of the EMP;
- To outline requirements for the effective management of contamination remaining at the site;
- Provide a framework for ongoing environmental management, monitoring and reporting requirements of the site during future disturbance of the designated remediation areas; and
- Provide scope of review and revisions to the EMP as necessary to ensure appropriateness of the EMP and maintain its currency into the future.

Description of the nature of the residual contamination:

Residual contamination comprises soil impacted by heavy metals, polycyclic aromatic hydrocarbons (PAHs) and asbestos (friable and non-friable) under capped areas and along the site boundary as shown in EMP figures.

Summary of the actions required by the EMP:

- Preventative management methods, comprising routine inspection of the capping layer.
- Safety requirements during intrusive work, which requires preparation of safe work method statements, the use of personal protective equipment and workplace asbestos clearance.
- Management procedures in all areas of environmental concern and tree protection zones, which includes soil management, validation procedures, defect repair.
- Requirements for repair of underground utilities.
- Disposal of fill soil.
- Other environmental management requirements.

How the EMP can reasonably be made to be legally enforceable:

The EMP is made legally enforceable by Condition 3 of LDA2019/0436 (13 May 2020) issued by City of Ryde Council.

How there will be appropriate public notification:

Section 4.3 states that the EMP will incorporated into Section 10.7 planning certificate under Section 10.7 of the Environmental Planning and Assessment Act and the Certificate of Title of the site, under Section 88 of the Conveyancing Act 1919.

This SAS and LTEMP will be provided to Council.

~~Overall comments:~~

## Section B

Purpose of the plan[4] which is the subject of this audit:

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**I certify that, in my opinion:**

(B1)

☐ The nature and extent of the contamination **has** been appropriately determined

☐ The nature and extent of the contamination **has not** been appropriately determined

AND/OR (B2)

☐ The investigation, remediation or management plan **is** appropriate for the purpose stated above

☐ The investigation, remediation or management plan **is not** appropriate for the purpose stated above

AND/OR (B3)

☐ The site testing plan:

☐ **is** appropriate to determine

☐ **is not** appropriate to determine

if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

AND/OR (B4)

☐ The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):

☐ **have** been complied with

☐ **have not** been complied with.

*voluntary management proposal no.

**management order no.

AND/OR (B5)

☐ The site **can be made suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

[4] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

- ☐ Residential, including substantial vegetable garden, excluding poultry
- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify):

IF the site is remediated/managed* in accordance with the following plan (**attached**):

*Strike out as appropriate

Plan title

Plan author

Plan date No. of pages

SUBJECT to compliance with the following condition(s):

Overall comments:

# Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. 0802

**I certify that:**

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Date 16 February 2022

# Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

## How to complete this form

### Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

### Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

### Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

### Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

*Environmental management plan*

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

*Active or passive control systems*

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

*Auditor's comments*

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

## Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

### Part III

In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

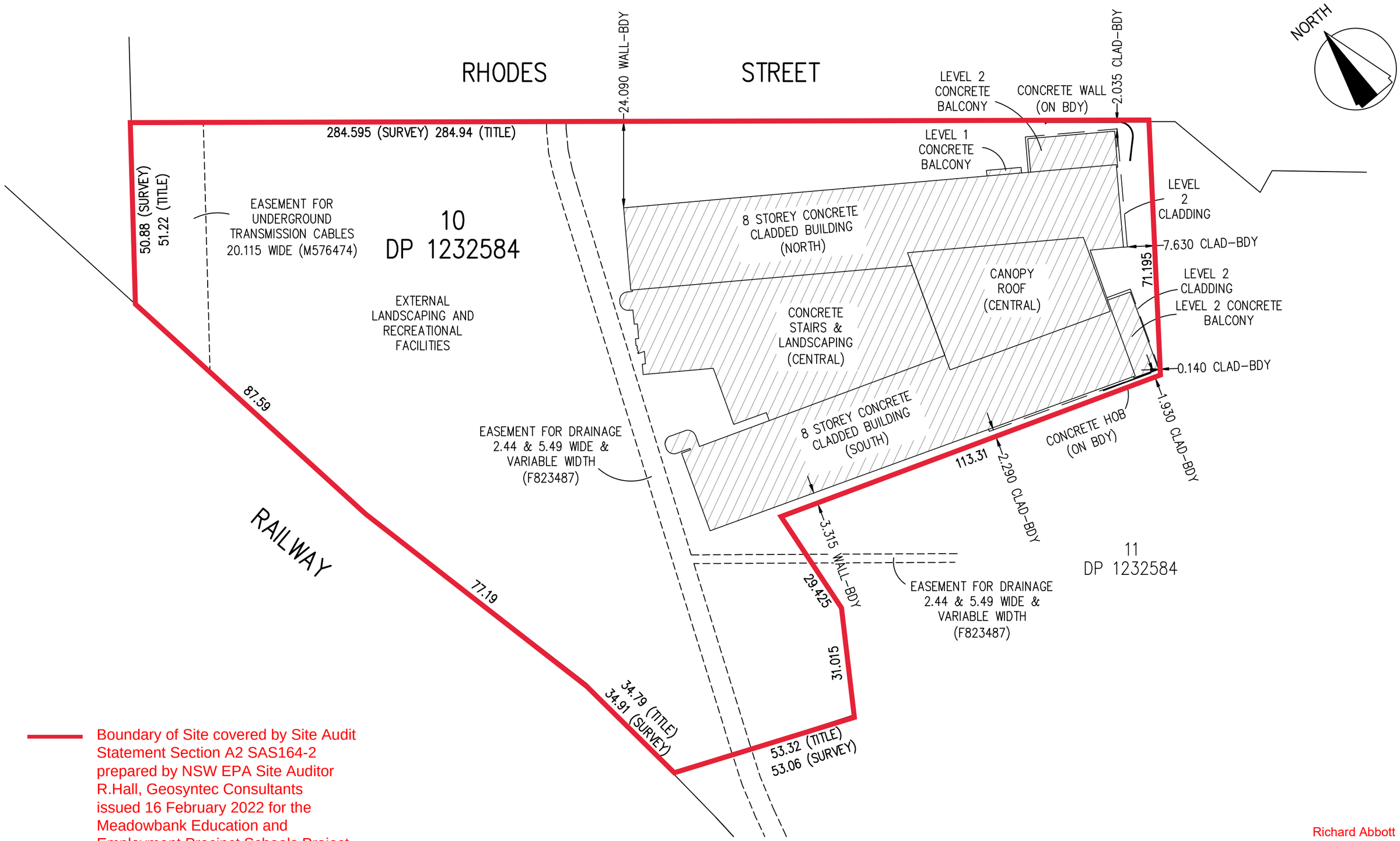
## Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**: nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND

- the **local council** for the land which is the subject of the audit.




Boundary of Site covered by Site Audit Statement Section A2 SAS164-2 prepared by NSW EPA Site Auditor R.Hall, Geosyntec Consultants issued 16 February 2022 for the Meadowbank Education and Employment Precinct Schools Project

Richard Abbott
Registered Surveyor
Nº 9057

TSS TOTAL SURVEYING SOLUTIONS

LANE COVE | CAMDEN | MANLY VALE | CENTRAL COAST



# SURVEY REPORT - SKETCH

| | | | |
|---|---|---|---|
| | | JOB No.: 200850 | LGA: RYDE |
| | | PLAN No.: 200850-1 | DATUM: AHD |
| CLIENT: | ROBERTS CO | DATE: 15/12/2021 | SCALE: 1:1000 |
| PROJECT: | MEADOWBANK | DRAWN: JD | CONT. INTERVAL: N/A |
| ADDRESS: | MEADOWBANK | CHK: RA | SHEET 1 OF 1 |

# Long-Term Environmental Management Plan

**Project**

**Schools at the Meadowbank Education and Employment Precinct (SMEEP)**
**2 Rhodes Street, Meadowbank, NSW**

**Prepared for**

***Ward Civil & Environmental Engineering Pty Ltd***

**Date**

**11 February 2022**

**Report No**

**10834-ER-5-1_Rev02**

alliance
geotechnical & environmental solutions


**Alliance Geotechnical Pty Ltd**

**Address:** 8-10 Welder Road
Seven Hills, NSW

**Phone:** 1800 288 188
**Office Email:** info@allgeo.com.au
**Web:** www.allgeo.com.au

# Document Control

| Revision | Date | Author | Reviewer | Project Manager |
|---|---|---|---|---|
| **Draft** | 24/09/2021 | M. Asadabadi | A. Rooney | M. Asadabadi |
| **1** | 21/01/2022 | M. Asadabadi | A. Rooney | M. Asadabadi |
| **2** | 11/02/2022 | M. Asadabadi | A. Rooney | M. Asadabadi |

# Important Information About This Report



This document is produced by Alliance solely for the use and benefit by the named client in accordance with the terms of the engagement between Alliance and the name client. Alliance (and the document Certifier if applicable) does not and shall not assume any liability or responsibility whatsoever to any third party arising out of any use or reliance by any third party on the content of this document.

This report must be reviewed in its entirety and in conjunction with the objectives, scope, and terms applicable to Alliance's engagement. The report must not be used for any purpose other than the purpose specified at the time Alliance was engaged to prepare the report.

The findings presented in this report are based on specific data and information made available during this project. To the best of Alliance's knowledge, these findings represent a reasonable interpretation of the general condition of the site at the time of report completion.

No warranties are made as to the information provided in this report. All conclusions and recommendations made in this report are of the professional opinions of personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this report or which are not made known to personnel and which may impact on those opinions is not the responsibility of Alliance.

Logs, figures, and drawings are generated for this report based on individual Alliance consultant interpretations of nominated data, as well as observations made at the time fieldwork was undertaken.

Data and/or information presented in this report must not be redrawn for its inclusion in other reports, plans or documents, nor should that data and/or information be separated from this report in any way.

Should additional information that may impact on the findings of this report be encountered or site conditions change, Alliance reserves the right to review and amend this report.

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# FIGURES



# TABLES



# APPENDICES

# Summary of Environmental Management Controls and Responsibilities

**Table 1.1.1 Summary of Environmental Management Controls and Responsibilities**

| Key Environmental Management Control and Responsibility | Responsible Parties |
|---|---|
| Ensure contractors and relevant employees of the school are made aware of the EMP through inductions and the like, and record kept on the induction register (**Appendix C**) | Whoever engages the Contractor (AMU or School Principal etc.).<br>SSAMP to be provided with all details of the EMP.<br>All works should be consulted with AMU. |
| Ensure site personnel working in accordance with the EMP understand all requirements and ensure compliance with the EMP, as a condition of agreement as part of induction into the EMP prior to commencing works (**Appendix C**) | Whoever engages the Contractor (AMU or School Principal etc.).<br>SSAMP to be provided with all details of the EMP.<br>All works should be consulted with AMU. |
| Ensure all controls in the EMP are strictly adhered to during any planned ground disturbance works within the capped remediation areas of the site | Whoever engages the Contractor (AMU or School Principal etc.).<br>SSAMP to be provided with all details of the EMP.<br>All works should be consulted with AMU. |
| Contact key stakeholders i.e., City of Ryde Council and/or SafeWork NSW if there are any excavation or asbestos removal works planned or required within the contaminated areas | Whoever engages the Contractor (AMU or School Principal etc.).<br>SSAMP to be provided with all details of the EMP.<br>All works should be consulted with AMU. |
| Store a controlled copy of the EMP at the school (**Section 2.7**). | EMP to be appended to the SSAMP with all requirements noted within the body of the document.<br>SSAMP to be available within the AMS. |
| Nomination of a Maintenance Manager at the school for ensuring implementation of the provision of the EMP (**Table 6.5.1**) | This will be shared responsibility between the schools and AMU. |
| Ensure any environmental incidents and unexpected site conditions are reported to the Maintenance Manager in a timely manner and appropriate statutory authorities i.e., City of Ryde Council, as necessary (**Appendix D**) | This will be shared responsibility between the schools and AMU.<br>Flow chart provided in (**Appendix D**) and SSAMP to be followed. |
| Ensure all non-conformance and/or complaints are appropriately recorded on the complaints and environmental incident register (**Appendix C**) | Recorded under the existing Department incident reporting system by schools or the AMU and on incident register (**Appendix C**) |
| Ensure regular, annual, and ad-hoc site inspections are undertaken to confirm the adequacy of the capping layers per the EMP, and recorded on the inspection form (not just annual inspections) (**Appendix C**) | Inspections will be the responsibility of the Principal or appointed Maintenance Manger |
| Maintain and review the Asbestos Register (**Appendix E**) | SINSW compliance |

*Please note any reference to AMU is in reference to the Department of Education Asset Management Unit
**AMP refers to the Asbestos Management Plan and SSAMP is the Site-Specific Asset Management Plan

# 1 Introduction

## 1.1 Background

Alliance Geotechnical (Alliance) Pty Ltd was engaged by Ward Civil & Environmental Engineering Pty Ltd (the Client) to prepare a Long-Term Environmental Management Plan (LTEMP) for the management of residual contamination located at the Meadowbank Education and Employment Precinct (SMEEP) Schools project, located at 2 Rhodes Street, Meadowbank NSW (hereafter referred to the as the 'site'. The site locality is presented in **Figure 1, Appendix A** and the site boundary presented on **Figure 2, Appendix A**. Alliance understand that the site comprises a primary school and secondary school.

To ready the site for construction of the proposed primary and secondary school, a development application (ref. LDA2019/0436) was submitted to and approved by the Joint Regional Planning Panel for the City of Ryde Council on 13 May 2020 for "Early Works – Remediation of contaminated land to ready the site for the construction of the Meadowbank Education and Employment Precinct Schools Project". The schools State Significant Development Application (SSDA) (relevant to school construction works) was approved by the Department of Planning, Industry and Environment (DPIE) on 21 May 2020 (ref. SSD-9343).

Previous contamination from heavy metals, polycyclic aromatic hydrocarbons (PAH) (benzo(a)pyrene (B(a)P)) and asbestos was identified at the site, which were considered to pose an unacceptable risk and required remediation. Alliance (2020) prepared a Remedial Action Plan (RAP) appropriate for the contamination identified and once implemented would render the site suitable for the proposed land use. The RAP identified that a Data Gap Assessment (DGA) was required to investigate potential groundwater contamination, ecological risks, and the extent of asbestos impacted fill at the site. Alliance addressed the data gaps in a DGA report in June 2020 (Alliance 2020) and updated the RAP to incorporate the findings of the DGA. The proposed remedial strategy required the implementation of a EMP to manage the residual contamination during ongoing operation of the site.

A Section B Site Audit Report (ref. SAR 164-1) and Site Audit Statement (ref. SAS164-1) was prepared by Rebeka Hall (NSW EPA Auditor Accreditation No.0802) of Geosyntec Consultants Pty Ltd (Geosyntec), formally Zoic Environmental Pty Ltd (Zoic) to verify that the RAP (Alliance 2020) was appropriate to remediate the contamination identified, based on site suitability for the proposed land use. The RAP for the site was endorsed by the Site Auditor on 22 September 2020 (ref. 10834-ER-1-2_Rev03).

The new school facilities will significantly increase capacity from Meadowbank Public School and Marsden High School's current facilities, increase connectivity to major transport hubs, and offer students contemporary and flexible learning spaces.

Ward Civil & Environmental Engineering Pty Ltd commenced remediation works in July 2020 and completed in December 2021. The new facilities cater for:

- 1000 primary students;
- 1500 secondary students; and
- 120 intensive English students.

The relocated school's feature:

- A primary school and a secondary school with facilities integrated into the landscape;

- Contemporary, multi-purpose and flexible learning spaces;
- Open green space for sporting and recreation activities;
- The Wallamattagal learning centre; and
- Opportunities for students to complete primary, secondary, and vocational education at one campus.

The remedial works conducted by Ward Civil & Environmental Engineering Pty Ltd and their associated subcontractors have been validated and verified by Alliance under an NSW EPA approved audit process, and the Site Validation Reports produced for the site.

The EMP specifically follows on from remediation of asbestos, heavy metals, and benzo(a)pyrene (B(a)P) impacted soils reported in Interim Site Validation Reports (Alliance 2020c, Alliance 2021) and Final Site Validation Report (Alliance 2022) prepared by Alliance, and capping of this material within the following identified areas on site (refer to **Figure 2, Appendix A**):

- All Tree Protection Zones (TPZs);
- AEC06, AEC08 and AEC10 (western portion of the site);
- AEC07 (eastern portion of the site);
- AEC101(southern portion of the site); and
- AEC14 (south-western portion of the site).

The impacted soils were covered by a capping layer system consisting of a high visibility geotextile marker layer overlain by ≥0.22 m and up to 1.0 m of a combination of Virgin Excavated Natural Materials (VENM), 20 mm Densely Graded Bedding Gravels (DGB20), quarried sand and gravels, landscaping materials, AstroTurf, turfed surfaces and reinforced concrete, which allowed for sufficient physical separation from the underlying contaminated soils. Refer to **Section 3** for further details on adopted capping layer system depths for AECs and TPZs.

The risks to site users, including maintenance workers, are considered low, however, excavation into impacted soils or defect of the appropriate capping system cannot be discounted. To safeguard the serviceability of the capping system, and mitigate future risk of exposure to contamination, this EMP has been prepared to detail the requirements for the ongoing management of residual impacted soils retained onsite. The EMP details the necessary management measures for scenarios where excavation activities are required within and below the capping layer system.

The EMP has been prepared in general accordance with guidelines made or approved by the NSW Environmental Protection Authority (EPA) in consideration of NSW Government Environmental Management System (EMS) Guide (2009), and other applicable guidelines, regulations, and standards.

The site boundary and areas subject to this EMP are outlined in **Figure 2, Appendix A**.

## 1.2 EMP Objectives

The principal objectives of the EMP are:

- To provide a summary of the status of residual contamination;

- Document the site containment infrastructure (capping layer system);
- To outline roles and responsibilities for implementation of the EMP;
- To outline requirements for the effective management of contamination remaining at the site;
- Provide a framework for ongoing environmental management, monitoring and reporting requirements of the site during future disturbance of the designated remediation areas; and
- Provide scope of review and revisions to the EMP as necessary to ensure appropriateness of the EMP and maintain its currency into the future.

This EMP should meet requirements of the NSW EPA (2017) and NSW EPA (2020). The EMP has been approved by NSW Department of Education, City of Ryde Council, and the NSW EPA-accredited Site Auditor.

## 1.3 Scope Works

The following scope of works were undertaken to address the project objectives:

- A desktop review of previous reports; and
- Data assessment and reporting.

The nominated scope of works was undertaken with reference to relevant sections of NEPC (2013), NSW EPA (2020b), DIPNR (2004), WA DOH (2009) and (DoE 2020).

# 2 Purpose

## 2.1 Reason, Purpose and Timeframe

The reason for this EMP is to provide a strategy for the management of residual land contamination at the site.

The purpose of this EMP is to facilitate the mitigation of unacceptable human health and/or ecological exposure risks to users of the site from the residual land contamination, within the scope of the proposed land use scenario, and to prevent degradation of the surrounding environment, both on-site and offsite.

This EMP:

- Comes into effect immediately upon the site transitioning from a construction phase to an operational phase;
- Will remain in force until such time as one or more of the following occurs:
- Is superseded by a new or updated EMP; or
- The contamination is remediated in such a way that ongoing management is no longer required.

In the event that ongoing management of contamination is no longer required, then it may be appropriate to remove the notation on the site's planning certificate and/or covenant on title, of the requirement for this EMP.

## 2.2 EMP Audience

This EMP has been prepared for the site owner, NSW Department of Education, who are occupying and responsible for the management of the site. Contact information is provided in **Table 6.1.1**.

## 2.3 About this EMP

This EMP is considered passive as there are no active management requirements that could potentially fail due to a power outage or mechanical malfunction. Given that the nature of contamination (asbestos, heavy metals, and benzo(a)pyrene) capped onsite, this EMP is to be implemented in perpetuity to ensure the site continues to be suitable for the intended land use as a primary and secondary school.

Alliance considers that the EMP should be included as required in the Dial Before You Dig (DBYD) information for the site, due to the following:

- There is an existing stormwater culvert (existing Sydney Water and Council DBYD Plans) entering the site through Rhodes Street. The culvert runs from opposite 7-9 Rhodes Street and south, through the site and known AEC101 containment area.

## 2.4 Legal Enforceability

This EMP is considered to be legally enforceable based on:

- Opinions sought from the relevant authority (i.e., the NSW Environment Protection Authority (EPA) or the local planning consent authority) on the legality of the EMP; and

- Advice from the local planning consent authority that exempt and complying development permitted on the land that this site falls on, will not be affected by the residual contamination.

Neither NSW EPA nor the local planning consent authority require financial assurance in the context of implementing this EMP.

To ensure effectiveness for the EMP, it must be legally enforceable. The EMP will be enforceable as it will need to meet State Significant Development (ref. SSD 9343) and City of Ryde (ref. LDA2019/0436) Development Condition of Consent.

In particular, the requirements to meet Consent Condition No. 3 of LDA2019/0436 are presented as follows:

3. **Remediation of land**. The land must be remediated to the extent necessary for the proposed use and a copy of the site validation report must be submitted to Council for consideration. The site validation report must comply with the Guidelines for Reporting on Contaminated Land (EPA, 2020) the *DECCW (2010) UPSS Technical Note: Site Validation Reporting* and demonstrate that the site is suitable for the proposed use.

   If requested by Council, a site audit statement and a site audit summary report from an accredited site auditor under the *Contaminated Land Management Act 1997* must be submitted to Council verifying the information contained in the site validation report.

   Where the ongoing land use suitability and release of the Site Audit Statement is dependent upon the implementation of an Environmental Management Plan (EMP) in relation to any residual contamination remaining onsite, the EMP must be approved by the Site Auditor and the Council prior to the issue of the Site Audit Statement.

   The owner of the land is required to comply with the ongoing obligations of any EMP which forms part of the Site Audit Statement for the site.

The implementation of the EMP will comply with all applicable legislation and regulatory instruments, standards, and frameworks in practice at the time of its application. The EMP will remain in force for the life of the proposed development, or until any remediation of the soil renders the area suitable for the intended land use(s) without the need for the containment and capping of potentially impacted soils.

## 2.5 Active or Passive

The methods being implemented to manage residual contamination are considered to be passive in nature, on the basis that the methods implemented (if left undisturbed) do not require human intervention to ensure the ongoing performance of those methods.

## 2.6 Responsible Parties

The parties responsible for implementation and review / maintenance of this EMP, and their associated tasks, are set out in **Section 6.5**.

## 2.7 Location of EMP

The controlled master copy of this EMP will be held by the Asset Management Unit (AMU) onsite within the O&M Manual.

# 3 Site Identification and Site Environmental Setting

Site identification details and associated information is present in **Table 3.1.1**. The locality of the site is presented in **Figure 1, Appendix A**, with the general layout and site boundaries presented on **Figure 2, Appendix A**.

**Table 3.1.1 Site Identification Information**

| | |
|---|---|
| **Site Address** | 2 Rhodes Street, Meadowbank, NSW |
| **Site Owner** | NSW Department of Education |
| **Cadastral Identification** | Lot 10 in Deposited Plan (DP) 1232584 |
| **Geographical Coordinates** | S: 33 48'46" E: 15105'27" (Source: Google Earth) |
| **Total Site Area** | 3.329 hectares (Source: Six Maps - https://maps.six.nsw.gov.au/) |
| **Zoning** | SP2 – Infrastructure (Ryde Local Environmental Plan 2014) |
| **Current Land Use** | Primary and Secondary School |
| **Local Government Area** | City of Ryde Council |
| **Geology** | A review of the Sydney 1;100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicated that the site is underlain by Middle Triassic Hawkesbury Sandstone (Rh), which is comprised of medium to coarse grained quartz sandstone, very minor shale and laminite lenses. A portion of the eastern boundary of the site is in close proximity to Ashfield Shale, which is comprised of black to dark grey shale and laminite. |
| **Soil Landscape** | Reference to the Sydney Soil Landscape 1:100 000 Map Sheet the site is within an area of Lucas Heights soil. This soil type is characterised by moderately hard setting Yellow Podzolic Soils and Yellow Soloths, and Yellow Earths on outer edges of crests.<br>(Source: https://www.environment.nsw.gov.au/eSpade2WebApp) |
| **Topography** | The site topography is generally flat, with minor slopes generally towards the south and southeast, and in the northern portion, towards the east.<br>Surveys included in **Appendix B** provides further information on surface contours and elevations. |
| **Site Drainage** | Drainage in hardstand areas is likely to be collected and discharged to the municipal stormwater system. Drainage in unsealed areas (i.e., landscaped areas etc.) in likely to consist of direct soil infiltration and overland flow. |
| **Nearest Surface Waterbody** | Parramatta River, approximately 400 m to the south of the site. |
| **Adjacent Land Uses** | • North: Commercial/ light industrial properties, including mechanical workshop, tyre shop, café, and smash repairers;<br>• East: An electrical substation and TAFE NSW Meadowbank Campus;<br>• South: TAFE NSW Meadowbank Campus; and<br>• West: Sydney Trains Rail corridor |

## 3.1 Summary of previous contamination onsite that required management

Previous contamination reports conducted at the site indicate that the site was historically used as a water handling facility, manufacturing of agricultural items, tramcars, railway rolling stock, vehicles, and engines and for tertiary education (TAFE).

Based on the above historical land uses, potential contaminants of potential concern (COPC) requiring investigation included heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), pesticides, polychlorinated biphenyls (PCB), Volatile Organic Compounds (VOCs) and asbestos. The requirement for a groundwater investigation was also included in Remediation Action Plan (RAP) dated March 2020 (Alliance 2020) with tetrachloroethene (PCE) as the COPC. However, based on further groundwater assessment during remedial works, Alliance assessed that the groundwater at the site did not pose an unacceptable human health risk to future users.

The RAP (Alliance 2020) identified Areas of Environmental Concern (AECs) and associated Contaminants of Potential Concern (COPCs), as outlined in **Table 3.2.1**:

**Table 3.2.1 AEC and COPC**

| Area of Environmental Concern | Contaminant of Potential Concern | Media | Maximum Concentrations Recorded within AEC (mg/kg) / (w/w%) |
|---|---|---|---|
| **AEC04** | Benzo(a)pyrene TEQ | Soil | 8.4 |
| **AEC101** | Benzo(a)pyrene TEQ & Asbestos | Soil | 18/ 0.005 (AF/FA) |
| **AEC06** | Benzo(a)pyrene TEQ | Soil | 8.5 |
| **AEC07** | Copper & Asbestos | Soil | 330/ 0.0013 (AF/FA) |
| **AEC08** | Asbestos | Soil | ACM fragments detected |
| **AEC10** | Asbestos | Soil | ACM fragments detected |
| **AEC12** | Copper | Soil | 550 |
| **AEC14** | Asbestos | Soil | 0.001 (AF/FA) |
| **TPZs*** | Asbestos | Soil | 0.005 (AF/FA), 0.329 (Bonded-Field) & 0.84 (Bonded-Lab) |

** Areas within tree protection zones for native species of trees to be retained onsite – TPZ-1 to TPZ-4, and TPZ-F.*

Alliance notes that AEC04, AEC07 and AEC12 were remediated by way excavation and off-site disposal and reported in interim Site Validation Report no.1 (ref: 10834-ER-4-1_Rev01) prepared by Alliance (2020).

The remaining AECs (AEC06, AEC08 and AEC10, AEC14, AEC101, TPZ-1 to TPZ-4) were remediated by way onsite cap and containment and are subject to implementation of this EMP. The subject AECs are shown in **Figure 2, Appendix A**.

# 4 Implementing the Long-Term Environmental Management Plan

## 4.1 Stakeholders and Responsibilities

The key stakeholders involved in the development of this EMP are listed in **Table 4.1.1**.

**Table 4.1.1 Key Stakeholders**

| Key Stakeholder | Role | Responsibility |
|---|---|---|
| NSW Department of Education c/- Colliers International | Current Site Owner<br>Site Development & Construction | ▪ Compliance with EMP.<br>▪ Notification to contractors, tenants, and site occupiers of the existence of a EMP and provision of a copy of the current EMP.<br>▪ Registration of details of the Site Audit Statement and EMP on the Certificate(s) of Title under Section.88B of the Conveyancing Act 1919 and notation on the planning certificate(s) issued under Section 10.7 of the EPA Act 1979.<br>▪ Notification of restrictions applying to the land to ensure that potential purchasers or other interested individuals are aware of the restrictions listed on the Certificate(s) of Title under Section.88B of the Conveyancing Act 1919 and notation on the planning certificate(s) issued under Section 10.7 of the EPA Act 1979.<br>▪ Notification to Future Site Owner(s) of existence of an EMP and provision of a copy of the current EMP. |
| City of Ryde | Council | ▪ Provision of written confirmation of acceptance of the EMP as per Condition 8.7.1 of the Notice of Determination.<br>▪ Entity for legal enforcement of the EMP.<br>▪ Enforcement of Site Audit Statement and EMP registration on Certificate(s) of Title under Section.88B of the *Conveyancing Act 1919* and notation on the planning certificate(s) issued under Section 10.7 of the EPA Act 1979. |
| Rebeka Hall<br>(Geosyntec Consultants Pty Ltd) | (NSW EPA-Accredited Site Auditor No. 0802) | ▪ Review and approval of EMP.<br>▪ Preparation of Site Audit Statement and Site Audit Report.<br>▪ Review of updates, revisions, or amendments of the EMP as applicable. |
| - | Future Site Owner(s) | ▪ Registration of details of Site Audit Statement and EMP on Section 10.7 Planning Certificate.<br>▪ Registration of details of Site Audit Statement and EMP on Certificate(s) of Title.<br>▪ Notification to tenants and site occupiers of the existence of a EMP and provision of a copy of the current EMP.<br>▪ Implementation of, and compliance with the EMP.<br>▪ Implementation of management measures including routine inspection and record keeping outlined in **Section 6.**<br>▪ Notification to contractors of existence of the EMP and provision of a copy of the current EMP.<br>▪ Notification to next Future Site Owner of the existence of an EMP on the Certificate(s) of Title under Section.88B of the Conveyancing Act 1919 and notation on the planning certificate(s) issued under Section 10.7 of the EPA Act 1979.<br>▪ Provision of a copy of the current EMP. |

| Key Stakeholder | Role | Responsibility |
|---|---|---|
| - | Contractors, Sub-contractors, Employees | Civil works, maintenance and repair, service installation.<br>Compliance with EMP.<br>Inclusion of EMP in preparation of a Construction Environmental Management Plan (CEMP).<br>Safe Work Method Statement (SWMS) during any site works. |

## 4.2 Amendment to the EMP

The EMP must be amended and re-issued under the following circumstances:

- Where there is a change in land-use;
- Where the capping layer is removed or modified (other than for maintenance purposes);
- Services trenches, stormwater pipes or other infrastructure are removed or modified (other than for maintenance purposes);
- There is a modification to Certificate(s) of Title;
- The capping layer is compromised and no longer provides adequate physical separation from the contained impacted material;
- The impacted material beneath the capping system is found to be different to that described in this EMP; and
- There is a modification to NSW environmental or planning legislation affecting EMP implementation and compliance.

The site owner(s) is/are responsible for the amendment of the EMP, where amendment is required. The site owner(s) is/are responsible for the provision of revisions of the EMP to City of Ryde (entity responsible for legal enforcement of the EMP), as per the conditions of the development consent.

Any amendments to the EMP, required or made, are to be completed by a suitably qualified environmental consultant. All amendments to the EMP are to be reviewed by the appointed NSW EPA-Accredited Site Auditor.

## 4.3 Distribution of the EMP

The EMP, and any subsequent revisions, must be distributed to the following parties:

- The appointed NSW EPA-accredited Site Auditor;
- City of Ryde (Planning and Regulatory Authority);
- Contractors responsible for management, maintenance, and inspection of associated infrastructure and services;
- Tenants and site occupiers of the existence of an EMP and provision of a copy of the current EMP; and

- Future Site Owners (considering the existence of an EMP on the Certificate(s) of Title under Section.88B of the Conveyancing Act 1919 and notation on the planning certificate(s) issued under Section 10.7 of the EPA Act 1979.

The site owner(s) is/are responsible for the distribution of the EMP, and the provision of any subsequent revisions to City of Ryde (entity responsible for legal enforcement of the EMP), as per the conditions of the development consent.

## 4.4 Cessation of the EMP

The EMP will remain in force for the duration of time that the impacted fill remains contained beneath the onsite capping layers. Should there be a requirement in the future for a breach of capping layers and for the impacted material to be removed from the site, the EMP may cease and be removed from the Certificate of Title and Planning Certificate, where:

- Any plan for the cessation of the EMP, whereby impacted soils managed under the EMP is to be removed from the site, either by waste classification and disposal, or any alternate strategy setting out the intention to cease contamination management is to be reviewed and approved by the appointed NSW EPA Accredited Site Auditor and relevant regulatory and/or consent authority (Council);

- Impacted soil is removed from the containment area, waste classified according to NSW EPA (2014) Waste Classification Guidelines (or equivalent in force at the time) and disposed offsite to an appropriately licensed landfill facility;

- Validation of the area to which the EMP applies, and any waste classification documents and disposal records of the impacted material, is to be documented in a Validation Report; and

- The Validation Report is to be reviewed by the appointed NSW EPA Accredited Site Auditor. Were the appointed NSW EPA Accredited Site Auditor is satisfied that the area managed by the EMP has been validated, and there is sufficient evidence the containment and capping system is no longer required, then a Site Audit Statement noting the suitability of the area for use without the need for protection measures and ongoing management, will be prepared. At that point, application can be made to the relevant authorities for cessation of the EMP and removal from title.

The existing EMP will remain in force until approval to cease has been received by NSW Department of Education.

# 5 Pre-existing & Residual Contamination

## 5.1 Identified Soil Contamination

As discussed in previous reporting for the site (Alliance 2018a, 2018b, 2019a, 2019b and 2020a), it was established that contamination was widely distributed across most of the site. Unacceptable contamination exceeding National Environment Protection Council 2013 (NEPC 2013) Human Health HIL-A, and HSL-A&B land use criteria, included:

- Lead at 3 sample locations;
- Benzo(a)Pyrene (B(a)P) at 3 sample locations;
- Non-friable (bonded) asbestos at 19 sample locations; and
- Friable asbestos in the form of Asbestos Fines / Fibrous Asbestos (AF/FA) in fill soils at 9 sample locations.

Alliance notes that there were three (3) locations that recorded copper concentrations above the Ecological Investigation Levels (EILs) for Urban Residential and Public Open Space.

All other COPCs, including heavy metals (As, Cd, Cr, Cu, Hg, Ni, Zn), total recoverable hydrocarbons (TRH), monocyclic aromatic hydrocarbons: benzene, toluene, ethylbenzene, and xylenes (BTEX), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), polychlorinated biphenyls (PCB) and volatile organic compounds (VOCs), analysed for during previous investigation, were reported below adopted NEPC (2013) HIL-A and HSL-A&B land use criteria at the site.

Unacceptable contamination exceeding National Environment Protection Council 2013 (NEPC 2013) Ecological Investigation Level (EIL) and Ecological Screening Levels (ESL) and land use criteria, included:

- Copper at 1 sample location.

AECs impacted by friable asbestos (AF/FA), lead, B(a)P and non-friable (bonded) ACM in fill materials, were considered suitable for remedial excavations and cap and containment onsite.

Alliance notes that the ‘cap and contain’ remediation strategy was adopted due to financial disadvantages following the data gap assessment and the commencement of remediation in AEC07 (East and West), as the observable depth of impacted fill materials encountered, was greater than had been anticipated. In keeping with Alliances understanding of the project objectives (taking into consideration the proposed development plans and proposed cut and fill areas across the site), the modified site-wide selected remedial strategy comprised a combination of ‘excavation and offsite disposal’ of selected areas and ‘capping and isolation’ of impacted soils where feasible, with areas where ‘capping and isolation’ potentially broadened/maximised so as to reduce the significant economic impact of offsite disposal.

## 5.2 Cap & Containment – Subject AECs

Impacted soils have been retained within Tree Protection Zones (TPZs), AEC101, AEC07, AEC08 (including AEC06 and AEC10) and AEC14. Proposed capping depths adopted are summarised in **Table 5.1.1.** Surveyed capping layer depths following remediation are presented in **Section 5.4**. Sample points and remaining exceedances are shown on **Figures 3** to **5**, **Appendix A**.

**Table 5.1.1 Profile of Containment and Proposed Capping Layer System**

| Subject Area | Pavement Type | Capping Material Depth (m) | Total Capping Layer Depth (m) | Stormwater Trench Isolation – capping layer |
|---|---|---|---|---|
| TPZs (TPZ-1 to TPZ-4) | - | Sandy loam topsoil (0.15m) underlying quarried sandstone pebbles (0.3m) | 0.45m | - |
| AEC101 | - | Crushed Sandstone (1.0m) | 1.0m | maximum of 0.5m blow pipe invert level and 1m wide |
| AEC06, AEC08 and AEC10 | Pavement Type 1/ 7 | DGB20 (0.1m) underlying Concrete 32MPa F82 Mesh (0.12m) / Concrete (0.1m) underlying stone set (0.01m) | 0.22m/ 0.11m | maximum of 0.5m blow pipe invert level and 1m wide |
| | Pavement Type 2 | DGB20 (0.1m) underlying Concrete 32MPa F82 Mesh (0.15m) | 0.25m | |
| | Pavement Type 3 | DGB40 (0.1m) underlying DGB20 (0.1m) underlying Crusher dust with Astroturf finish (0.02m) | 0.22m | |
| | Non-Paved Area | Crushed Sandstone (1.0m) | 1.0m | |
| AEC14 | Pavement Type 2 | DGB20 (0.1m) underlying Concrete 32MPa F82 Mesh (0.15m) | 0.25m | maximum of 0.5m blow pipe invert level and 1m wide |
| | Non-Paved Area | Crushed Sandstone (1.0m) | 1.0m | |

As residual fill remains along the boundaries of AEC07, AEC08, AEC101 and AEC14 from a workplace health and safety standpoint, a decision was made in consultation with a licensed asbestos assessor (LAA), to place and pin the approved high- visibility geotextile membrane material along the wall/ boundaries of AEC's where fill materials would be exposed during school construction. As per the requirements of the RAP, the site auditor had endorsed the 'Profab Geotextile Indicator Marker Layer (AS140/Orange)' prior to use onsite (email dated 22 July 2020). The geotextile membrane was placed in accordance with WA DoH (2009) 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia' and as per the validation requirements in Alliance RAP.

The pavement plan and the associated depths (pavement and TPZ plans) are included in **Appendix B**. The summary of containment of impacted materials within each AEC is as follows, with surveyed capping layer detail provided in **Section 5.4**:

- The top 0.15m of the fill materials within the TPZs were waste classified and removed offsite to a licensed tipping facility. The exposed surface was covered with high visibility geotextile cover and capped with 0.45m of landscaping materials overlying quarried sandstone pebble;
- Fill materials within AEC06,08&10, AEC14 and AEC101 that exist along the proposed inground stormwater service trench was excavated down to a maximum depth of about 0.5m below proposed invert levels and 1m wide and backfilled with approved VENM;
- The top 1m of AEC101 was excavated and removed offsite to a licenced tipping facility. The in-situ impacted fill materials were subject to characterisation and an assessment of leachability was also undertaken on selected samples. AEC101 was capped with 1m of approved VENM;
- The in-situ impacted fill materials within AEC06, AEC08 and AEC10 were subject to characterisation and an assessment of leachability was also undertaken on selected samples. The impacted fill

materials were stripped and stockpiled temporarily. Impacted soils within AEC06, AEC08 and AEC10 were excavated up to 3m depth below ground surface, into the underlying natural materials and backfilled with impacted fill materials (materials sourced from AEC06, AEC08, AEC10 and AEC14), in preparation for capping. AEC06, AEC08 and AEC10 was capped with 1m of VENM in locations where pavement / hardstand was not proposed. The proposed pavement areas within AEC06, AEC08 and AEC10 were capped with 0.22m to 0.25m of materials (refer to **Table 5.1.1**);

- The in-situ impacted fill materials within AEC14 were subject to characterisation and an assessment of leachability was also undertaken on selected samples. The fill materials were stripped and temporarily. Impacted soils within AEC14 were excavated up to 3m depth below ground surface, into the underlying natural materials and backfilled with impacted fill materials (materials from AEC07 and trench spoil from adjacent AECs), in preparation for capping. AEC14 was capped with 1m of VENM in locations where pavement / hardstand was not proposed. The proposed pavement areas within AEC14 were capped with 0.25m of materials comprising 0.1m DGB20 underlying 0.15m of reinforced concrete.

## 5.3 Characterisation of Residual Fill Materials

### 5.3.1 AEC07-East – Copper, Benzo(a)Pyrene and Asbestos Impacted Soils

Upon removal/ remediation of AEC07-East, the walls of the excavations (at the boundaries of AEC07-East), where there was exposed residual fill, were subject to site characterisation sampling and testing. The perimeter of AEC07-East, where fill materials were exposed was about 400m. Alliance collected a total 143 asbestos wall validation samples and 67 chemical wall validation samples. The exposed wall materials encountered can generally be described as a combination of silty SAND, clayey SAND, and gravelly CLAY. The exceedances are summarised in below **Table 5.3.1**.

**Table 5.3.1 AEC07-East – Site Characterisation Wall Soil Sample Exceedances**

| Sample ID/ Depth (m) | Asbestos (%w/w) | B(a)P (mg/kg) | Copper-Cu (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's/HSL's (mg/kg)/ (% w/w) |
|---|---|---|---|---|---|---|---|
| VS-7E-W17 (0.5) | - | 9.1 | - | - | - | NA | NA |
| VS-7E-W41 (0.9) | - | - | 280 | 560 | - | 170 (Cu), 497 (Zn) | 300 (Pb) |
| VS-7E-W43 (1.5) | - | - | 210 | - | - | 170 (Cu) | NA |
| VS-7E-W49 (1.0) | - | - | - | 300 | - | NA | 300 (Pb) |
| VS-7E-W51 (1.2) | - | - | - | 300 | - | NA | 300 (Pb) |
| VS-7E-W53 (0.8) | - | - | - | 640 | - | NA | 300 (Pb) |
| VS-7E-W55 (0.1) | - | - | - | 520 | - | NA | 300 (Pb) |
| VS-7E-W65 (0-1.0)/ DUP0 | - | - | 220 | 1600/1700 | 1300/1500 | 170 (Cu), 1100 (Pb) & 497 (Zn) | 300 (Pb) |
| VS-7E-W65 (1.0-2.0) | - | - | - | 1100 | 1100 | 170 (Cu), 1100 (Pb) | 300 (Pb) |
| VS-7E-W67 (1.0-2.0) | 0.215 (ACM) | - | - | - | - | NA | 0.01 |
| VS-7E-W70 (2.0-2.8) | 0.0025 (AF/FA) | - | - | - | - | NA | 0.001 |
| VS-7E-W75 (0-1.0) | - | - | - | 840 | - | NA | 300 (Pb) |
| VS-7E-W75 (1.0-2.0) | - | - | - | 310 | - | NA | 300 (Pb) |

NA: Not Applicable

There were two samples, VS-7E- W64 (0.0m-0.9m) and VS-7E- W79 (0.0m-0.3m), that recorded friable asbestos at concentration below the adopted site criteria. Alliance notes that there may be elevated concentration of TRH, PAH, heavy metals and asbestos along the boundary of subject AEC, that was not subject to testing.

The soil sample exceedances listed in **Table 5.3.1** are impacted fill materials that have been covered with a geotextile membrane separation layer. Leachability analysis has been undertaken on elevated concentrations and considers the contaminants to be non-leachable, are considered not to pose a risk to future site users and ecological receptors.

### 5.3.2 AEC07-West – Asbestos Impacted Soils

Upon removal/ remediation of AEC07-West, the walls of the excavations (at the boundaries of AEC07-West), where there was exposed residual fill, were subject to site characterisation sampling and testing. The perimeter of AEC07-East, where fill materials were exposed was about 270m. Alliance collected a total 89 asbestos wall validation samples and 45 chemical wall validation samples. The exposed wall materials encountered can generally be described as a combination of silty SAND, clayey SAND, and gravelly CLAY. The exceedances are summarised in below **Table 5.3.2**.

**Table 5.3.2 AEC07-West – Site Characterisation Wall Soil Sample Exceedances**

| Sample ID/ Depth (m) | Chromium (mg/kg) | Nickel (mg/kg) | Copper-Cu (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's (mg/kg) |
|---|---|---|---|---|---|---|---|
| VS-7W-W16 (0-1.0) | - | - | 440 | - | - | 170 (Cu) | - |
| VS-7W-W32 (0-1.0)* | 150 | 240 | - | - | - | 162 (Ni) | 100 (Cr) |
| VS-7W-W32 (1.0-1.6)* | 110 | 210 | - | - | 1200- | 162 (Ni) & 497 (Zn) | 100 (Cr) |
| DUP K* | - | - | 190 | - | - | 170 (Cu) | - |
| VS-7W-W36 (0-1.0)* | - | - | - | - | 1900 | 497 (Zn) | |
| VS-7W-W36 (1.0-1.4)* | - | 170 | - | - | - | 162 (Ni) | - |
| VS-7W-W40 (0-1.0)* | 130 | 180 | - | - | - | 162 (Ni) | 100 (Cr) |
| VS-7W-W42 (0-1.0)* | 130 | 230 | - | - | - | 162 (Ni) | 100 (Cr) |
| VS-7W-W45 (0-1.0)* | - | - | 1400 | 460 | 530 | 170 (Cu) & 497 (Zn) | 300 (Pb) |
| VS-7W-W45 (1.0-2.0)* | - | - | 990 | 380 | - | 170 (Cu) | 300 (Pb) |
| VS-7W-W53 (0-0.1) | - | - | - | 320 | - | - | 300 (Pb) |

The soil sample exceedances listed in **Table 5.3.2** are impacted fill materials that have been covered with a geotextile membrane separation layer. Leachability analysis has been undertaken on elevated concentrations and considers the contaminants to be non-leachable, are considered not to pose a risk to future site users and ecological receptors.

### 5.3.3 AEC101 – Benzo(a)Pyrene and Asbestos Impacted Soils

Site characterisation of the residual fill materials to be capped was conducted on 30 September 2020 and included testing for Heavy Metals, PAHs, and TRH (if required). Based on the previous assessments conducted within AEC101, the impacted fill materials contained friable asbestos in the form of AF/FA and non-friable (bonded) asbestos exceeding the adopted site assessment criteria.

As part of the site characterisation for AEC101, Alliance collected a total of 11 soil samples at varying depths. The encountered fill materials can generally be described as a combination of Gravelly CLAY, Gravelly SAND and Sandy CLAY. The exceedances are summarised in below **Table 5.3.3**.

**Table 5.3.3 AEC101 – Site Characterisation Soil Sample Exceedances**

| Sample ID/ Depth (m) | B(a)P (mg/kg) | Copper-Cu (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's (mg/kg) |
|---|---|---|---|---|---|---|
| SC-101-TP02 2.8-3.0 | - | **310** | **2,400** | **680** | 170 (Cu), 1100 (Pb) & 497 (Zn) | 300 (Pb) |

Upon removal of approximately 1m of impacted soils within AEC101, the walls of the excavations (at the boundaries of AEC101), where there was exposed residual fill, were subject to site characterisation sampling and testing. The perimeter of AEC101, where fill materials were exposed was about 260m. Alliance collected a total 55 asbestos wall validation samples and 28 chemical wall validation samples. The exposed wall materials encountered can generally be described as a combination of silty SAND, clayey SAND, and gravelly CLAY. The exceedances are summarised in below **Table 5.3.4**.

**Table 5.3.4 AEC101 – Wall Soil Sample Exceedances**

| Sample ID/ Depth (m) | Asbestos (%w/w) | TRH (F3) (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's/HSL's (mg/kg)/ (% w/w) |
|---|---|---|---|---|---|---|
| VS-101-W41/ 0.0-0.2 | 0.004% | - | 360 | - | - | 300 (Pb)/ 0.001 (AF/FA) |
| VS-101-W43/ 0-0.2 | | 450 | - | - | 300 (F3) | - |
| VS-101-W51/ 0-1.0 | 0.156 (ACM) | | | | | 0.01 (ACM) |
| VS-101-W52/ 0-0.8 | 0.01 (AF/FA)/ 0.108 (ACM) | - | - | - | - | 0.001 (AF/FA)/ 0.01 (ACM) |
| VS-101-W53/ 0-0.6 | 0.004 (AF/FA)/ 0.34 (ACM) | - | - | - | - | 0.001 (AF/FA)/ 0.01 (ACM) |
| VS-101-W54/ 0-0.4 | 0.03 (AF/FA)/ 0.3 (ACM) | - | - | - | - | 0.001 (AF/FA)/ 0.01 (ACM) |
| VS-101-W55/ 0.0-0.2 | 0.001 (AF/FA)/ 0.3 (ACM) | - | 430 | - | - | 300 (Pb), 0.001 (AF/FA), 0.01 (ACM) |
| VS-101-W10/ 0-0.2 | 0.0014 (AF/FA) | - | - | - | - | 0.001 (AF/FA) |
| VS-101-DUP4 (duplicate of VS-101-W55/ 0.0-0.2) | | - | 400 | - | - | 300 (Pb) |

The soil sample exceedances listed in **Table 5.3.3** and **Table 5.3.4** are impacted fill materials that have been covered with a geotextile membrane separation layer and capped with approved VENM materials. Refer to capping detail provided in **Section 5.4.**

Leachability analysis has been undertaken on elevated concentrations and considers the contaminants to be non-leachable, are considered not to pose a risk to future site users and ecological receptors.

### 5.3.4 AEC06, AEC08 and AEC10 – Benzo(a)Pyrene and Asbestos Impacted Soils

Site characterisation of the residual fill materials to be capped was conducted on 28 and 29 July 2020 and included testing for Heavy Metals, PAHs, and TRH (if required). Based on the previous assessments conducted within the subject area, the impacted fill materials contained non-friable (bonded) asbestos and B(a)P concentrations exceeding the adopted site criteria.

As part of the site characterisation for AEC06, AEC08 and AEC10, Alliance collected a total of 15 soil samples at varying depths within the impacted fill materials encountered. The encountered fill materials can generally be described as a combination of Gravelly CLAY, Gravelly SAND, Clayey SAND and Sandy CLAY. The exceedances are summarised in below **Table 5.3.5**.

**Table 5.3.5 AEC06, AEC08 and AEC10 – Site Characterisation Soil Sample Exceedances**

| Sample ID/ Depth (m) | B(a)P (mg/kg) | Chromium (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's (mg/kg) |
|---|---|---|---|---|---|---|
| PCA_8/ 1.4 | - | **160** | - | - | - | 100 (Cr) |
| OPCA_3/ 0.1 | - | - | - | **1,800** | 497 (Zn) | - |

Upon removal of impacted soils within AEC06,08&10, the walls of the excavations (at the boundaries of AEC08), where there was exposed residual fill, were subject to site characterisation sampling and testing. The perimeter of AEC08, where fill materials were exposed was about 205m. Alliance collected a total 47 asbestos wall validation samples and 23 chemical wall validation samples. The exposed wall materials encountered can generally be described as a combination of silty SAND, clayey SAND, and gravelly CLAY. The exceedances are summarised in below **Table 5.3.6**.

**Table 5.3.6 AEC08 – Wall Soil Sample Exceedances**

| Sample ID/ Depth (m) | Asbestos (%w/w) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria – EIL's (mg/kg) | Validation Criteria – HIL's/HSL's (mg/kg)/ (% w/w) |
|---|---|---|---|---|---|
| VS-08-W39/ 0.0-1.0 | - | 570 | 530 | 497 (Zn) | 300 (Pb) |
| VS-08-W41/ 0.0-1.0 | | 410 | - | - | 300 (Pb) |

The soil sample exceedances listed in **Table 5.3.5** and **Table 5.3.6** are impacted fill materials that have been covered with a geotextile membrane separation layer and capped with approved VENM materials. Refer to capping detail provided in **Section 5.4.**

Leachability analysis has been undertaken on elevated concentrations and considers most of the contaminants to be non-leachable, except for soil sample OPCA_3/ 0.1m, of which recorded a leachable concentration of 9.1mg/L for Zinc.

As a result, Alliance supervised removal of zinc impacted materials from an area (representing the lateral extent of OPCA_3) of 10.0 m x 15.0 m and a depth of 0.15m. The impacted materials were excavated, waste classified (refer to Alliance report 10834-ER-2-6 (IA12), dated 20 August 2020) and disposed offsite to a tipping facility. The waste disposal is discussed in interim Site Validation Report (Alliance 2021).

Validation soil samples were collected from the walls and base of the excavation and analysed for Zinc. Validation results for samples were all below adopted site criteria for zinc.

### 5.3.5 AEC14 – Benzo(a)Pyrene and Asbestos (AF/FA) Impacted Soils

Site characterisation of the residual fill materials to be capped was conducted on 1 October 2020 and included testing for Heavy Metals, PAHs, and TRH (if required). Based on the previous assessments conducted within the subject area, the impacted fill materials contained asbestos (AF/FA) and B(a)P concentrations exceeding the adopted site criteria.

As part of the site characterisation for AEC14, Alliance collected a total of nine soil samples at varying depths within the impacted fill materials encountered. The encountered fill materials can generally be described as a combination of Gravelly CLAY, Gravelly SAND, Clayey SAND and Sandy CLAY. The exceedances are summarised in below **Table 5.3.7**.

**Table 5.3.7 AEC14 – Site Characterisation Soil Sample Exceedances**

| Sample ID/ Depth (m) | B(a)P (mg/kg) | Chromium (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's (mg/kg) |
|---|---|---|---|---|---|---|
| SC-14-TP9/ 0.4-0.5 | - | - | **350** | - | - | 300 (Pb) |

Upon removal of impacted soils within AEC14, the walls of the excavations (at the boundaries of AEC14), where there was exposed residual fill, were subject to site characterisation sampling and testing. The perimeter of AEC14, where fill materials were exposed was about 165m. Alliance collected a total 34 asbestos wall validation samples and 17 chemical wall validation samples. The exposed wall materials encountered can generally be described as a combination of silty SAND, clayey SAND, and gravelly CLAY. The exceedances are summarised in below **Table 5.3.8**.

**Table 5.3.8 AEC14 – Wall Soil Sample Exceedances**

| Sample ID/ Depth (m) | Asbestos (%w/w) | B(a)P (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria – EIL's (mg/kg) | Validation Criteria – HIL's/HSL's (mg/kg)/ (% w/w) |
|---|---|---|---|---|---|
| VS-14-W20/ 0.0-1.0 | 0.04 (ACM) | - | - | - | 0.01 (ACM) |
| VS-14-W9/ 0.0-0.5 | 0.006 (AF/FA) | - | - | - | 0.001 (AF/FA) |
| VS-14-W18/ 0.0-0.7 | 0.017 (ACM) | - | - | - | 0.01 (ACM) |
| VS-14-W27/ 0.0-1.0 | - | - | 590 | 497 (Zn) | - |
| VS-14-W31/ 0.0-0.1 | - | 7.1 | - | - | 3 (B(a)P) |

The soil sample exceedances listed in **Table 5.3.7** and **Table 5.3.8** are impacted fill materials that have been covered with a geotextile membrane separation layer and capped with approved VENM materials. Refer to capping detail provided in **Section 5.4.**

Leachability analysis has been undertaken on elevated concentrations and considers the contaminant to be non-leachable (SC-14-TP9/ 0.4-0.5 at 0.3mg/L for lead), is considered not to pose a risk to future site users and ecological receptors.

### 5.3.6 Central Hardstand Area – Site Characterisation

Alliance conducted site characterisation assessment of the central hardstand area on 26 and 27 November 2020. The assessment included excavation of nine (9) test pits to termination depths ranging 2.8m to 4.1m below ground level (bgl). The exceedance recorded are summarised in below **Table 5.3.9**.

**Table 5.3.9 Central Hardstand Area – Site Characterisation Soil Sample Exceedance**

| Sample ID/ Depth (m) | B(a)P (mg/kg) | Chromium (mg/kg) | Lead-Pb (mg/kg) | Zinc-Zn (mg/kg) | Validation Criteria - EIL's (mg/kg) | Validation Criteria - HIL's (mg/kg) |
|---|---|---|---|---|---|---|
| CH-6 / 2.6-2.8 | **3.2** | - | - | - | - | 3 (B(a)P) |

Alliance notes that one sample (CH9/ 0.0m-1.0m) recorded AF/FA at a concentration (0.00004% w/w) below the adopted site criteria.

The detected concentrations of carcinogenic PAHs in the fill samples analysed, were subjected to statistical analysis using ProUCL 5.1.002 by analysing 27 samples (including all previous samples data, i.e., western boundary of AEC07-west) of the fill profile within central hardstand area. The maximum value of the data set was 3.2mg/kg, the standard deviation of the data set was 0.746, while the 95% upper confidence limit was 1.674mg/kg, which is lower than the adopted direct contact human health exposure criteria for carcinogenic PAHs. Furthermore, Alliance assessed the leachability of PAHs in sample CH6_2.6-2.8 (highest concentration) and determined the PAHs in soils to be non-leachable (all <0.001mg/L).

Alliance notes that the central hardstand area did not require remediation and was assessed to be suitable for the proposed land use.

#### 5.3.7 TPZs (TPZ-1 to TPZ-4) – Asbestos (non-friable and friable) Impacted Soils

Site characterisation of the TPZs (TPZ-1 to TPZ-4) onsite was not conducted due to restriction in relation intrusive assessments. However, based on the previous assessments conducted within the TPZ's, the impacted fill materials contained asbestos in the form of non-friable (bonded) ACM fragments and friable asbestos (AF/FA).

Alliance notes that there were no visible phytotoxic impacts observed on the trees retained within the TPZs.

The impacted fill materials that have been covered with a geotextile membrane separation layer and capped with approved landscaping materials. Refer to capping detail provided in **Section 5.4.**

### 5.4 Risk Mitigation

As discussed in **Section 5.3** impacted soils have been retained in various locations within the site by implementation of the containment and capping strategy detailed in the Remedial Action Plan (RAP) (Alliance, 2020b). Installation of the containment and capping is documented in the interim Site Validation Report (Alliance, 2021). The capping and containment areas subject to this EMP are identified in **Figure 2, Appendix A**, and survey plans are provided in **Appendix B**.

#### 5.4.1 Cap and Containment Cell Details (AEC06, AEC07, AEC08, AEC10, AEC14, TPZ-1 to TPZ-4 and AEC101)

AEC14 and AEC06, AEC08 and AEC10 were used for the accommodation of impacted soils were excavated to create the necessary holding capacity for the containment of impacted soil, with excavation to create void space at both locations reaching an approximate depth of 2.75m for AEC08 and 3.14m for AEC14. Impacted soils were placed into the excavation in discrete layers, then compacted.

The capping system was installed directly over compacted impacted soil. A high visibility geotextile marker layer (ProFab AS140/Orange) was placed directly upon impacted soil over the extent of each containment footprint and across the walls of each AEC (including AEC07 boundaries) and followed by the installation of a 0.22m to 0.25m capping associated with areas with proposed pavement and 1m capping for areas outside of the proposed pavement footprints. This capping system provides adequate physical separation by covering, in accordance with ANZECC (1999). A copy of the specification for the geotextile marker is included in **Appendix F**.

A summary of the capping and containment profile within TPZ's, AEC101, AEC06, AEC07, AEC08, AEC10, and AEC14 are presented in **Tables 5.4.1** to **Table 5.4.5**, respectively.

**Table 5.4.1 Profile of Containment and Capping System (AEC101)**

| Layer | Description | Depth – Upper (m bgl) | Depth – Lower (m bgl) | Volume ($m^3$) |
|---|---|---|---|---|
| Capping Layer | Sandy GRAVEL, medium to coarse grained, orange/pale yellow (crushed sandstone)<br>Geotextile demarcation (orange). | 0.0 | 0.784 – 2.48 | AEC101 Capping – ≈3,847 |
| Impacted Fill Soils | Gravelly CLAY, Gravelly SAND, Sandy CLAY, CLAY; brown to dark grey, with foreign inclusions consisting of fragmented brick and concrete, plastics, Styrofoam, asphaltic gravel, glass, bonded and friable ACM. | 0.784 – 2.48 | 3.0m to 5m | - |
| Natural Residual Soils | CLAY, brown to orange, mottled orange/ red/ grey | >3m – >5 | - | - |

**Table 5.4.2 Profile of Containment and Capping System (AEC06, AEC08 and AEC10)**

| Layer | Description | Softfall area (m bgl) | Pavement 1/ 7 Depth (m) | Pavement 2 Depth (m) | Pavement 3 Depth (m) | Volume ($m^3$) |
|---|---|---|---|---|---|---|
| Capping Layer | Concrete and underlying DGB materials | | ≈0.12/ 0.1 | 0.084 – 0.151 | - | - |
| Capping Layer | Astroturf, Crusher dust and underlying DGB materials | | - | - | 0.159 - 0.419 | - |
| Capping Layer | sandy GRAVEL, medium to coarse grained, orange/pale yellow (crushed sandstone)<br>Geotextile demarcation (orange). | 1.195 – 1.713 | 0.239 to 3.239 | - | - | - |
| Impacted Fill Soils | Gravelly CLAY, Gravelly SAND, Sandy CLAY, CLAY; brown to dark grey, with foreign inclusions consisting of fragmented brick and concrete, plastics, Styrofoam, asphaltic gravel, glass, bonded and friable ACM. | >1.195 to >1.713 | >0.359 to >3.359 | >0.084 – >0.151 | >0.159 - >0.419 | ≈ 6,405$m^3$ |
| Natural Residual Soils | CLAY, brown to orange, mottled orange/ red/ grey | >1.627 to >3.516 | - | >0.301 to >1.34 | >1.066 to >3.009 | - |

**Table 5.4.3 Profile of Containment and Capping System (AEC14)**

| Layer | Description | Depth (m BGL) | Pavement Type 2 Depth (m) | Non-Paved areas (m) | Volume ($m^3$) |
|---|---|---|---|---|---|
| Capping Layer | Reinforced Concrete overlying DBG layer | - | 0.290 – 0.532 | - | - |
| Capping Layer | sandy GRAVEL, medium to coarse grained, orange/pale yellow (crushed sandstone) and a combination of DGB and concrete for the proposed pavement areas<br>Geotextile demarcation (orange). | - | - | 0.693 – 1.858 | - |
| Contaminated Soil | Gravelly CLAY, Gravelly SAND, Sandy CLAY, CLAY; brown to dark grey, with foreign inclusions consisting of fragmented brick and concrete, plastics, Styrofoam, asphaltic gravel, glass, bonded and friable ACM. | 0.290 - 3.241 | - | - | ≈ 302$m^3$ |
| Residual Soils | CLAY, brown to orange, mottled orange/ red/ grey | >0.693 - >3.241 | | - | - |

**Table 5.4.4 Profile of Containment and Capping System (TPZ-1 to TPZ-4 capped)**

| Layer | Description | Depth – Upper (m BGL) | Depth – Lower (m BGL) | Volume ($m^3$) |
|---|---|---|---|---|
| Capping Layer | sandy loam, fine to medium grained, dark grey underlying sandstone gravel (quarried)<br>Geotextile demarcation (orange). | 0.0 | 0.399 to 0.769 | AEC14 Capping – ≈1500 $m^3$ |
| Contaminated Soil | Gravelly CLAY, Gravelly SAND, Sandy CLAY, CLAY; brown to dark grey, with foreign inclusions consisting of fragmented brick and concrete, plastics, Styrofoam, asphaltic gravel, glass, bonded and friable ACM. | 0.399 to 0.769 | >0.399 to >0.769 | - |

Exposure risks to future site users are low, given the placement of a capping layer and hi-visibility geofabric marker layer. Additionally, the risk of aerial dispersion and offsite migration of residual contamination is nullified by the capping layer.

There is risk to maintenance and service installation workers during repair, maintenance, and installation activities within the area covered by this EMP, and if excavation advances deeper than the capping layer (> 0.084m to 3.239m bgl) and through the demarcation geotextile to expose underlying impacted soil. The principal risk associated with exposure to asbestos contamination residing below the capping layer relates to

inhalation of asbestos fibres, which could occur during any excavation activity or disturbance of the contained impacted soils.

### 5.4.2 Isolation of Inground Services (AEC06, AEC08, AEC10, AEC101 and AEC14)

Prior to placing the approved geotextile membrane cover over the impacted materials that were capped (AEC06, AEC08, AEC10 and AEC101), as per the RAP, the associated trenches for proposed inground services were excavated to ~ 0.5m below pipe invert levels and to 1m wide. **Table 5.4.5** summarises the isolation of associated inground services within AEC06, AEC08, AEC10 and AEC101.

**Table 5.4.5 Isolation of Inground Services**

| Location/ AEC | Pipe Invert Depths (m) | Trench Invert Depths (m) | RAP condition for trench isolation | Verification Record |
|---|---|---|---|---|
| AEC101 | The pipe invert depths ranged from 5.39m to 5.68m; | The trench invert depths ranged from 4.13m to 4.43m; | ~ 0.5m below the proposed invert levels and to 1m wide (extra 0.5m excavation vertically and horizontally) | Depth between pipe and trench invert depths ranged 1.25m to 1.26m in depth were about 1m in width. |
| AEC06, AEC08 and AEC10 | The pipe invert depths ranged from 8.21m to 9.513m; | The trench invert depths ranged from 7.17m to 9.978m; | | Depth between pipe and trench invert depths ranged 0.262m to 1.04m in depth were about 1m in width. |
| AEC14 | The pipe invert depths ranged from 7.65m to 8.225m; | The trench invert depths ranged from 7.62m to 7.92m; | | Depth between pipe and trench invert depths ranged 0.03m to 0.42m in depth were about 1m in width. |

Alliance notes that the inground service trenches within AEC14 are all located in backfilled VENM capping materials, however, there exists deficiencies in the depth of clean verified material below invert level as detailed below:

- based on review of the trench and pipe invert levels in AEC14, there were four comparable locations along the trench line where there is approximately 0.03m to 0.42m of clean materials below the proposed trench invert levels;
- the current capping depths achieved along the area of the excavated stormwater trench range from 0.923m to 1.078m; and
- during future maintenance of services, the materials that will be excavated will comprise capping materials (walls and base).

### 5.4.3 Future Remediation

Remediation of the impacted soil at the site, for example, by excavation, off-site disposal, and validation of these works, would mitigate possible risks associated penetration of the capping layer and works required for maintenance. Remediation of this impacted soil may result in cessation of the EMP. This is outlined further in **Section 9**.

# 6 Management Measures

## 6.1 Register of Emergency Contacts

A register of emergency contact details of stakeholders considered relevant to the project, is presented in **Table 6.1.1**.

**Table 6.1.1 Register of Emergency Contacts**

| Role | Person/s | Stakeholder | Contact |
|---|---|---|---|
| Emergency Services | - | Police / Fire Ambulance | 000 |
| Planning Authority/Council | - | City of Ryde | 02 9952 8222 |
| WHS Regulatory Authority | - | SafeWork NSW | 13 10 50 |
| Environmental Regulatory Authority | - | NSW EPA | 13 15 00 |
| NSW State Emergency Service | - | NSW State Emergency Service | 13 25 00 |
| Hospital – Emergency Department | - | Ryde Hospital Emergency Department | - |
| Site Owner | Lance Berry (School Principal) | Marsden High School Principal - NSW Department of Education | 02 9874 6544 |
| | Jennifer Cope (School Principal) | Meadowbank Public School Principal - NSW Department of Education | 02 9809 3648 |
| Maintenance Manager | Anthony Protich (Person from AMU responsible for maintenance) | Asset Management Unit (AMU) | 0459 856 195 |
| Environmental Consultant / Occupational Hygienist | Mehran Asadabadi | Alliance Geotechnical | 1800 288 188 |
| NSW EPA Accredited Site Auditor | Rebeka Hall | Geosyntec Consultants Pty Ltd | 02 9251 8070 |

## 6.2 Register of Utility Provider Contacts

A register of emergency contact details of stakeholders considered relevant to the project, is presented in **Table 6.1.1**

**Table 6.1.1 Register of Utility Contacts**

| Provider | Utility Service | Contact |
|---|---|---|
| Ausgrid | Electricity | (02) 4951 0899 |
| City of Ryde | Sewer | (02) 9952 8003 |
| Jemena Gas North | Gas | 1300 880 906 |
| Optus / Uecomm NSW | Communications | 1800 505 777 |
| Sydney Water | Water | 13 20 92 |
| Telstra NSW Central | Communications | 1800 653 935 |
| TPG Telecom (NSW) | Communications | 1800 786 306 |

## 6.3 Consistency with Development Conditions of Consent

Development Application (ref. LDA2019/0436) and associated modification application, as outlined in Consent Condition No. 3, requires the site owner to comply with this EMP.

## 6.4 Existing Environmental / Asbestos Management Systems

NSW Department of Education, Asbestos Management Plan (AMP) for NSW government schools (DoE 2020) sets out a panel contract for the supply of hygienist services to address issues identified by maintenance and capital work contractors, assessment management units and schools. The AMP has been developed to manage asbestos hazards and minimise the risk of exposure to asbestos of all personnel, including all department of education personnel, teaching staff, maintenance staff, students, maintenance contractors and other visitors and ensure school asbestos registers are update regularly whenever asbestos disturbance works are undertaken on NSW government school sites.

Specifically, the AMP (DoE 2020) outlines management procedures and scope as follows:

- Scope and limitations of the AMP
- Overview of the risk assessment process
- Asbestos related regulatory requirements
- Organisational responsibilities
- Management of in-situ asbestos containing materials
- Safe working practices
- Requirements for asbestos removal
- Training, and
- Emergency response procedures.

## 6.5 Management Structure and Responsibilities

The management structure (responsible parties) and responsibilities (tasks) for this EMP are presented in **Table 6.5**.

The NSW Department of Education as owner of the site will manage these responsibilities by including the EMP and its requirements in a facilities management tool or similar. The owner/s are required to ensure its maintenance employees and contractors have read and understood the EMP, agree to undertake the relevant obligation within the EMP and confirm that they are readily competent to adhere to the same obligations. The roles and responsibilities are summarised in **Table 6.5.1**:

**Table 6.5.1 Roles and Responsibilities**

| Party/Role | Responsibility |
|---|---|
| NSW Department of Education (Site Owner) | The key responsibility of NSW Department of Education is to ensure the protection of site users and future maintenance workers. Specifically:<br>• Maintain ultimate responsibility for implementation of the EMP;<br>• Review of the effectiveness of the EMP on an annual basis (every 12 months) and following any incident (**Appendix C**) that could potentially suggest that the EMP is ineffective;<br>• Nominate a Maintenance Manager / Employees;<br>• Implement and communicate improvements and amendments to the EMP, as required;<br>• Provision of required resources, where required, in order to comply with the requirements of this EMP;<br>• Briefing the maintenance employees of the existence of this EMP and their associated roles; and<br>• Maintain and review the Asbestos Register (**Appendix E**). |
| Maintenance Manager / Employees | The maintenance manager / employees are responsible for successful planning, implementation, and completion of maintenance activities in a manner that does not compromise the health of workers or site users:<br>• Complete asbestos awareness training provided by an accredited training provider;<br>• Conduct regular, routine and ad-hoc inspections of the site condition and capping integrity in accordance with **Section 6.11** and ensure remedial measures are implemented, and notified where problems are identified;<br>• Ensure that all maintenance staff conducting works are briefed on the presence of asbestos beneath the encapsulation areas and inducted into the EMP;<br>• Maintain records of maintenance and/or reports related to the site;<br>• Review subcontractor work method statements for compliance with the EMP and any other aspects required for the safe completion of works on site;<br>• Monitor subcontractor compliance with their work method statements and inspect completed work to ensure the capping is restored appropriately upon completion and the integrity of the marker layers and capping layers are not compromised, and /or are restored if compromised; and<br>• Notify any concerns/ incidents regarding the implementation of this EMP, in a timely manner to the relevant representative of NSW Department of Education. |
| Contractors and Sub-Contractors | All subcontractors have an obligation to carrying out their own work with due diligence. They should also:<br>• Comply with statutory requirements applicable to their work;<br>• Prepare their Safe Work Method Statements (SWMS) with reference to this EMP; |

- Have SWMS reviewed by the maintenance employees, and amended, if necessary, prior to starting works;
- Be inducted into this EMP;
- Abide by their SWMS during all works;
- Report any incidents that may result in health or environmental risk arising during, or in relation with work carried out by them; and
- Implement practical ways to control health and environmental risks.

## 6.6 Approvals and Licensing

Approval to manage the residual contamination at the site, has been provided by the local planning authority, via a condition of consent in development application LDA-2019/0436.

An environmental protection license (EPL) is not required as part of this EMP.

## 6.7 Site Operating Hours

The hours of operation at the site will be limited to:

- Primary School: 8.45am to 2.45pm (Monday to Friday);
- Secondary School: 9.00am to 3.00pm (Monday to Friday);
- OOSH: 7.00am to 8.45am and 2.45pm to 6.00pm (Monday to Friday); and
- Ad hoc or regular out of hours community events, including weekends.

## 6.8 Training

The appointed maintenance manager/employees are required to complete asbestos awareness training, provided by an accredited training provider. Asbestos awareness training will provide the Maintenance Manager the knowledge required to identify and work safely with asbestos or asbestos containing material (ACM). Training will ensure personnel understand what asbestos is, where it may be found and what steps to take to stay safe, covering topics such as identification, safe handling and appropriate control measures, types of ACMs etc.

All employees and contractors undertaking works on, or in the immediate vicinity of, the land that is the subject of this EMP, will undergo training to ensure they understand their obligations under this EMP.

Training will include:

- A site induction;
- Familiarisation with the requirements of this EMP;
- Familiarisation with site environmental controls;
- Targeted environmental training for specific personnel, for example, specific training in dust management, or use of relevant personal protective equipment (PPE); and
- Environmental emergency response training.

Training records will be maintained, and will include:

- Date of the training;
- Name of the trainer;
- Scope of the training;
- Names of personnel trained in this EMP; and
- Information on how competency was assessed.

The need for additional training or revised training will assessed based on the outputs of monitoring and review of EMP implementation.

### 6.8.1 Communication Protocol

In developing this EMP, consultation has been and will continue to be conducted with the following government authorities and key community stakeholders with respect to the implementation and update of this EMP and protocols where relevant:

- City of Ryde Council;
- The site owner, maintenance manager, the site lessee (if any in the future), and any individual, business, or organisation conducting works at the site, such as consultants, contractors, subcontractors, and the like; and
- Workers performing construction and maintenance activities.

The details regarding the site's contacts and response are included in **Table 6.1.1.** Utility providers contact details are provided in **Table 6.2.1**.

## 6.9 Long-Term Environmental Management Areas

This EMP relates to the capping and containment areas presented in **Figure 2, Appendix A**. The lateral and vertical extents are shown in the survey plans provided in **Appendix B**.

## 6.10 Notification of Asbestos Removal Works

If asbestos removal works are planned for the site, notification, in the approved format, must be provided to SafeWork NSW by a licensed asbestos removalist, at least 5 days before commencement of licensed asbestos removal work.

## 6.11 Preventative Management Methods

Routine inspection of the capping layer, and usage and wear patterns monitored. Observed areas of damage or surface wearing should be repaired promptly to prevent exacerbation. If the surface finish and repair is not to original standards and thickness, the responsible party will be required to repair the finished surface to an acceptable standard.

The following inspection routine and requirements are recommended:

- All inspections to be conducted by the appointed Maintenance Manager or Principal, appropriately trained in asbestos identification (i.e., asbestos awareness training) to ensure that any occurrences of ACM on ground surfaces, if identified, are appropriately managed;
- Environmental inspections of surface covering to ensure maintenance (in unpaved areas) on a regular basis (every 6 months);
- A detailed inspection on a routine basis (every 12 months) to ensure contamination is not exposed at the surface. An inspection checklist is provided in **Appendix C**;
- An inspection following an accidental breach/penetration of the capping layer / surface covering (following an incident); and
- Inspection following a break / repair of capping layer / surface covering (on completion of works).

An ad hoc site condition assessment if required if there is degradation in site cover/capping or exposure of underlying contamination (i.e., after heavy rainfall, heatwaves, drought etc. damaging surface covering across the site).

A suitably qualified and experienced environmental consultant should be engaged if anomalous conditions be identified by the Maintenance Manager / Principal during a regular or routine inspection under implementation of the unexpected finds protocol (**Appendix D**), or if the appointed person is not suitability qualified in asbestos identification.

Inspection should visually check for the following (and is to include a photographic record of the inspection, refer to inspection checklist provided in **Appendix C**):

- Surface wear, deterioration, or deformation;
- Finish quality works following maintenance or repair;
- Finish quality of trenching, or any other works penetrating the capping layer, and its integration into capping system following maintenance or repair;
- Areas of exposed soil or remnants of stockpiled soils, particularly following maintenance, or repair;
- Extent and adequacy of clean-up following maintenance or repair of the capping layer; and
- All inspections are to be recorded and documented, in addition to the requirements of visual inspection, noted above, inspection reporting should be completed in accordance with requirements outlined in **Section 6.19**.

## 6.12 Planned Activities and Procedures

### 6.12.1 Safe Work Method Statements

All parties intending to undertake planned disturbance in areas that are the subject of this EMP, will prepare a project specific safe work method statement (SWMS) that documents:

- The task/s to be undertaken;

- Hazards associated with undertaking those task/s;
- A risk assessment of each hazard, considering consequence and likelihood;
- Control measures to be implemented to mitigate identified risks; and

A re-assessment of each hazard, assuming control measure implementation, and showing a demonstrable decrease to the risk.

#### 6.12.2 Personal Protective Equipment

Impacted soils will be encountered if excavation extends beyond the capping layer system, which could result in asbestos exposure. For completing any excavation works, use of the following Personal Protective Equipment (PPE) is required, and should meet Level C requirements:

- Long sleeves and trousers;
- Steel-toe footwear (no laces) or boot covers;
- Safety glasses/googles;
- Face respirator (P2 cartridge); and
- Tyvek coveralls (to be available).

#### 6.12.3 Workplace Asbestos Clearance

A Licensed Asbestos Assessor (LAA) will be required to conduct control asbestos air monitoring during any excavation works within remediated areas. Details regarding the performance of Asbestos Air Monitoring are outlined in **Section 6.16**.

At the completion of works and reinstation of the capping layer, the LAA is to complete the following:

- Perform a clearance inspection of the works area;
- Issue an asbestos clearance certificate in writing before the site area can be re-occupied; and
- Additionally, the results of air monitoring show that any identified respirable asbestos fibre levels are below 0.01 fibres / ml.

### 6.13 All AECs & TPZs onsite

#### 6.13.1 Soil Management Procedures

The following soil management procedures are to be adopted at all times during disturbance of the capping layer system:

- Where works require the disturbance of subsurface soils (e.g., excavation, trenching or drilling), such works must be completed in a safe and acceptable manner, to prevent exposure to site users, tenants, visitors, site contractors, the public, and the surrounding environment;
- Areas of exposed soil should be demarcated by hazard tape or temporary barriers as appropriate;

- Excavated soils should be stockpiled in designated areas and excavation voids are to be kept damp at all times by periodic water spray;
- Capping layer soil (above geotextile membrane) and potentially contaminated soil (below geotextile membrane) are to be stockpiled separately. Stockpiled soils are to be placed on plastic liner and covered with plastic liner or geotextile, with perimeter silt controls employed;
- Appropriate controls for dust generation and erosion/run-off are to be employed;
- Excavated soil below geotextile membrane can be reused beneath capping. Alternatively, this material can be disposed offsite after appropriately waste classified, as outlined in **Section 6.16**;
- Excavated voids above the geotextile member should be reinstated with suitable material, consisting of certified excavated natural material (ENM) or virgin excavated natural material (VENM);
- Demarcation geotextile should be reinstated or repaired (if required) with equivalent material;
- The capping layer must be reinstated to original installation standards to ensure a minimum separation and thickness, as outlined in **Table 5.4.1** to **Table 5.4.5** and shown in **Appendix B**; and
- Clean-up should be thorough, and no trace of excavated soil are to remain at the ground surface.

### 6.13.2 Soil Validation Procedures

Following excavation and reinstatement of the capping layer system, the following validation requirements apply to ensure that the capping layer system has been adequately installed. Validation should be conducted by a suitably qualified environmental consultant, as follows:

- A pre- and post- survey of the work area, with records kept together with the EMP;
- Appropriate material classification of materials for offsite disposal in line with EPA (2014) guidelines;
- Assessment of suitability of material for importation to site, and used as a capping reinstatement;
- Appropriate validation reporting/documentation; and
- Amendment and/or update to the EMP (as appropriate).

## 6.14 Defect Repair

Capping layer defects should be monitored and repaired, particularly as the capping layer ages, to ensure that the capping layer remains serviceable. Where significant surface wear, deformation, cracking, or damage to the surface of the capping layer is observed, an immediate and thorough investigation should be completed to identify the defect mechanism. In relation rectification to of capping layer and the minimum requirements based on current capping conditions, please refer to **Sections 5.2 and 5.4**, respectively. A copy of the specification for the geotextile marker is included in **Appendix F**.

All defect repairs must be completed within 5 working days of initial defect observation.

The following procedures are to be implemented for defect repair:

- Works must be completed in a safe and acceptable manner, to prevent potential exposure to site users, tenants, visitors, site contractors, the public, and the surrounding environment;

- The works area and any areas of exposed soil should be demarcated by hazard tape or temporary barriers, as appropriate;
- Excavated soils (stockpiles) and excavation voids are to be kept damp at all times by periodic water spray;
- Capping layer soils that area removed are to be stockpiled separately. Stockpiled soils are to be placed on plastic liner and covered with plastic liner or geotextile, with perimeter silt control employed. Appropriate controls for dust generation, leaching, and erosion/run-off are to be employed;
- Any defect repair requiring the removal of capping soil will require appropriate stockpile management and waste classification testing before removal from site, as outlined in **Section 6.16**;
- Soil validation procedures should be followed as outlined in **Section 6.13.2**;
- Demarcation high visibility geotextile should be reinstated or repaired (if required) with approved and validated material imported for backfill;
- In all cases, excavated voids should be reinstated with extricated capping soils or suitable material consisting of certified excavated natural material (ENM) or virgin excavated natural material (VENM);
- The capping layer must be reinstated to original installation standards to ensure a minimum separation distance is maintained; and
- Clean-up of the works area should be thorough, and no trace of excavated soils are to remain at the ground surface.

## 6.15 Repair of Sydney Water Underground Utilities

Excavation beyond the capping layer system and disturbance of the impacted soil should be avoided where possible. Alternative options should be considered to lessen the need to penetrate the capping layer system. Should the capping layer system be penetrated, and impacted soils disturbed, soils should be managed as outlined in **Section 6.13.1** and validated as procedures outlined in **Section 6.13.2**.

The capping layer system is be reinstated to original standards and thickness upon completion of all works in accordance with **Table 5.1.1**, and survey plans provided in **Appendix B**.

## 6.16 Disposal of Fill Soils (Waste)

Excavated soils require sampling, analysis, classification, and disposal according to the NSW EPA (2014) Waste Classification Guidelines (or equivalent in force at the time).

A competent environmental consultant should be engaged to inspect, and sample impacted soils (in situ or in stockpiles) and prepare a waste classification report for generated stockpile(s). Minimum competencies for the completion of this work are outlined in **Section 7**.

Soils are to be classified based on a visual assessment, and chemical assessment of contaminants of potential concern (COPCs), and collected at the following frequency:

- One test per 25 $m^3$ for soils assessed for volumes less than 200 $m^3$; or

- One test per 250 $m^3$, with a minimum of 10 samples collected for a volume over 200 $m^3$ to allow for the calculation of the 95% Upper Confidence Limit (UCL) value.

Based on the contaminants of potential concern identified during the previous site investigations, waste classification samples collected should be assessed for the following contaminants of concern:

- Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn).
- Total recoverable hydrocarbons (TRH).
- Monocyclic aromatic hydrocarbons (MAH): benzene, toluene, ethylbenzene, and total xylenes (BTEX).
- Polycyclic aromatic hydrocarbons (PAHs).
- Organochlorine pesticides (OCPs).
- Organophosphorus pesticides (OPPs).
- Polychlorinated biphenyls (PCBs).
- Asbestos (presence / absence).

Once classified, stockpiles should be transported and disposed to a waste disposal facility. The transporter (driver and vehicle) should be appropriately licenced to transport the classified material. There are special considerations for transport and management including disposal of asbestos waste under the Protection of the Environment Operations (Waste) Regulation, including tracking, and reporting of asbestos waste using Waste-Locate. The waste disposal facility should be appropriately licenced to receive the classified material. Classification should take into consideration previous characterisation results with extra consideration to special waste and scheduled waste criteria.

## 6.17 Asbestos Air Monitoring

Asbestos air monitoring is required for any excavation that proceeds beyond the capping layer system and into impacted soil. Asbestos air monitoring is to be conducted by a Licensed Asbestos Assessor. Minimum competencies are outlined in **Section 7**.

Air Quality Monitoring should be conducted according to the Safe Work Australia Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)]. Air monitoring action levels are provided in **Table 6.17.1** below.

**Table 6.17.1 Air Monitoring Action Levels**

| Air Monitoring Action Level (fibres / ml) | Action |
|---|---|
| < 0.01 | • No Action. Continue with existing control measures |
| ≥0.01 | • Notify Site Controller<br>• Licensed Asbestos Assessor and Site Controller to review current control measures and improve, where applicable. This may include improvements of work practices, use of further control measures (e.g., additional plastic screening or water spray techniques), upgrading PPE (i.e., respirator, coveralls) or changing the work methodology<br>• Implement measures, continue work, and continue air monitoring |

| | |
|---|---|
| ≥0.02 | • Stop Work Immediately<br>• Check and extend barricades as required<br>• Notify Site Controller and Council<br>• Provide notification to SafeWork NSW regarding concentration >0.02 fibres / ml<br>• Licensed Asbestos Assessor to conduct investigations to establish cause and advise/implement corrective action<br>• Additional air monitoring to be conducted by Licensed Asbestos Assessor<br>• No recommencement of works until Air Monitoring reports <0.01 fibres / ml |

## 6.18 Stockpiles

During any soil excavation works on site:

- Any contaminated soil or asbestos that is excavated during onsite works, such as maintenance of underground services and utilities, must be securely stockpiled;
- Where possible, stockpiles should be placed on a sealed or hardstand surface or on 200 µm plastic sheeting to prevent cross contamination of unsealed surfaces;
- If it is not possible to stockpile on a sealed or plastic covered surface, the unsealed surface within the footprint of the stockpiles must be visually inspected by a person who is appropriately qualified to recognise ACM, and samples collected across the footprint;
- Stockpiles must be placed in a secure location onsite and covered in geofabric if to remain for more than 24 hours; and
- All excavation works and stockpiling of soil should be kept damp to prevent the generation of dust. Care should be taken to not over wet excavations and/or stockpiles that excess runoff is generated, and appropriate sediment and erosion controls must be implemented and maintained for the duration of soil management works.

## 6.19 Dust

During intrusive works that will disturb contaminated soils:

- Exposed impacted fill / soils in the walls and floors of excavations and stockpiles of spoil should be kept moist to prevent the generation of dust from these sources;
- Care should be taken to not over-wet excavations and/or stockpiles such that excess surface runoff is generated;
- Works should cease should visible dust be migrating from the work site area, until such time as dust is controlled or conditions causing dust migration (e.g., excessive wind, storms etc.) improve;
- For substantial soil disturbance works, appropriate dust controls should be applied at work site boundaries; and
- Any non-compliances or migration of dust from site boundaries should be reported to the Maintenance Manager.

## 6.20 Odours

Where odour complaints occur, the following will be undertaken:

- Disturbance of soils during meteorologically favourable periods only;
- Covering of impacted soils; and/or
- Installation of an odour screening / masking system at the site boundaries if the initial management approaches are ineffective.

Additional odour suppression actions to reduce the odours may include:

- Increasing the amount of covering of excavations / stockpiles;
- Mist-Sprays;
- Odour suppressants; and/or
- Maintenance of equipment.

## 6.21 Noise and Vibrations

Where noise or vibration pollution complains occur, appropriate mitigation controls should be installed at the site, which may include:

- Works undertaken during permitted operational hours;
- Vibration Monitoring;
- Noise Monitoring; and
- Select machinery and/or tools with minimal or controlled noise and vibrations.

## 6.22 Sediment

During intrusive works that will disturb contaminated soils, that may result in sediment erosion, appropriate sediment and erosion controls will be installed around the work area i.e., coir logs, silt fencing or drain covers.

## 6.23 Groundwater Management

No abstraction of groundwater should occur at the site unless approval is granted by the relevant government authorities.

Should groundwater accumulation be encountered during site works, a suitably qualified and experienced person should assess potential treatment, discharge and disposal.

## 6.24 Unexpected Finds

Observations during environmental assessment field works did not report the occurrence of significantly malodorous soil, stained soil or phase-separated (liquid) material. Impacted material located below the capping layer system was reported to contain bonded asbestos containing materials (ACM) and friable asbestos.

If unexpected finds are observed in accordance with the unexpected finds protocol (**Appendix D**), then work should stop immediately, the area made safe and demarcated by hazard tape or temporary barriers as appropriate. An appropriately qualified and experienced Environmental Consultant should be engaged to inspect, sample, and recommend corrective action as appropriate. Minimum competencies are outlined in **Section 7**.

## 6.25 Inspection & Monitoring Records

All inspection records completed by the maintenance employees, including records of annual inspections, maintenance, and repairs are to be maintained in an orderly and systematic manner and must be made available for auditing purposes upon request by the relevant consenting authority. An inspection checklist is provided in **Appendix C.**

Furthermore, all inspections undertaken as part of the management of containment and capping area are to be adequately documented, and include the following:

The name of the inspection report (i.e., annual inspection, post-repair or maintenance inspection, post-works inspection).

- Date of inspection;
- Person completing inspection;
- Reason for the inspection, including any description of works performed;
- Who the report will be provided to, and whether their review or approval is required;
- Document control procedures;
- General assessment of environmental conditions of the capping area and surrounding areas;
- Qualitative assessment of the cap, state of cap repair, and the adequacy of environment controls during any works completed;
- Observations of activities performed (where required);
- Details of actions arising from inspections and how they will be managed, including action response times, review of effectiveness and closure of action responses; and
- Responsibilities and timeframes for following up on outstanding actions.

The EMP is a dynamic document which will be reviewed regularly so that it remains consistent with legislation and best practice and site changes over time. A review may be called for by NSW Department of Education at any time to assess the performance of the EMP and to suggest changes. We recommend a review take place at a minimum of every four years to ensure the references to legislation, codes of practice and environmental guidelines and standards remains up to date.

The EMP must be updated in the following circumstances:

- Change of site owner/site operator; or
- Changes in EMP procedures; or
- Changes in site use, approved land use or development.

The second and third dot points stated above, must be approved by a suitably qualified and experienced environmental consultant, and requires re-assessment to ensure consideration is given to the encapsulated impacted materials and any changes to the site do not increase the risk of exposure. Updates and revisions to the EMP are the responsibility of the site lessee/site operator and are to be communicated to stakeholders and responsible parties by registered mail or electronic means.

Given the nature of the contaminant (asbestos, b(a)p, TRH (F3), chromium, zinc, nickel, and lead) capped onsite this EMP is required to be continually implemented (in perpetuity). The likelihood that the impacted materials are removed from the site in the future is considered low and the cessation of this EMP is also considered unlikely.

# 7 Competencies

The required minimum competencies of an environmental consultancy, environmental consultant, and a licensed asbestos assessor engaged to assist in implementation of this EMP are outlined below.

**Environmental Consultancy**

- Established environmental consultancy with policies, procedures, and experience sufficient for acceptance by the Australian Contaminated Land Consultants Association (ACLCA), Australian Land and Groundwater Association (ALGA), or other equivalent professional association.

**Environmental Consultant / Competent Person**

- Tertiary qualifications in Environmental Science, Environmental Engineering, or equivalent from a recognised tertiary institution.

- Minimum of two years of professional experience in environmental sampling and practice.

**Licensed Asbestos Assessor / Occupational Hygienist**

- Holder of an asbestos assessor license issued by SafeWork NSW under the Work Health and Safety Regulation 2017.

# 8 Legislative Compliance

All future site works shall be undertaken with due regard for human health and protection of the environment and in accordance with all relevant statutory requirements, including requirements of City of Ryde Council.

Works approvals and licensing requirements are to comply with the following NSW legislation and regulatory guidelines:

- Contaminated Land Management Act 1997.
- Protection of the Environment Operations Act 1997.
- Environmental Offences and Penalties Act 1997.
- Environmentally Hazardous Chemicals Act 1985.
- Waste Avoidance and Resource Recovery Act 2001.
- Environmental Planning and Assessment Act 1979.
- Protection of the Environment Operations Act 1997
- Dangerous Goods Act 1975.
- Clean Waters Act 1970.
- Clean Air Act 1961.
- Noise Control Act 1975.
- Pollution Control Act 1970.
- Work Health and Safety Act 2011.
- Work Health and Safety Regulation 2017.
- State Environmental Protection Policy (SEPP) 55 – Remediation of Land.
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013).
- Guidelines on the Duty to Report Contamination under the Contaminated Land Act 1997 (EPA 2015)

## 8.1 Other Applicable Guidelines and Codes of Practice

Works conducted on site which may cause disturbance or exposure will need to be conducted by appropriately trained staff, with the reporting and notification of the works conducted in accordance with applicable regulations, guidelines, and codes of practice.

Other applicable guidelines and/or codes of practice are listed as following, but not limited to:

- NSW Government Managing asbestos in or on soil (March 2014);

- SafeWork NSW Confined Spaces Code of Practice (August 2019);
- SafeWork NSW How to Safely Remove Asbestos Code of Practice (August 2019);
- SafeWork NSW How to manage and control asbestos in the workplace Code of Practice (August 2019);
- SafeWork NSW Excavation Work Code of Practice (August 2019);
- SafeWork NSW How to manage work health and safety risks Code of Practice (August 2019); and
- SafeWork NSW Work Health and Safety Consultation, Co-operation, and Co-ordination Code of Practice (August 2019).

# 9 Management Review

## 9.1 Review of Plan and Reporting

The EMP will be subjected to periodical management review, to ensure its ongoing applicability, suitability, and effectiveness.

The review will be undertaken by the Site Owner on an annual basis (every 12 months) from the date of implementation of this EMP, or at the time immediate actions require EMP review. A review of the EMP will required based on the following actions:

- Change of site owner;
- Changes in EMP procedures; and
- Changes in site pattern, layout, or approved land use.

The review will include:

- A check on whether relevant records are being adequately maintained; and
- Identification of opportunities for improvement on implementation of this EMP.

The report for the management review will include:

- Date of review and names of parties involved;
- Site identification details;
- A summary of planned disturbance work undertaken during the review period (if any);
- A summary of the findings of periodic inspections;
- A summary of unplanned disturbances and corrective / preventative actions implemented.
- Identification of opportunities for improvement; and
- Recommendations for amendments and/or removal of the EMP.

A record of each review report will be maintained by the Site Owner.

## 9.2 Asbestos Register

The site owner must ensure that an asbestos register is prepared and kept at the workplace, with referenced to the AMP (DoE 2020). The site owner must ensure the asbestos register is maintained to ensure the information in the register is up to date, and retain the following information:

- A record any asbestos or ACM identified at the workplace or likely to be present at the workplace;
- The date on which the asbestos or ACM was identified; and
- The location, type and condition of the asbestos or ACM.

Alternatively, if there is no asbestos or ACM is identified at the workplace, the site owner must note that no asbestos or ACM has been identified.

The site owner must ensure that the register is reviewed, at least whenever further asbestos or ACM is identified at the workplace, or asbestos is removed, altered, or disturbed, sealed, or enclosed at the workplace.

All employee, contractors or consultants undertaking works that may result in disturbance or impact to ACM should check the asbestos register during site induction prior to commencing works.

An asbestos register is provided in **Appendix E**.

# 10 Recommendation Summary

A summary of recommendations made in this EMP are outlined in **Table 10.1.1**. This should be read as a summary only and reference should be made to the associated sections noted.

**Table 10.1.1 Summary of EMP Recommendations**

| Recommendation | Cross Reference |
|---|---|
| **Roles & Responsibilities** | |
| NSW Department of Education to provide oversight and ultimate responsibility for the implementation of the EMP | **Section 6.5** |
| Upon completion of site development, the Maintenance Manager will plan, implement, and monitor contractor works in accordance with the requirements of this EMP. Review of contractor SWMS prior to commencement of works and notification to representative of NSW Department of Education, of any incidents | **Section 6.5, Appendix C** |
| Subcontractors to prepare SWMS documentation with reference to this EMP and conduct their work in accordance and adherence with their SWMS. Subcontractor to notify their supervisor of any incidents | **Sections 6.5, 6.12, Appendix C** |
| Maintenance Manager to conduct routine monitoring required by the EMP, conduct field activities in accordance with the EMP and report any report data, recommendations, and incidents to representative of NSW Department of Education in a timely manner | **Sections 6.5, 6.11, Appendix C** |
| **Risk Assessment & Training** | |
| All contractors to undertake a site-specific risk assessment as part of their SWMS preparation | **Sections 6.5, 6.11-6.12** |
| Once the site is developed the facility / Maintenance Manager will review contractor risk assessments and proposed works plan | **Section 6.5** |
| Contractors are to implement an induction process for their works to communicate risks and mitigation/control measures | **Sections 6.5, 6.8 and 6.11** |
| **Implementation** | |
| Protection of site users by:<br>• Fencing off work areas involving excavations through the cap / marker layer at either of the asbestos containment areas;<br>• Covering stockpiles and controlling dust and sediment;<br>• Reinstating the cap/ marker layer upon completion;<br>• Air monitoring for asbestos during excavation work within asbestos containment areas; and<br>• Appropriate signage of stockpiles and works areas. | **Sections 6.13 to 6.25** |
| Protection of maintenance personnel by:<br>• Abiding by any relevant Work Health and Safety and legislation in force;<br>• Minimum PPE of long sleeves and pants, gloves, steel cap boots and eye protection;<br>• If penetrating the cap PPE to increase to P2 dust mask and Tyvek suite;<br>• Staff to adopt good personal hygiene (no eating, drinking, or smoking on the worksite); | **Sections 6.5 to 6.25** |

| | |
|---|---|
| • Excavation work within the asbestos containment areas to be carried out by licensed asbestos removal contractors; and<br>• Air monitoring for asbestos fibres for any work conducted within the asbestos containment areas. | |
| • Protection of the environment by:<br>• Protecting the mitigation measures during all maintenance/excavation works;<br>• Air monitoring (asbestos) during all excavation works within the asbestos containment areas;<br>• Ensuring dust and sediment are controlled during all excavation/stockpiling works;<br>• Keep haul roads clean and cover loads appropriately;<br>• Waste classification of all spoil to be disposed offsite. Disposal to licensed facilities with records maintained; and<br>• Only import VENM as backfill material, if necessary, provide validation results. | **Sections 6.5 to 6.25** |
| **Monitoring** | |
| Maintenance Manager to carry out the monitoring (regular, routine and ad-hoc site inspections) in accordance with the EMP and advise the NSW Department of Education of any recommendations. | **Section 6.11** |
| • Maintenance Manager to ensure that excavation beneath the encapsulation areas is conducted under the supervision of an appropriately licensed asbestos assessor or removalist and during contractor works there is appropriate asbestos air monitoring for excavations within the asbestos containment areas;<br>• Maintenance Manager to implement a program of routine site inspections to assess condition of capping layers in the vicinity of asbestos containment areas; and<br>• Further inspections to be carried out during and following any intrusive maintenance works on the site. | **Section 6.11** |
| **Review** | |
| NSW Department of Education representative to maintain records of the activities onsite and monitoring results. NSW Department of Education representative to coordinate EMP review as needed to ensure the EMP is kept up to date.<br>The site owner must ensure that an asbestos register is prepared and kept at the workplace, with referenced to the AMP (DoE 2020). The site owner must ensure the asbestos register is maintained to ensure the information in the register is up to date. | **Sections 9.1, 9.2 Appendix E** |

# 11 Conclusions

Alliance considers that the residual land contamination identified at the site, would not present an unacceptable human health and/or ecological risks, in the context of the adopted land use scenario as a primary and secondary school, subject to implementation and compliance with this long-term environmental management plan.

This report must be read in conjunction with the ***Important Information About This Report*** statements at the front of this report.

# 12 References

Alliance 2018a, 'Stage 1 Preliminary Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584, 2 Rhodes Street, Meadowbank, NSW', dated June 2019, ref: 6179-ER-1-1 Rev 5;

Alliance 2018b, 'Stage 2 Detailed Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584) 2 Rhodes Street, Meadowbank, NSW', dated June 2019, ref: 6179-ER-1-2 Rev 6;

Alliance 2019a, 'Supplementary Contamination Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584) 2 Rhodes Street, Meadowbank, NSW', dated July 2019, ref: 9280-ER-1-1 Rev 1;

Alliance 2019b, 'Additional Supplementary Contamination Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP123258) 2 Rhodes Street, Meadowbank, NSW', dated Sept 2019, ref: 9692-ER-1-1 Rev 1;

Alliance 2020, 'Remediation Action Plan', Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW', dated 18 March 2020, ref: 9692-ER-1-2 REV3;

Alliance 2020a, 'Data Gap Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW', dated 10 June 2020, ref: 10834-ER-1-1;

Alliance 2020b, 'Remediation Action Plan, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW', dated 15 September 2020, ref: 10834-ER-1-2_Rev03;

Alliance 2020c, 'Interim Site Validation Report, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW', dated 12 November 2020, ref: 10834-ER-4-1_Rev01;

Alliance 2021, 'Interim Site Validation Report No.2, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW', dated 22 June 2021, ref: 10834-ER-4-2_Rev2;

Alliance 2022, 'Final Site Validation Report', Schools at the Meadowbank Education and Employment Precinct (SMEEP), 2 Rhodes Street, Meadowbank, NSW', dated 17 January 2022, ref: 10834-ER-4-3;

CRC CARE 2017, Risk-based management and remediation guidance for benzo(a)pyrene, CRC CARE Technical Report no. 39, CRC for Contamination Assessment and Remediation of the Environment, Newcastle, Australia.

National Environment Protection Council (NEPC) 2013a, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013'.

National Environment Protection Council (NEPC) 2013b, 'Schedule B(2) Guideline on Site Characterisation, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013'.

NSW Department of Education 2020, Asbestos Management Plan, NSW Government Schools

NSW EPA 1995, Contaminated Sites: Sampling Design Guidelines.

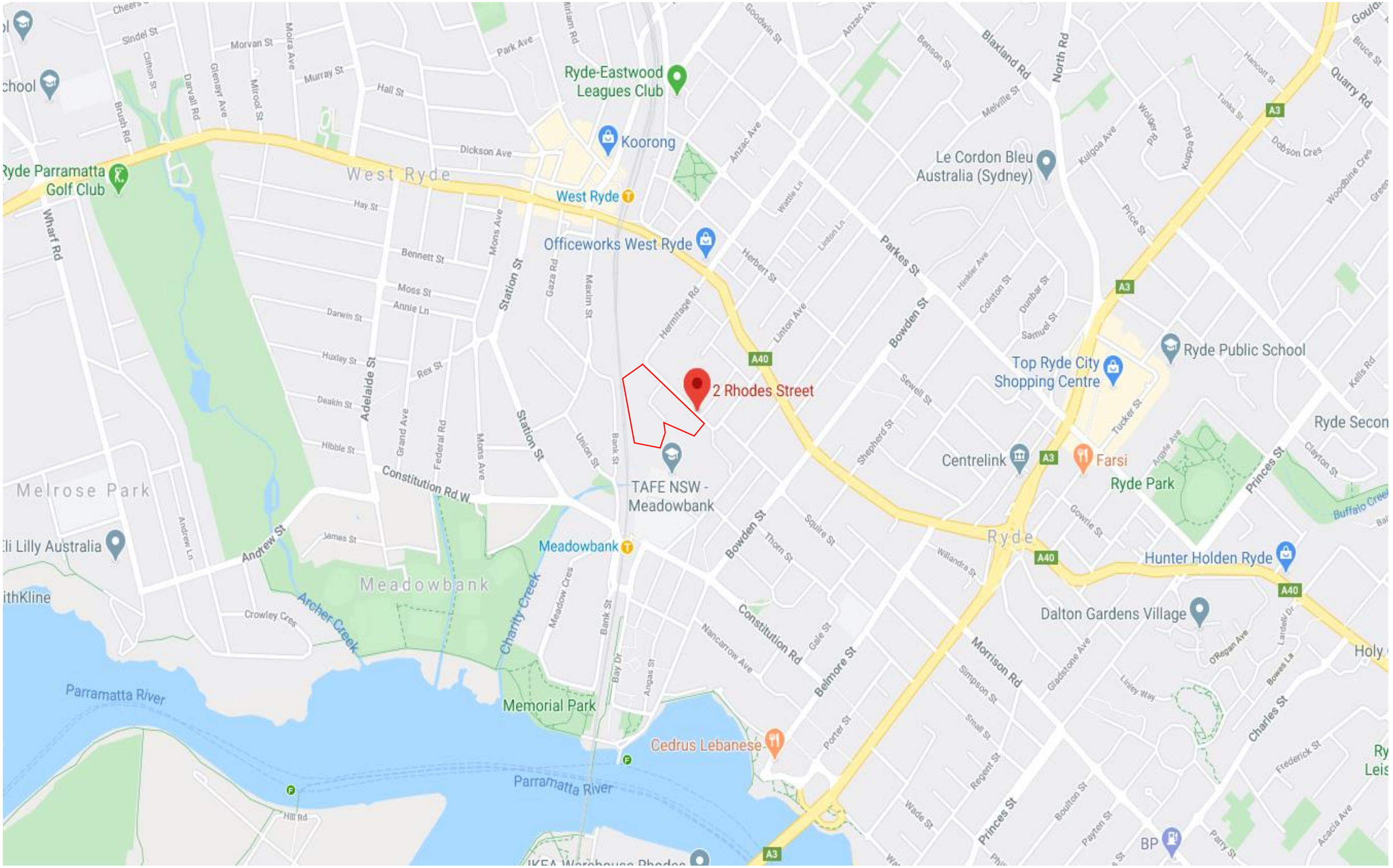
NSW EPA 2017, Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition)'.

NSW EPA 2020, Contaminated Land Guidelines: Consultants Reporting on Contaminated Sites.

SafeWork NSW Codes of Practice 2019: How to Safely Remove Asbestos

WA DOH 2009, 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia' dated May 2009.

# APPENDIX A: Figures

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geotechnical & environmental solutions

**Site Locality**

| | | | | |
|---|---|---|---|---|
| Client Name: | Ward Civil | N | Figure Number: | 1 |
| Project Name: | Meadowbank Education & Employment Precinct Schools Project | | Figure Date: | 11 February 2022 |
| Project Location: | 2 Rhodes Street, Meadowbank, NSW | | Report Number: | 10834-ER-5-1_Rev02 |


Scale: 50.00 m

Site Locality

| | | | |
|---|---|---|---|
| Client Name: | Ward Civil | Figure / Drawing Number: | 2 |
| Project Name: | Meadowbank Education and Employment Precinct Schools Project | Figure / Drawing Date: | 11 February 2022 |
| Project Location: | 2 Rhodes Street, Meadowbank, NSW | Report Number | 10834-ER-5-2_Rev02 |

N


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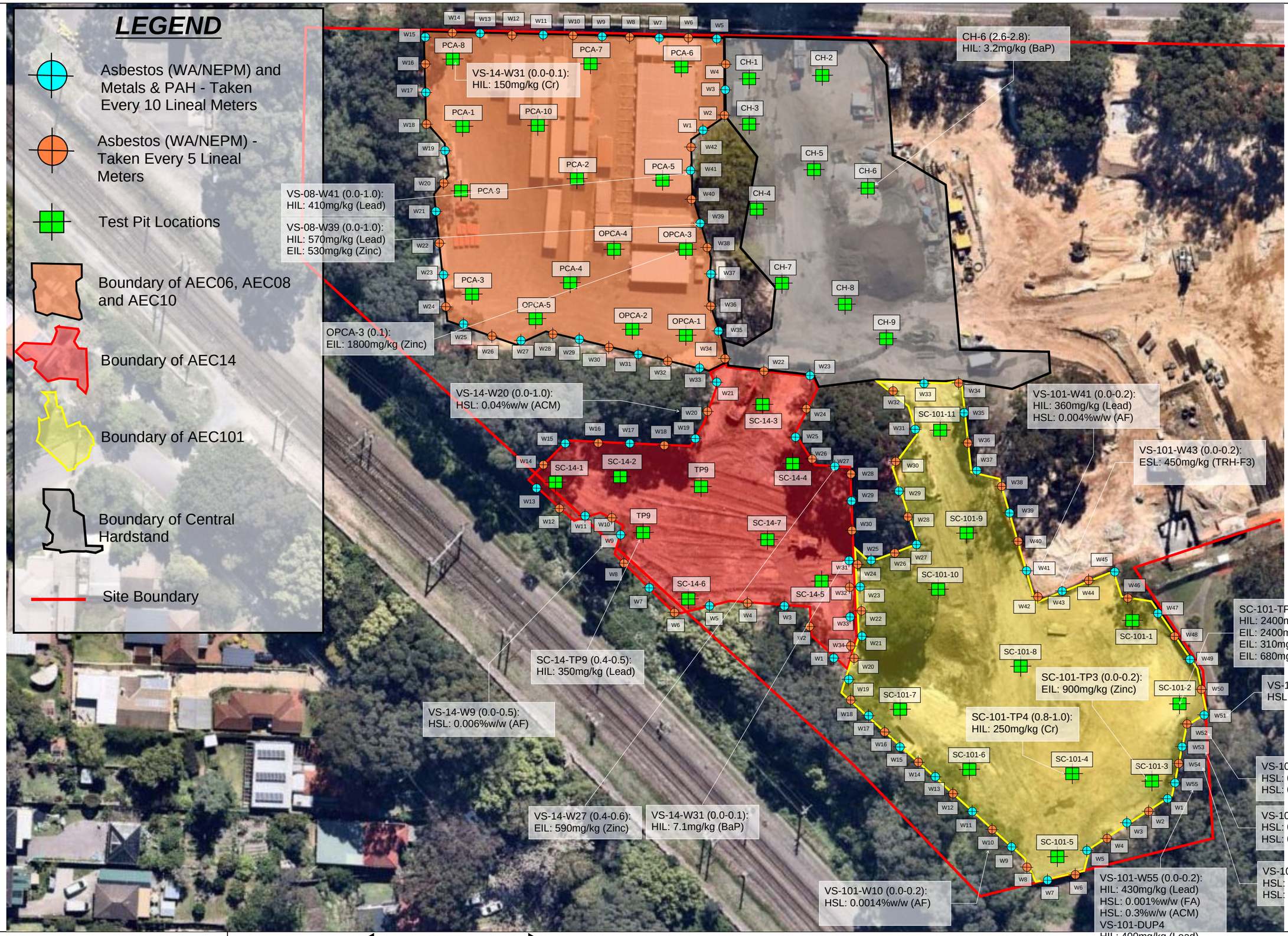
**Wall Validation Sampling Points & Exceedances Remaining for AEC07- East and AEC07 West**

| | | | |
|---|---|---|---|
| Client Name: | Ward Civil | Figure Number: | 3 |
| Project Name: | Meadowbank Education & Employment Precinct Schools Project | Figure Date: | 11 February 2022 |
| Project Location: | 2 Rhodes Street, Meadowbank, NSW | Report Number: | 10834-ER-5-2_Rev02 |

N




| | | | |
|---|---|---|---|
| Scale: | 40.00 m | **Wall validation and site characterisation sampling points & exceedances remaining** | |
| Client Name: | WARD CIVIL | Figure Number: | 4 |
| Project Name: | Meadowbank Education and Employment Precinct Schools Project | Figure Date: | 11 February 2022 |
| Project Location: | 2 Rhodes Street, Meadowbank | Report Number: | 10834-ER-5-2_Rev02 |

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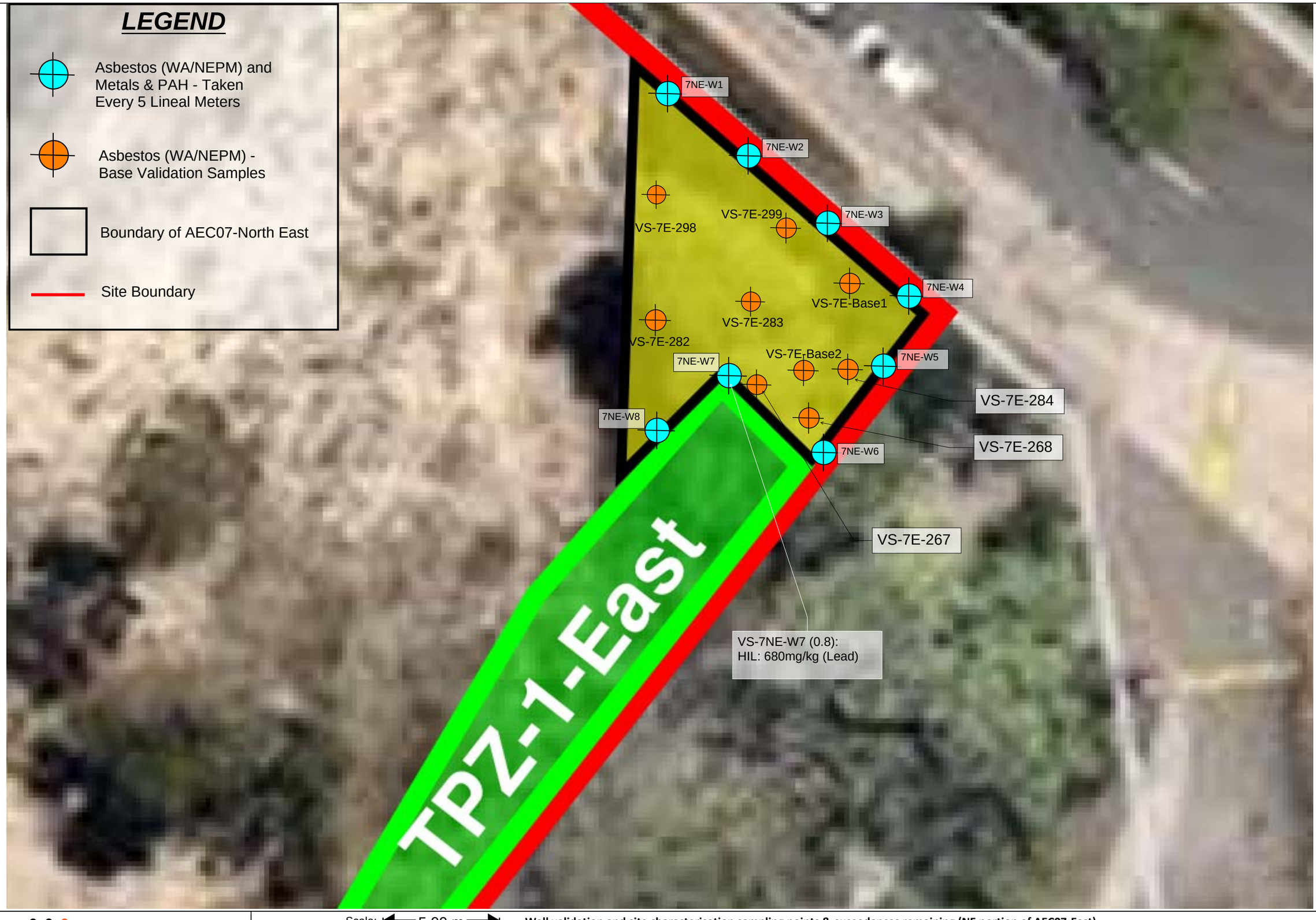
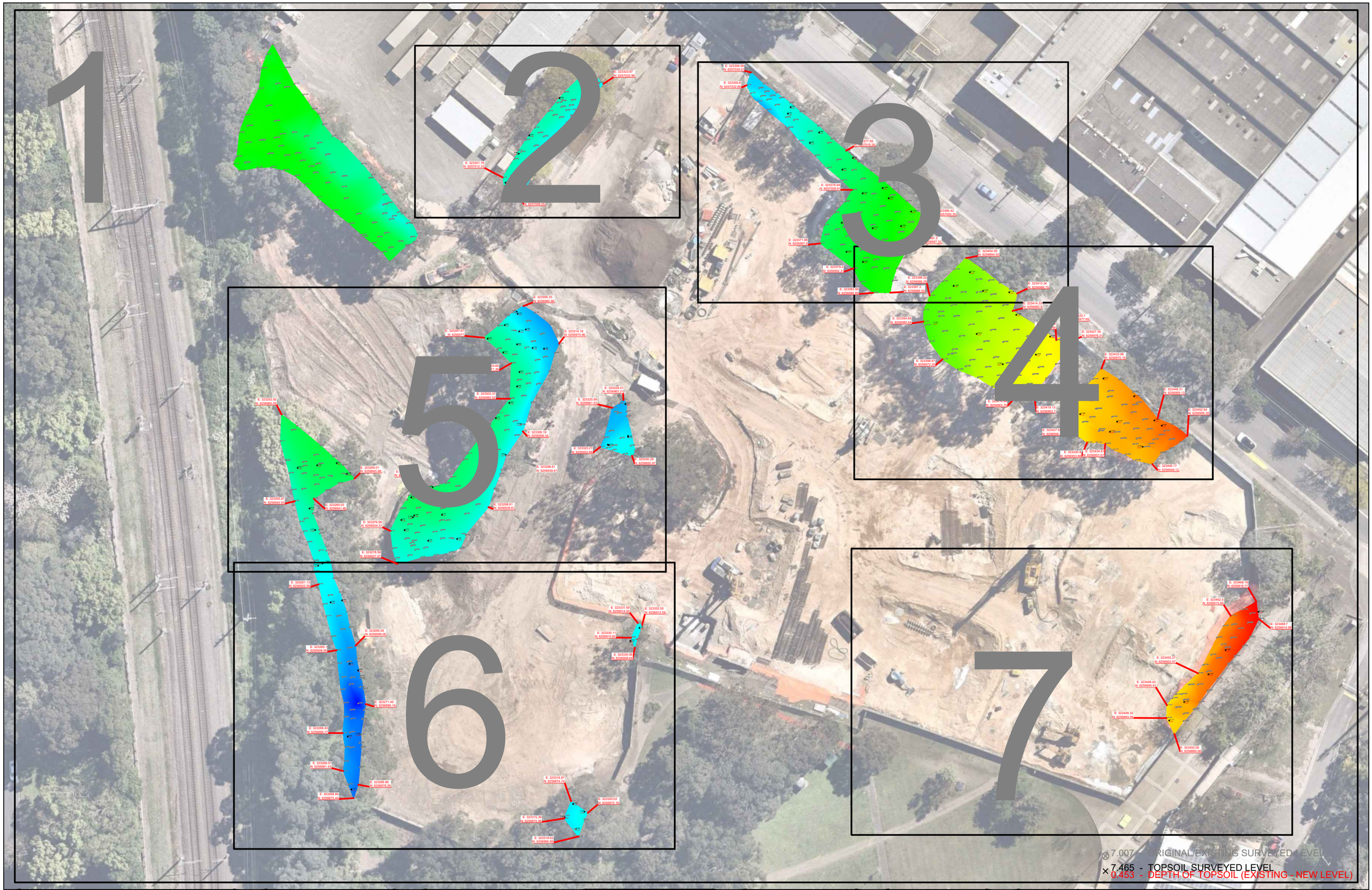



| | | | | |
|---|---|---|---|---|
| alliance geotechnical & environmental solutions | Scale: 5.00 m | **Wall validation and site characterisation sampling points & exceedances remaining (NE portion of AEC07-East)** | | |
| | Client Name: | WARD CIVIL | Figure Number: | 5 |
| | Project Name: | Meadowbank Education and Employment Precinct Schools Project | Figure Date: | 11 February 2022 |
| | Project Location: | 2 Rhodes Street, Meadowbank | Report Number: | 10834-ER-5-2_Rev02 |

# APPENDIX B: Site Survey, Pavement &Tree Protection Zone Plans




7.007 - ORIGINAL/EXISTING SURVEYED LEVEL
7.465 - TOPSOIL SURVEYED LEVEL
0.453 - DEPTH OF TOPSOIL (EXISTING - NEW LEVEL)

TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 1

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE:22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
|---|---|---|
| 22/0221 | A | |
| | | |
| | | |


TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 2

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE: 22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
|---|---|---|
| 22/0221 | A | |
| | | |
| | | |


TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 3

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE:22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
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E: 323396.02
N: 6256986.29

E: 323387.3
N: 6256986.93

E: 323415.34
N: 6256986.75

E: 323414.33
N: 6256982.9

E: 323425.7
N: 6256977.69

E: 323394.65
N: 6256980.54

E: 323423.99
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E: 323427.39
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E: 323434.81
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E: 323445.17
N: 6256949.12

0 5.82 11.64 Meters

⊗ 7.007 - ORIGINAL/EXISTING SURVEYED LEVEL

× 7.465 - TOPSOIL SURVEYED LEVEL
0.453 - DEPTH OF TOPSOIL (EXISTING - NEW LEVEL)

TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 4

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE: 22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
|---|---|---|
| 22/0221 | A | |
| | | |
| | | |

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N: 6256960.05

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0 7.11 14.22 Meters

⊗ 7.007 - ORIGINAL/EXISTING SURVEYED LEVEL
× 7.465 - TOPSOIL SURVEYED LEVEL
0.453 - DEPTH OF TOPSOIL (EXISTING - NEW LEVEL)

TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 5

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE:22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
|---|---|---|
| 22/0221 | A | |
| | | |
| | | |


TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 6

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE: 22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
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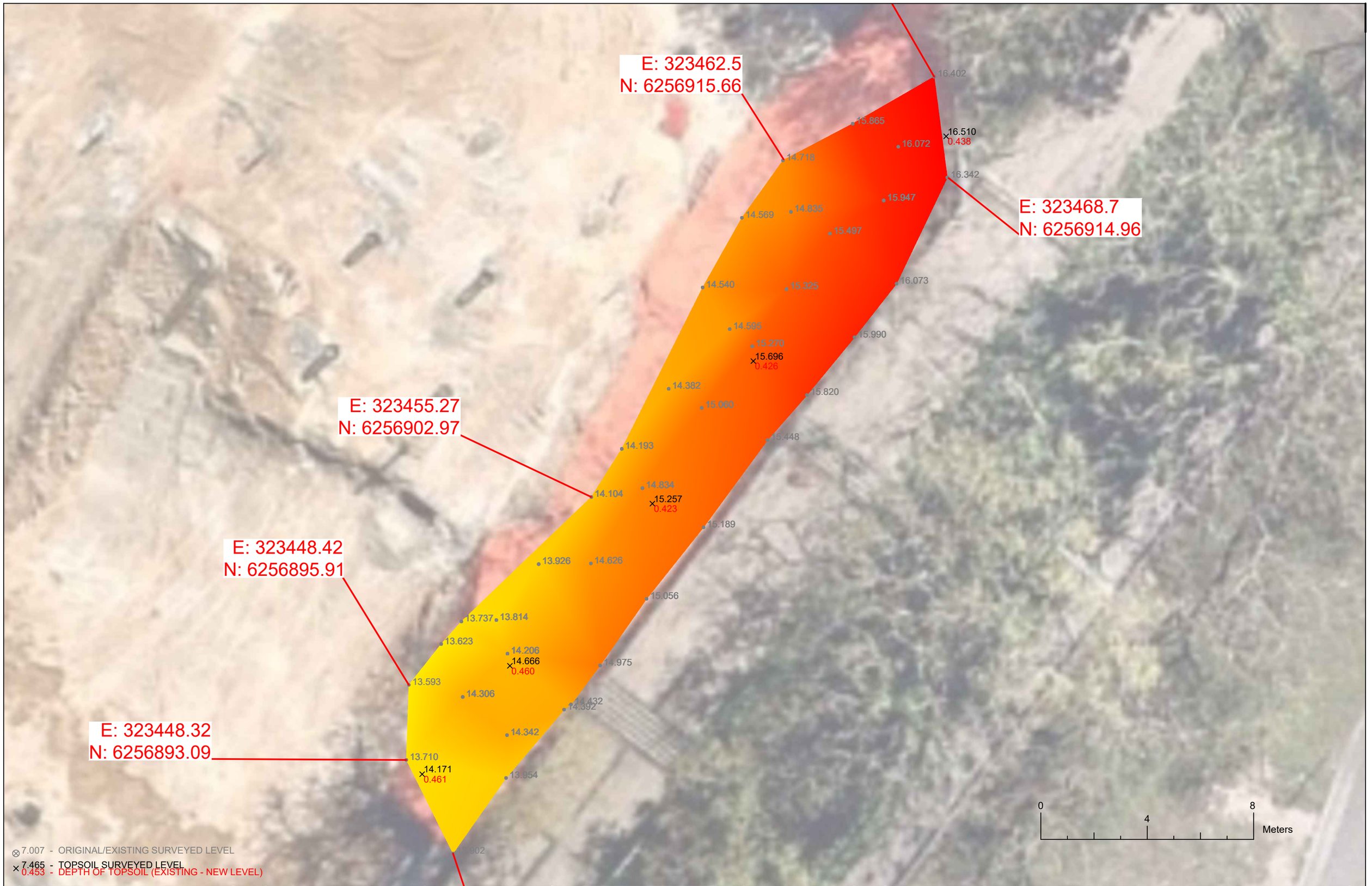


TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
Tree Protection Zone
Topsoil Installation
Level Survey - Sheet 6

CLIENT: Ward Civil
PROJECT: M.E.E.P
Rhodes St., Meadowbank
201155

WARD

PLAN No.: 201155.9107
DATE:22/02/21 SCALE: NTS
DRAWN: PF
CHK: PF
CONT. INT.: Cont

DATUM: AHD
ORIGIN
MGA Yes

| DATE | REV | COMMENTS |
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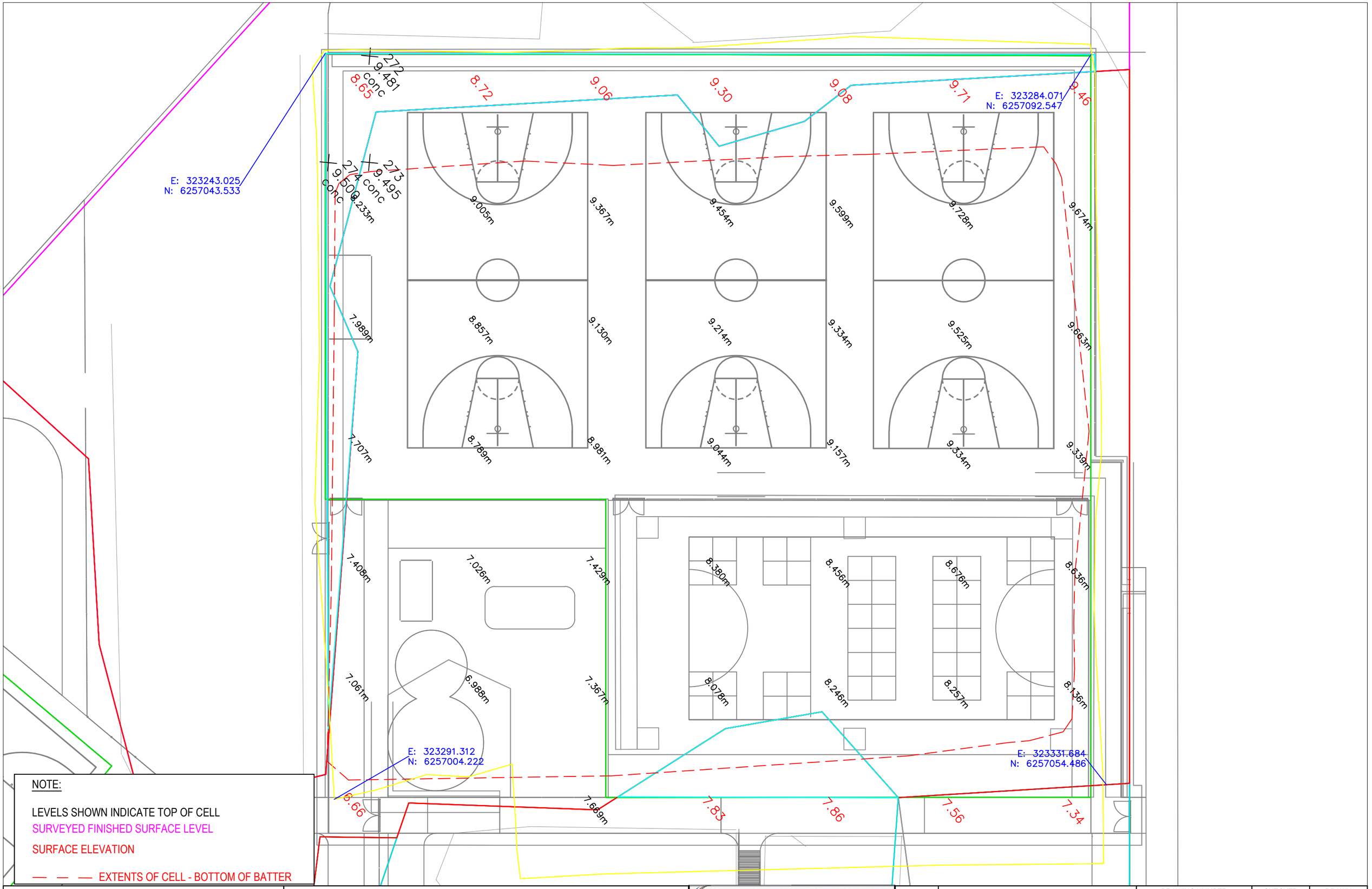


NOTE:

LEVELS SHOWN INDICATE TOP OF CELL

SURVEYED FINISHED SURFACE LEVEL

SURFACE ELEVATION

— — — EXTENTS OF CELL - BOTTOM OF BATTER

IMPORTANT NOTE:
This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

0 5 10 Meters

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
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| | | AHD | MGA | TJM | QA |
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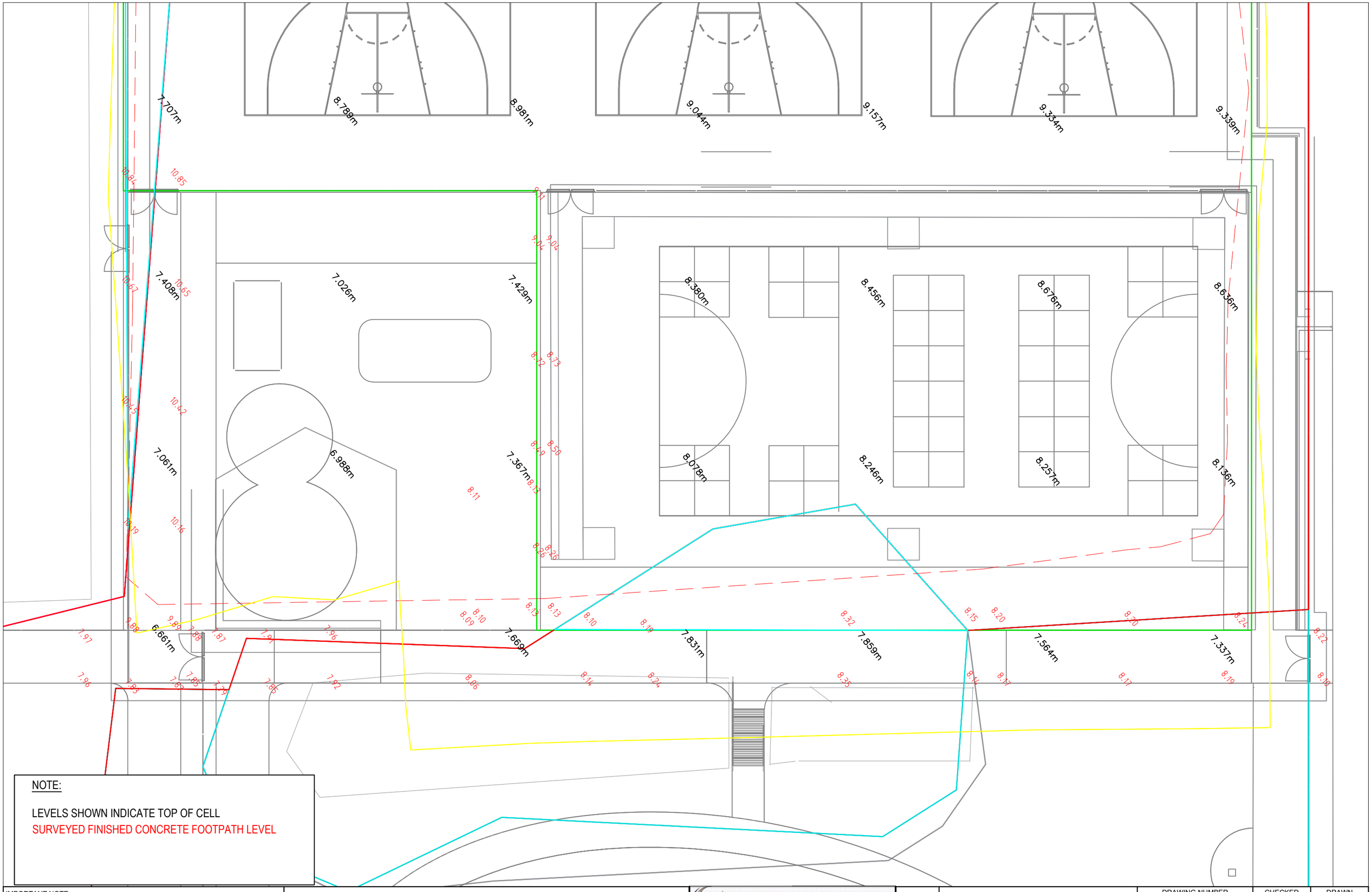
| | | SHEET 1 | | | |




NOTE:

LEVELS SHOWN INDICATE TOP OF CELL

SURVEYED FINISHED CONCRETE FOOTPATH LEVEL

IMPORTANT NOTE:
This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

0 5 10 Meters

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
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TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
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| | | 201155.9206 | | TJM | TJM |
| ADDRESS: | 2 RHODES STREET | DATUM | SOURCE | SURVEYED | QA |
| | | AHD | MGA | TJM | QA |
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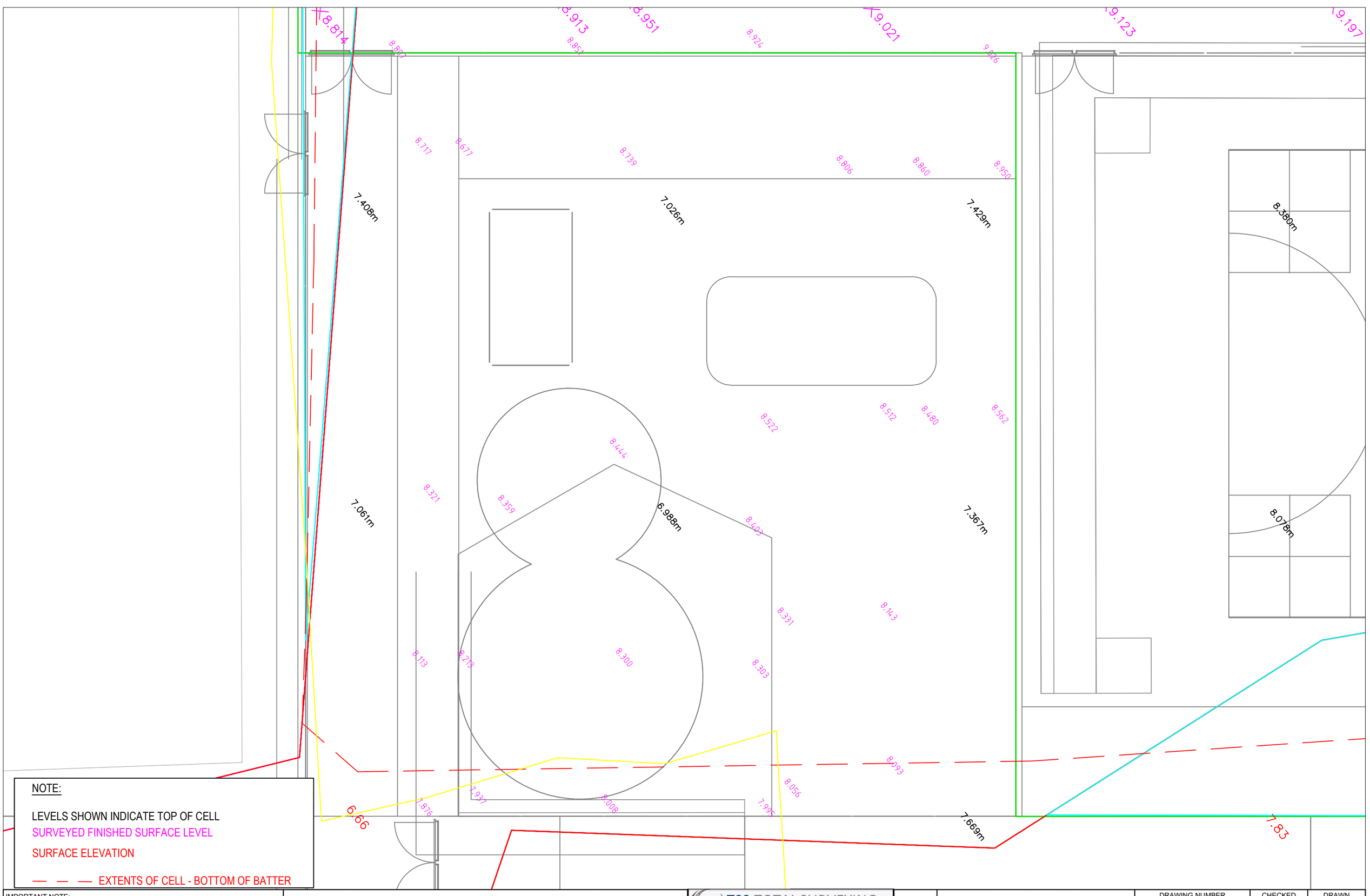


NOTE:

LEVELS SHOWN INDICATE TOP OF CELL

SURVEYED FINISHED SURFACE LEVEL

SURFACE ELEVATION

— — — EXTENTS OF CELL - BOTTOM OF BATTER

IMPORTANT NOTE:
This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

0 4 8 Meters

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
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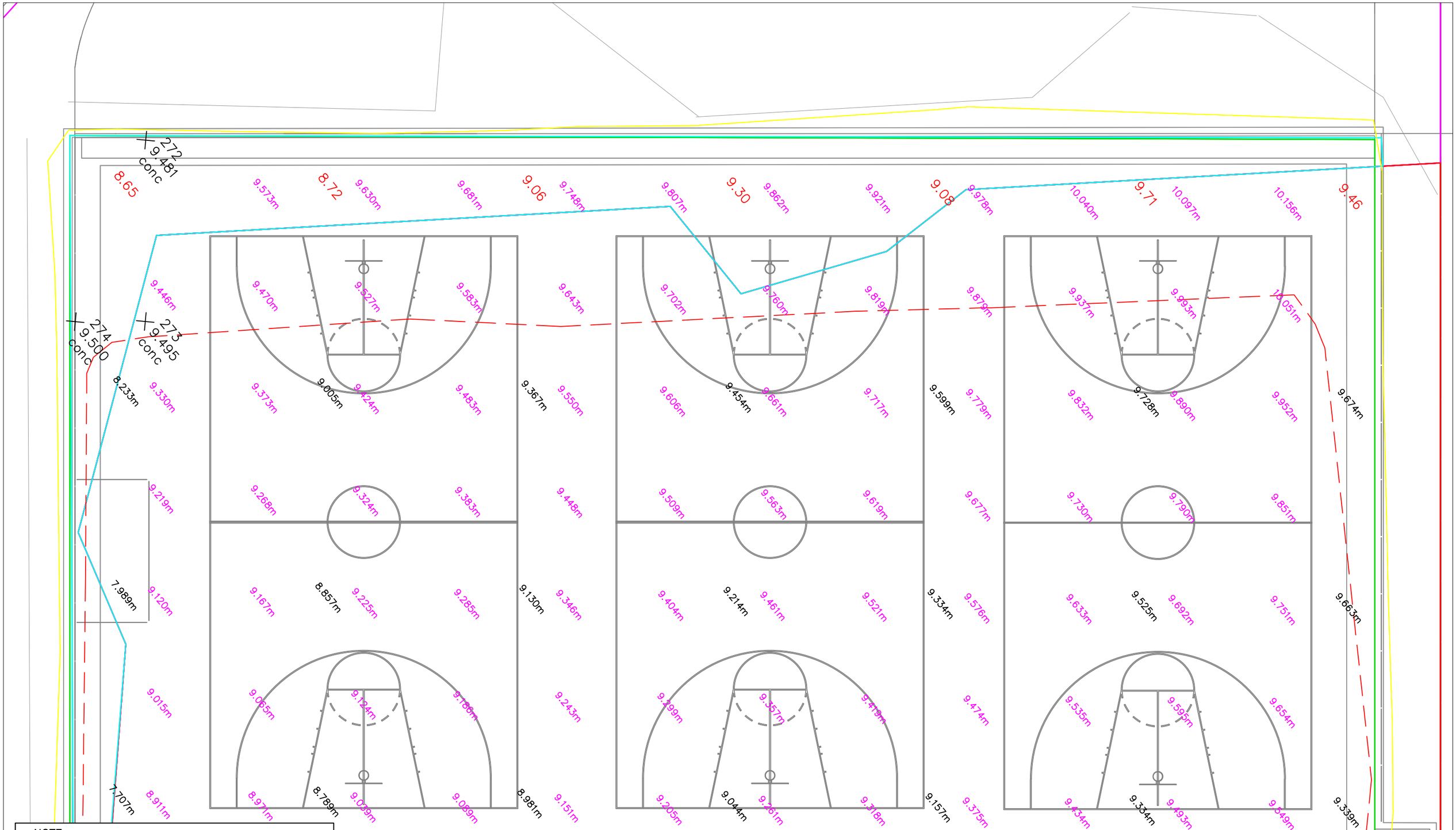


NOTE:

LEVELS SHOWN INDICATE TOP OF CELL

SURVEYED FINISHED SURFACE LEVEL

SURFACE ELEVATION

— — — EXTENTS OF CELL - BOTTOM OF BATTER

IMPORTANT NOTE:
This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

0 5 10 Meters

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
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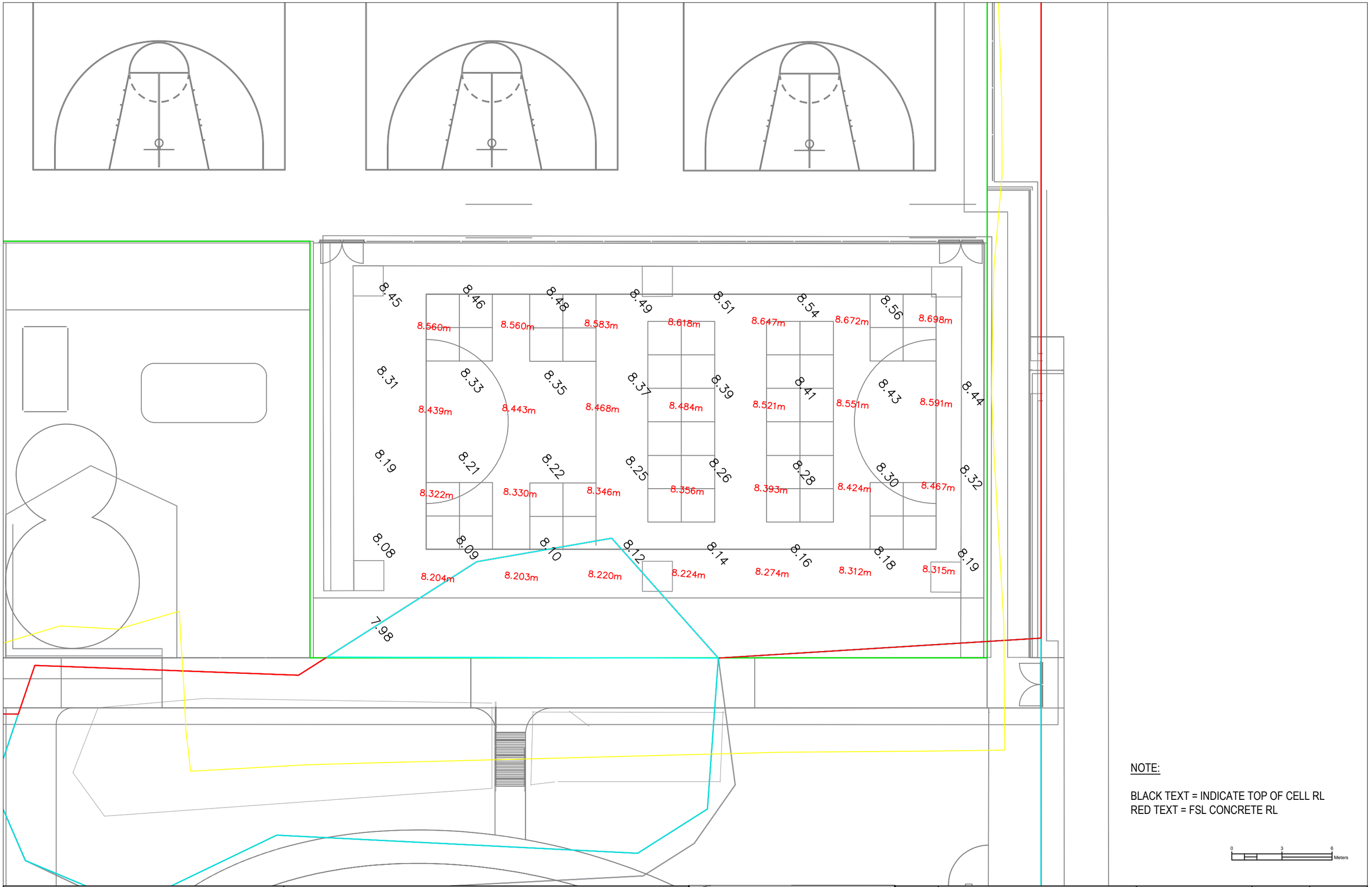
| | | SHEET 1 | | A | |




NOTE:

BLACK TEXT = INDICATE TOP OF CELL RL
RED TEXT = FSL CONCRETE RL

0 3 6 Meters

IMPORTANT NOTE:
This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
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| | | SHEET 1 | | | |

NOTE:

BOUNDARIES HAVE BEEN DETERMINED BY SURVEY,
SIGNOFF DATE: 08/05/2020
REF: 200850.0002 (BOUNDARY FIX)

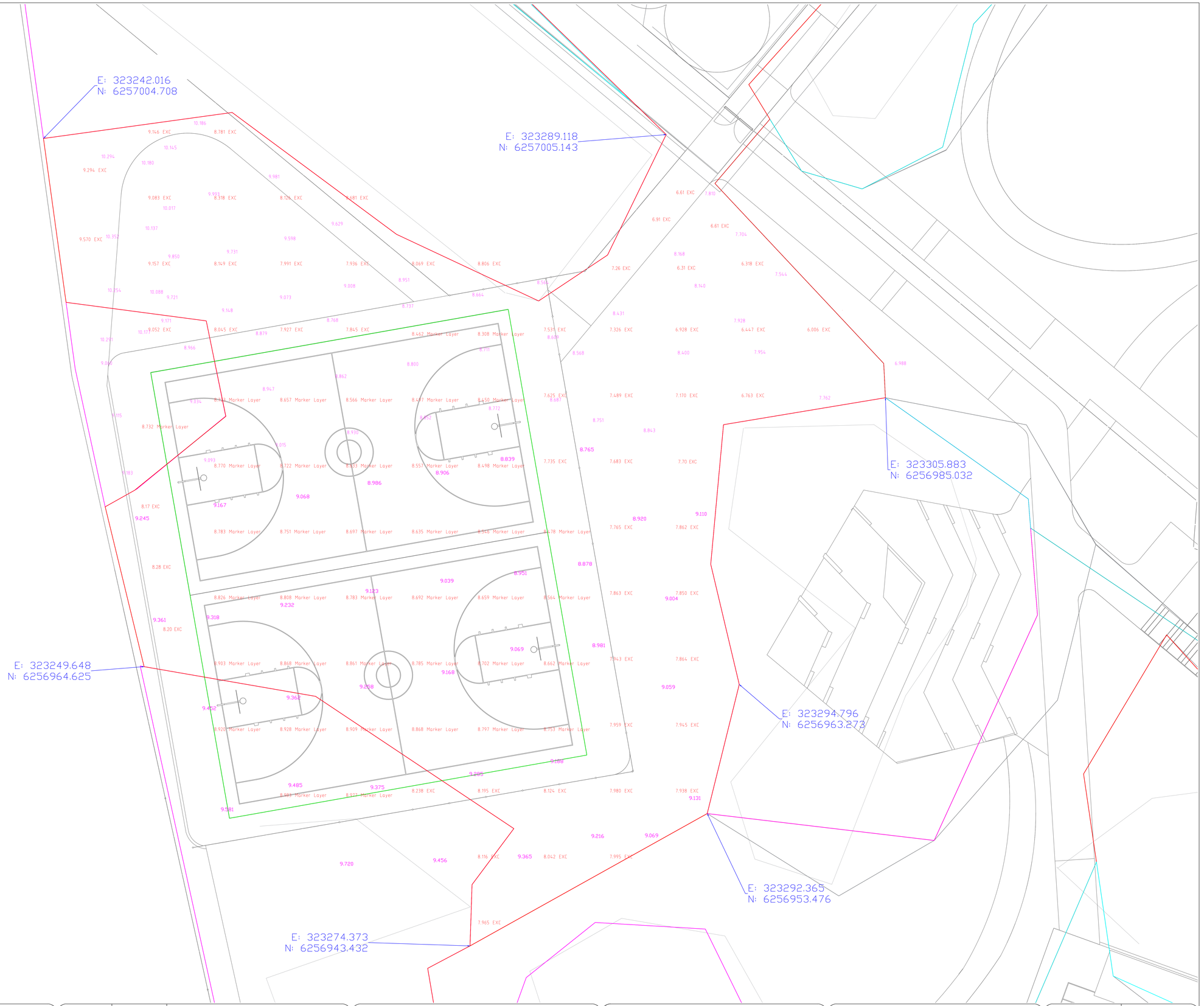
LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD)
ORIGIN: DETAIL - MSP-CM-SV-17314[7],
HEIGHT: BM:7.11m

ALL POSITIVE VALUES INDICATE HEIGHT DIFFERENCE FROM THE SURFACES NOTED, ALL VALUES ARE SHOWN IN METRES.

ALL NEGATIVE VALUES INDICATE THAT THE EXCAVATED SURFACE IS ABOVE THE FINISHED DESIGN SURFACE LEVEL.

ALL RL'S ARE SHOWN IN METRES. RL'S ARE SHOWN WHERE EXCAVATION EXTENDS BEYOND FINISHED SURFACE DESIGN MODEL.

MEASURE DATA COLLECTED BY JJ, MM, RK, TM, WARD CIVIL FROM 26/08/20 TO 19/11/2021




LEGEND:
GREEN FSL = COURT AREA FSL RL
MAGENTA = SURVEYED FSL 19/11/21

TSS TOTAL SURVEYING SOLUTIONS
LANE COVE | CAMDEN | MANLY VALE | CENTRAL COAST



| REVISION No. | REVISION DATE: | COMMENT: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

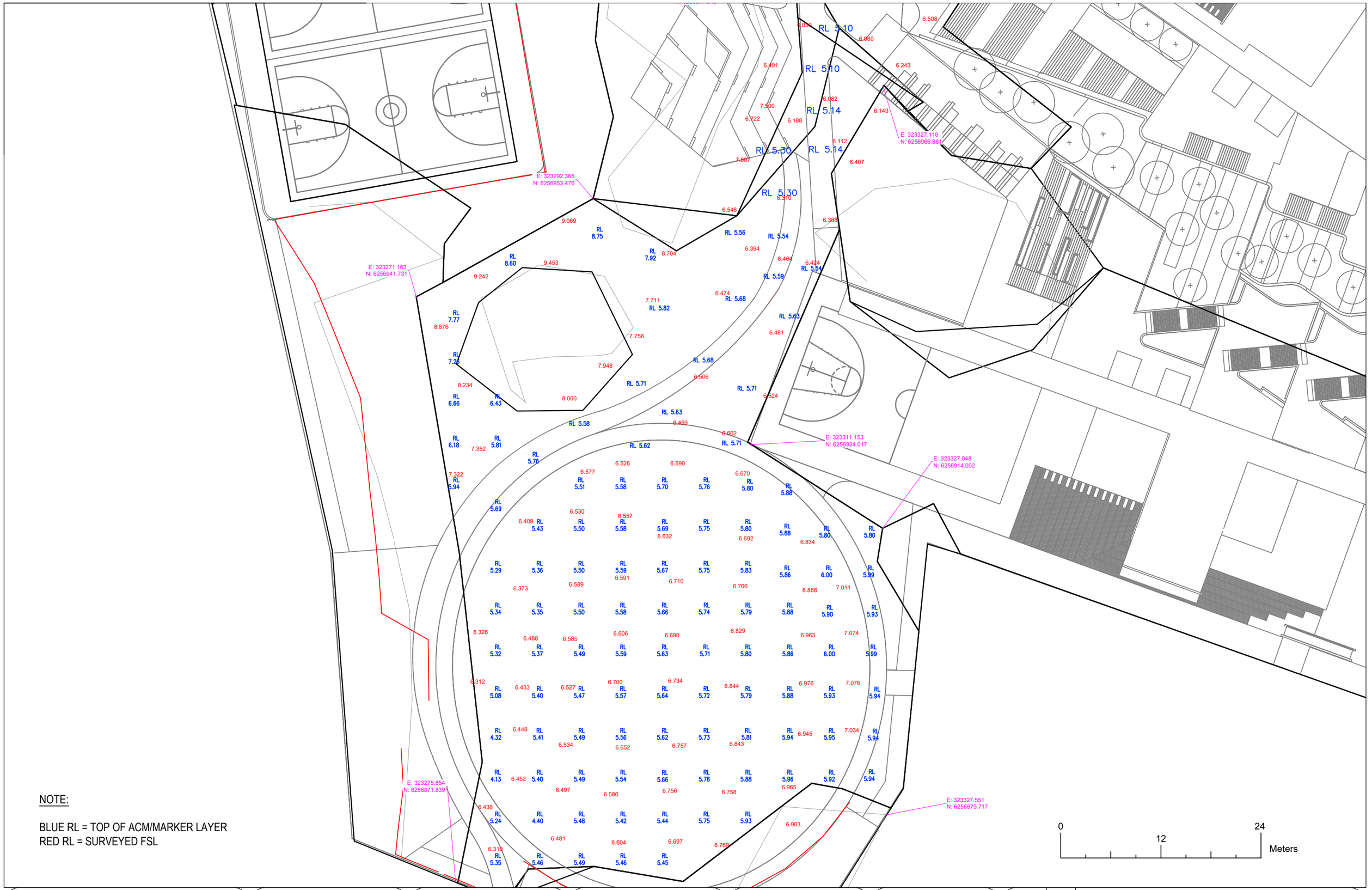
WARD

BAR SCALE
0 1 2 3 4 5 10m
PLOTTED SCALE 1:100 (A1 SIZE SHEET)

PLAN SHOWING EXCAVATION REDUCED LEVELS
WARD CE MEADOWBANK

| | | | |
|---|---|---|---|
| CLIENT: | WARD CIVIL | DATE: 25/11/2021 | SCALE: 1:100 |
| PROJECT: | MEADOWBANK | DRAWN: TJM | CONT. INTERVAL: N/A |
| ADDRESS: | RHODES STREET, MEADOWBANK | CHK: BMB | SHEET 1 OF 1 |

JOB No.: 201155 | LGA:
PLAN No.: 9204 | DATUM: AHD




NOTE:

BLUE RL = TOP OF ACM/MARKER LAYER
RED RL = SURVEYED FSL

TSS TOTAL SURVEYING SOLUTIONS
ARTARMON | CAMDEN | MANLY VALE

DRAWING TITLE
PLAN SHOWING
EXCAVATION LEVEL AND FSL
IN AREA AEC101

CLIENT: WARD CIVIL
PROJECT: MEADOWBANK
ADDRESS: RHODES STREET
JOB NO.: 201155

PLAN No.: 201155.9108
DATE: 11/01/22
SURVEYOR: TJM
CHK: PF
CONT. INT.: -

DATUM: AHD
ORIGIN:
MGA: Y
SCALE: 1:400

| DATE | REV | COMMENTS |
|---|---|---|
| | | |
| | | |
| | | |

C:\Users\Tom\OneDrive - Total Surveying Solutions\WARD - FINAL WAE\220111

# MEADOWBANK TRENCHES WAE

AS-BUILT INFORMATION SHOWN IN RED/BLUE HAS BEEN REFERENCED FROM SURVEY INFORMATION TAKEN ON **10/09/2020** TO DRAWING **"tin FSL From Contours 200826".**

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING ORIGINAL DETAIL SURVEY BENCHMARK ON 'DETAIL-MSP-CM-SV-17314[7]' WITH RL 7.11m(AHD) TRANSFERRED ON 18/05/2020

RL. 9.51
RL. 9.48
RL. 9.77
RL. 9.19
IL9.513m
RL. 9.17
RL. 9.7
RL. 8.04
RL. 9.21
IL9.558m
RL. 9.36
RL. 9.06
RL. 9.05
RL. 7.86
RL. 9.23
RL. 8.15
RL. 7.88
IL8.788m
RL. 7.36
RL. 8.68
IL8.942m
RL. 9.13
RL. 8.46
RL. 8.47
RL. 7.98
RL. 8.25
RL. 7.7
IL8.417m
RL. 7.26
RL. 7.6
RL. 8.37
RL. 7.17
RL. 7.53
IL8.210m
RL. 7.12
RL. 7.77

0 8.44 16.88 Meters

IMPORTANT NOTE:
This plan is prepared for WARD from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

RL's INDICATE EXCAVATION LEVEL
TOP OF TRENCH
BOTTOM OF TRENCH

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|
| A | 10/09/20 | TRENCHES AND LEVEL CONFORMACE | MJM | MJM |

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
| | | 201155.9203 | | TJM | TJM |
| ADDRESS: | RHODES ST | DATUM | SOURCE | SURVEYED | QA |
| | | AHD | MGA94 | TJM | QA |
| TITLE: | TRENCHEST WAE & CONFORMANCE | SCALE N.T.S | | REV. | A3 |
| | | SHEET 1/1 | | A | |

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# MEADOWBANK TRENCHES WAE

AS-BUILT INFORMATION SHOWN IN RED/BLUE HAS BEEN REFERENCED FROM SURVEY INFORMATION TAKEN ON **10/09/2020** TO DRAWING **"tin FSL From Contours 200826".**

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING ORIGINAL DETAIL SURVEY BENCHMARK ON 'DETAIL-MSP-CM-SV-17314[7]' WITH RL 7.11m(AHD) TRANSFERRED ON 18/05/2020

RL. 6.50

RL. 7.62
IL = 7.65

IL = 7.96

RL. 7.75
IL = 8.170

RL. 7.66

IL = 8.225

RL. 7.92

0 6 12 Meters

IMPORTANT NOTE:
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**RL's INDICATE EXCAVATION LEVEL**
TOP OF TRENCH
BOTTOM OF TRENCH

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|
| A | 10/09/20 | TRENCHES AND LEVEL CONFORMACE | MJM | MJM |

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
| | | 201155.9203 | | TJM | TJM |
| ADDRESS: | RHODES ST | DATUM | SOURCE | SURVEYED | QA |
| | | AHD | MGA94 | TJM | QA |
| TITLE: | TRENCHEST WAE & CONFORMANCE | SCALE N.T.S | | REV. A | A3 |
| | | SHEET 1/1 | | | |

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# MEADOWBANK TRENCHES WAE

AS-BUILT INFORMATION SHOWN IN RED/BLUE HAS BEEN REFERENCED FROM SURVEY INFORMATION TAKEN ON **10/09/2020** TO DRAWING **"tin FSL From Contours 200826".**

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING ORIGINAL DETAIL SURVEY BENCHMARK ON 'DETAIL-MSP-CM-SV-17314[7]' WITH RL 7.11m(AHD) TRANSFERRED ON 18/05/2020

RL. 5.6
RL. 4.56
RL. 4.52
RL. 5.56
RL. 4.49
RL. 4.68
RL. 5.73
RL. 5.73
RL. 5.07
RL. 4.09
RL. 5.15
RL. 4.15
RL. 5.62
RL. 5.84
RL. 5.16
RL. 6.61

0 8.39 16.78 Meters

IMPORTANT NOTE:
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RL's INDICATE EXCAVATION LEVEL
TOP OF TRENCH
BOTTOM OF TRENCH

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|
| A | 10/09/20 | TRENCHES AND LEVEL CONFORMACE | MJM | MJM |

TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au

WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
| | | 201155.9203 | | TJM | TJM |
| ADDRESS: | RHODES ST | DATUM | SOURCE | SURVEYED | QA |
| | | AHD | MGA94 | TJM | QA |
| TITLE: | TRENCHEST WAE & CONFORMANCE | SCALE N.T.S | | REV. A | A3 |
| | | SHEET 1/1 | | | |

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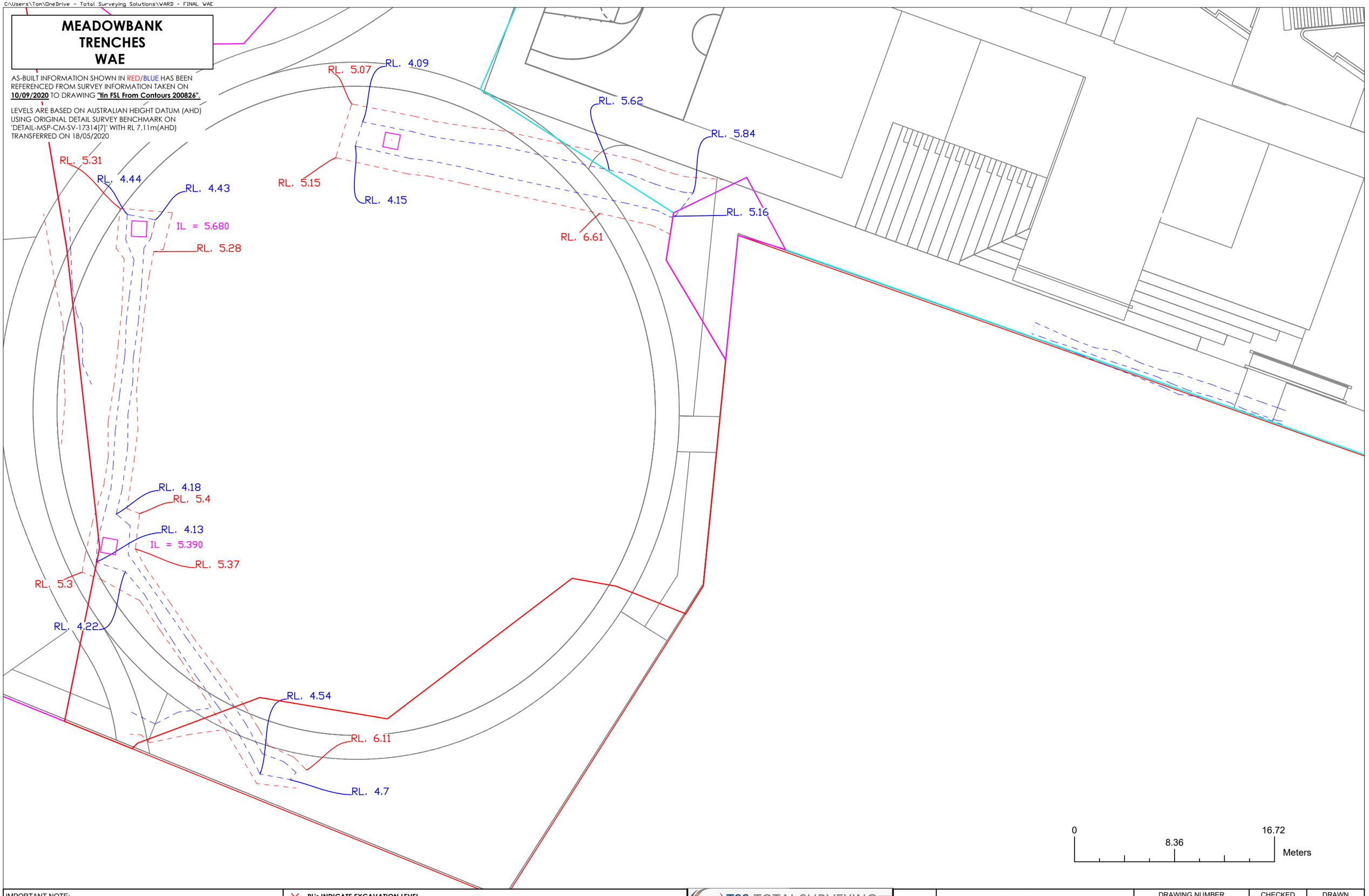
# MEADOWBANK TRENCHES WAE

AS-BUILT INFORMATION SHOWN IN RED/BLUE HAS BEEN REFERENCED FROM SURVEY INFORMATION TAKEN ON **10/09/2020** TO DRAWING **"tin FSL From Contours 200826"**.

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING ORIGINAL DETAIL SURVEY BENCHMARK ON 'DETAIL-MSP-CM-SV-17314[7]' WITH RL 7.11m(AHD) TRANSFERRED ON 18/05/2020




IMPORTANT NOTE:
This plan is prepared for WARD from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. A services search of the area surveyed above has not been undertaken. Visible services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

RL's INDICATE EXCAVATION LEVEL
TOP OF TRENCH
BOTTOM OF TRENCH

| REVISION | DATE | DESCRIPTION | DRAWN | CHECKED |
|---|---|---|---|---|
| A | 10/09/20 | TRENCHES AND LEVEL CONFORMACE | MJM | MJM |


TSS TOTAL SURVEYING SOLUTIONS
1300 877 000 info@totalsurveying.com.au


WARD

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | MEADOWBANK | DRAWING NUMBER | | CHECKED | DRAWN |
| | | 201155.9203 | | TJM | TJM |
| ADDRESS: | RHODES ST | DATUM | SOURCE | SURVEYED | QA |
| | | AHD | MGA94 | TJM | QA |
| TITLE: | TRENCHEST WAE & CONFORMANCE | SCALE N.T.S | | REV. A | A3 |
| | | SHEET 1/1 | | | |

NOTE:

BOUNDARIES HAVE BEEN DETERMINED BY SURVEY,
SIGNOFF DATE: 08/05/2020
REF: 200850.0002 (BOUNDARY FIX)

LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD)
ORIGIN: DETAIL - MSP-CM-SV-17314[7],
HEIGHT: BM:7.11m

ALL POSITIVE VALUES INDICATE HEIGHT DIFFERENCE FROM THE SURFACES NOTED, ALL VALUES ARE SHOWN IN METRES.

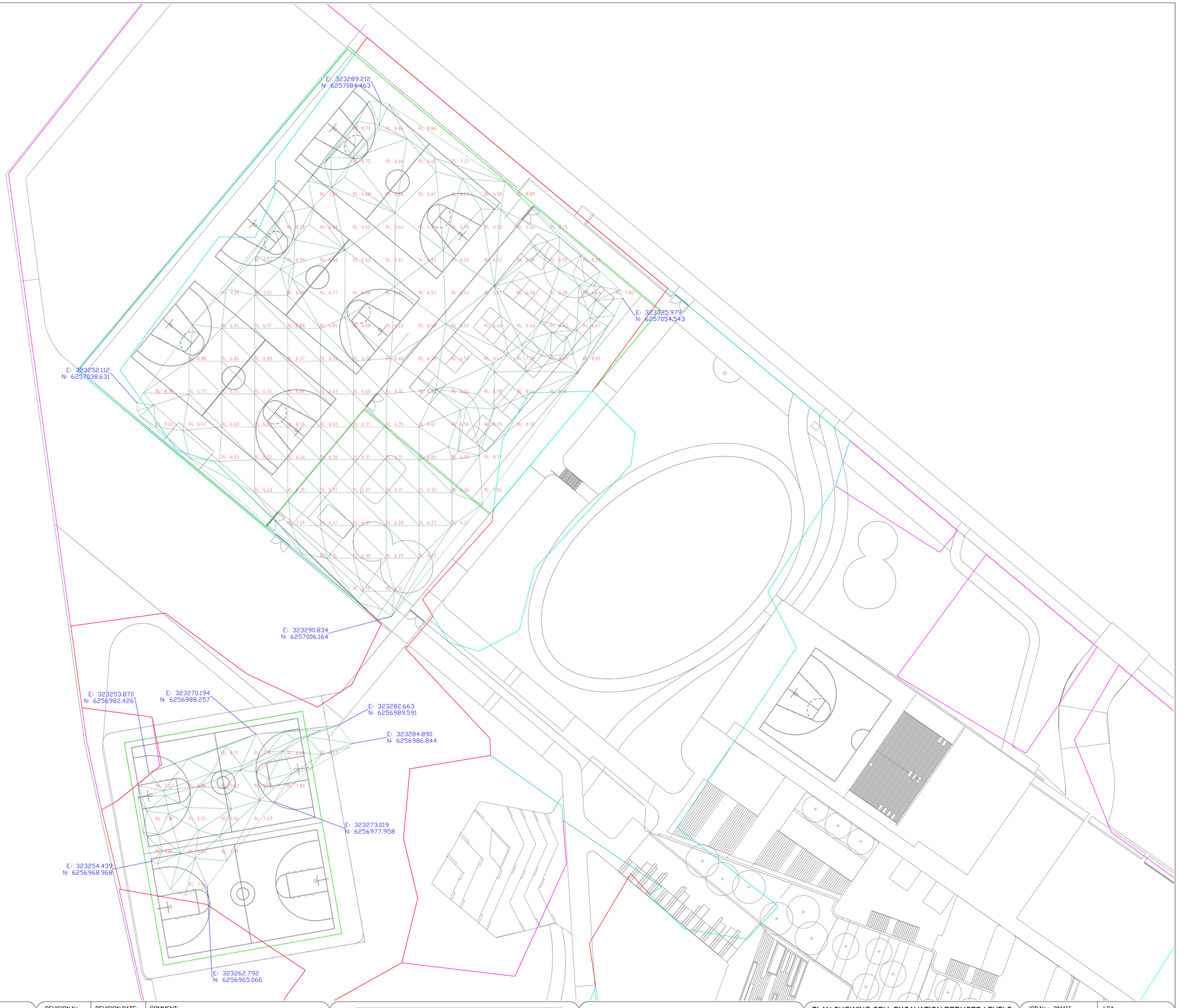
ALL NEGATIVE VALUES INDICATE THAT THE EXCAVATED SURFACE IS ABOVE THE FINISHED DESIGN SURFACE LEVEL.

ALL RL'S ARE SHOWN IN METRES.

MEASURE DATA COLLECTED BY JJ, MM, RK, TM, WARD CIVIL
FROM 26/08/20 TO 07/10/20

FSL TIN USED FOR CONFORMANCE:
MSP-EN-CV-00121, Rev 9 (25/08/20) and Rev A (18/09/20)

BACKCLOTH SHOWN FOR REFERENCE PURPOSES ONLY




LEGEND:

RL'S SHOWN = EXCAVATION LEVEL

TSS TOTAL SURVEYING SOLUTIONS
LANE COVE | CAMDEN | MANLY VALE | CENTRAL COAST



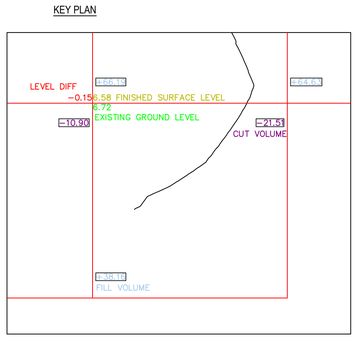
| REVISION No. | REVISION DATE: | COMMENT: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

WARD

BAR SCALE
0 2 4 6 8 10 20m
PLOTTED SCALE 1:200 (A0 SIZE SHEET)

# PLAN SHOWING CELL EXCAVATION REDUCED LEVELS WARD CE MEADOWBANK

| | | | |
|---|---|---|---|
| CLIENT: | WARD CIVIL | JOB No.: 201155 | LGA: |
| PROJECT: | MEADOWBANK | PLAN No.: 9201 | DATUM: AHD |
| ADDRESS: | RHODES STREET, MEADOWBANK | DATE: 16/12/2020 | SCALE: 1:200 |
| | | DRAWN: TJM | CONT. INTERVAL: N/A |
| | | CHK: BMB | SHEET 1 OF 1 |




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 318<br>3.4 | 85.1 | 288.4 | 202.6 | 764.0 | 978.3 | 537.3 | 311.0 | 16.8 |
| Fill | | | | | | | | |
| 605<br>1.2 | 1032.4 | 2794.4 | 1705.5 | 56.8 | 247.5 | 105.3 | 105.6 | 3.7 |
| Cut | | | | | | | | |

| | |
|---|---|
| 3.6 | 2.7 |
| 10.4 | 100<br>2.5 |
| 165.<br>9 | 131<br>6.5 |
| 385.<br>2 | 113<br>3.1 |
| 422.<br>7 | 118<br>4.2 |
| 107<br>5.6 | 981.<br>5 |
| 106<br>3.3 | 379.<br>7 |
| 56.<br>7 | 51.0 |
| Fill | Cut |

TSS TOTAL SURVEYING SOLUTIONS
SYDNEY - MELBOURNE - NEWCASTLE



| REVISION No. | REVISION DATE: | COMMENT: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

0 20 40 Meters
BAR SCALE

PLAN SHOWING
CUT/FILL FROM EXISTING GL TO FSL

| | | | |
|---|---|---|---|
| CLIENT: | WARD | DATE: | 03/12/2021 |
| PROJECT: | MEADOWBANK SCHOOL | DRAWN: | TJM |
| ADDRESS: | RHODES STREET | CHK: | SY |

| | |
|---|---|
| JOB No.: 201155 | LGA: RYDE |
| PLAN No.: 9800 | DATUM: AHD |
| | CONT. INTERVAL: 0.25m |
| | SHEET 1 OF 1 |

# APPENDIX C: EMP Compliance Forms

## EMP INDUCTION REGISTER

The purpose of the induction register is to acknowledge acceptance and compliance with the procedures outlined within this EMP by signing the attached log. Copies of this document must be made available for review and be readily available at the job site.

The Induction Register is required to be completed by each person inducted into the LTEMP.

| Personnel | Position / Role | Signature | Time / Date |
|---|---|---|---|
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| | | | |
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| Personnel | Position / Role | Signature | Time / Date |
|---|---|---|---|
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| Personnel | Position / Role | Signature | Time / Date |
|---|---|---|---|
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| Personnel | Position / Role | Signature | Time / Date |
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## ROUTINE SITE INSPECTION PROFORMA

| | |
|---|---|
| **Site Name** | |
| **Inspected By** | **(Maintenance Manager)** |
| **Inspection Date** | |
| **Annual / Year** | |
| **Weather** | |

| No. | Item | Inspection Observations |
|---|---|---|
| **1** | Condition of hardstand surface cover | |
| **2** | Condition of soft landscaped surface cover | |
| **3** | Degradation in the cap and contain remediation areas | |
| **4** | Asbestos contamination exposed at the site | |
| **5** | Other contamination exposed at the site | |

| | | |
|---|---|---|
| **6** | Aesthetic issues on the site surface | |
| **7** | Vegetation observed healthy | |
| **8** | Recommendation for Rectification | |
| **9** | Documentation of Rectification Conducted and Validation | |
| **10** | Close-out of the Rectification | |

**GENERAL COMMENTS**: (photographs taken)

**NOTES:**
If a breach in the capping layer is observed, the site surface should be repaired appropriately to ensure subsurface soils are adequately covered and not exposed.
If ACM is identified on the site surface, they should be removed in compliance with SafeWork NSW Codes of Practice and WHS Regulations 2017, and other relevant regulatory requirements.

| Sign off | | | |
|---|---|---|---|
| **Date** | **Time** | **Name** | **Signature** |
| | | | |

## COMPLAINTS AND ENVIRONMENTAL INCIDENT REGISTER

The purpose of the Complaints and Environmental Incident Register is to maintain a register of complaints and environmental incidents from surrounding residents or concerned parties, which will include a record of any action taken with respect to the complaints or incidents. The register is required to be completed immediately following the receipt of any complaints and/or incidents associated with works undertaken at the site.

| Date/Time | Communication | Personnel Name | Personnel Contact Details | Complaint | Correction Action | Response Date | Signature |
|---|---|---|---|---|---|---|---|
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| Date/Time | Communication | Personnel Name | Personnel Contact Details | Complaint | Correction Action | Response Date | Signature |
|---|---|---|---|---|---|---|---|
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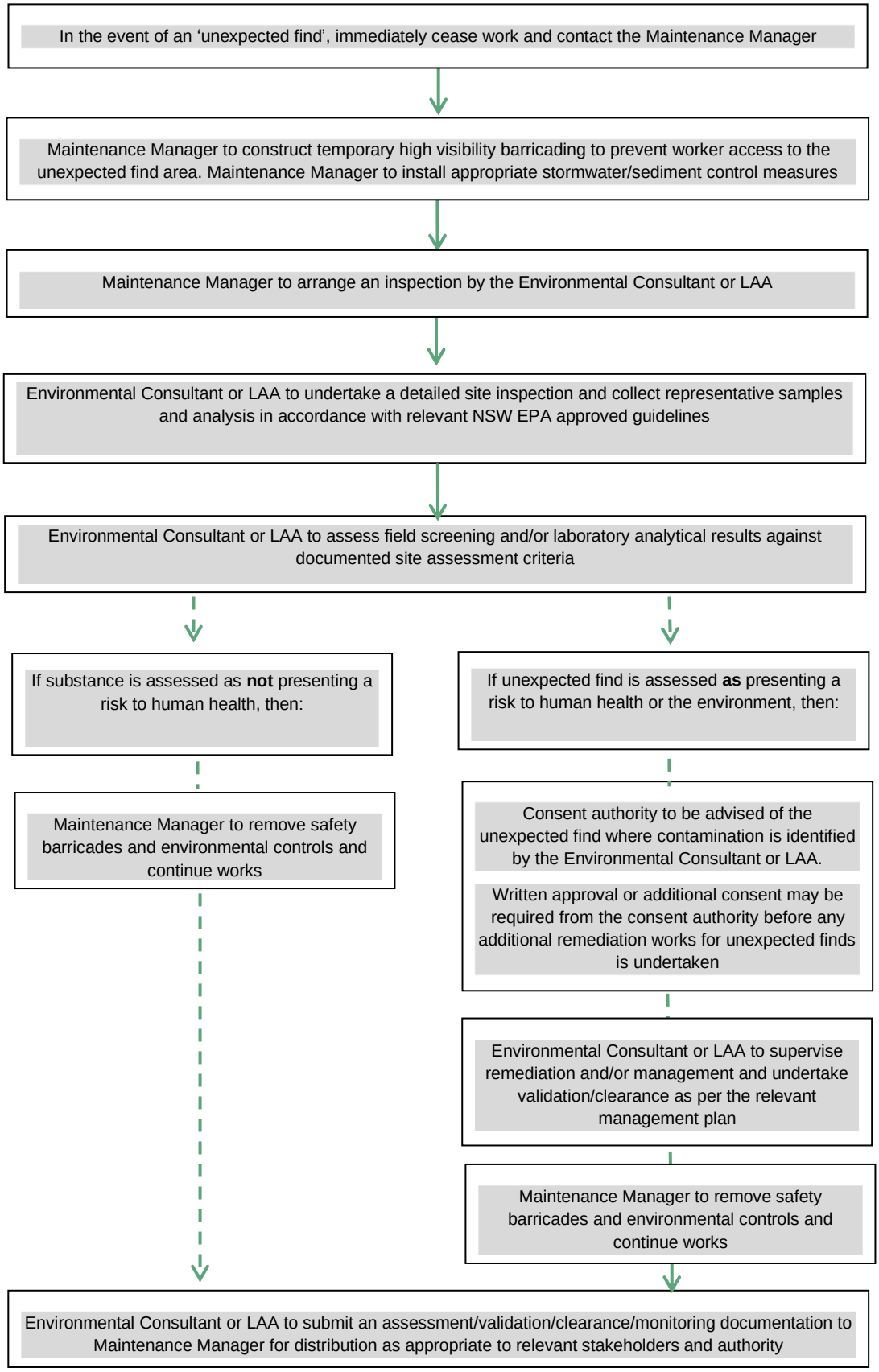
# APPENDIX D: Unexpected Finds Protocol

# Unexpected Finds Protocol



# APPENDIX E: Asbestos Register

## ASBESTOS SITE REGISTER

The purpose of the asbestos register is to maintain a record of asbestos materials used or present at the site. Copies of this document must be made available for review and be readily available at the job site.

| LOCATION | ASBESTOS CONDITION | SAMPLE REF | LABORAOTRY ANALYTICAL RESULTS | MATERIAL CONDITION | QUANTITY | ACTION REQUIRED | INSPECTION DATE | CONTROLS IMPLEMENTED |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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# APPENDIX F: Geotextile Marker Specification

# PROFAB® GEOTEXTILE INDICATOR MARKER LAYER

FOR DELINEATION OF POTENTIALLY HAZARDOUS MATERIAL LAYERS

## DESCRIPTION

ProFab® AS140/Orange nonwoven geotextiles are comprised of fibres, needled together into a stable matrix, that provides excellent physical and hydraulic properties.

The product is produced in a high visibility orange at the time of manufacture.

ProFab® AS140/Orange is designed to delineate potential areas of hazard when excavating potentially contaminated ground or in the positive identification of buried services. The AS140/Orange product is laid at time of construction over the top of identified hazards. Generally backfilling operations proceed to cover the potential hazard.

This marker layer of readily identified geotextile allows later construction activities to cease activities once this layer is exposed and assess options to proceed in a safe manner. Construction drawings should note the depth and extent of such geotextile marker layers for later use by service and construction operators.

## APPLICATION

ProFab® AS140/Orange provides a highly visual indicator layer that identifies buried hazards.

## TYPICAL PROPERTIES

| PROPERTY | TEST METHOD | UNIT | TYPICAL VALUE |
|---|---|---|---|
| Typical Mass | AS3706.1 | $g/m^2$ | 140 |
| Grab Tensile | AS3706.2 | N | 400 |
| Pore Size | AS3706.7 | mm | 0.2 |
| Flow Rate | AS3706.9 | $l / m^2 / s$ | 300 |
| Roll Dimensions | n/a | m | 2 x 50<br>2 x 100<br>4 x 100<br>6 x 100 |

DISTRIBUTORS OF :

**Geotextiles**
**Geogrids**
**Dewatering Tubes**
**Subsoil Drainage**
**Wick Drains**
**Erosion Control**
**Gabions & Rock Mattresses**
**Industrial Fabrics**
**Lining Systems**



JUNE.18

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**PERTH**
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F: (08) 9459 4311

**MELBOURNE**
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F: (03) 9791 1776

**ADELAIDE**
P: (08) 8384 8894
F: (08) 8384 3886

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