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ENVIRONMENTAL CONSULTING

# Acid Sulfate Soil Management Plan

Prepared for

## RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust

**The Timber Yards, Marrickville NSW**

Waratah Environmental Consulting | WEC201.ASSMP_v1.0 | 16 December 2024

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# Project Overview

This Acid Sulfate Soils Management *Plan* (ASSMP) has been prepared on behalf of Varsity Assets Management Pty Ltd (Developer) on behalf of RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust ('RTL Co.') (**the Applicant**) to support a State Significant Development Application (SSDA) for the proposed *Timberyards* development. The SSDA (SSD-76927247) seeks consent for a diverse rental housing precinct comprising build-to-rent (BTR), co-living and affordable housing. The precinct development comprises seven buildings ranging from eight to thirteen levels, with open space that includes a pocket park, through site links and communal open spaces. Specifically, consent is sought for the following:

- Site preparation (including remediation), demolition and bulk excavation for basement parking;
- Residential accommodation (shop top housing, residential flat buildings and mixed-use buildings) that includes BTR, co-living and affordable housing;
- Retail premises on the ground floor within the MU1 zoned land and extending up to 25m into the R4 zoned land;
- Publicly accessible recreation area (pocket park) and through site links;
- Neighbourhood shop (within the R4 zoned land);
- Associated landscaping and public domain works; and
- Augmentation of, and connection to, existing utilities as required.

A detailed description of the proposal is provided in the Environmental Impact assessment (EIS) by Ethos Urban. The development is declared State Significant by virtue of being a BTR development on land in Greater Sydney with an Estimated Development Cost (EDC) of greater than $50 million, with the tenanted component representing greater than 60% of the EDC (Schedule 1, *State Environmental Planning Policy (Planning Systems) 2021*).

## Project Vision

RTL Co. aim to deliver Sydney's premier neo-industrial residential neighbourhood - a global benchmark for imaginative urbanism. The Timberyards aims to seamlessly integrate diverse residential offerings into the distinctive character of Marrickville, fostering a sense of pride among residents and the local community. The project will deliver a wide range of rental living solutions, complemented by recreation spaces and local retail, all underpinned by Connection to Country and environmentally sustainable design principles.

## Site Description

The site is known as the 'Timberyards', located in Marrickville within the Inner West Local Government Area (LGA). The site comprises 39 lots with legal identification listed in the table below, and has a total area of 22,770m2 or, for the purpose of calculation of floor space, an area of 22,770 m² (excluding the SP2-zoned Victoria Road widening land, which is within the site boundary). The site is located within Precinct 47: Victoria Road in the *Marrickville Development Control Plan 2011* (MDCP 2011). The site is primarily contained in the Timber Yards sub-precinct of Precinct 47, with the lots fronting Victoria Road falling within the Victoria Road Corridor sub-precinct.

The site is approximately 700m walking distance to the newly opened Sydenham Metro Station, with 7-minute travel time to the Sydney CBD.

The site currently comprises primarily industrial and light industrial uses, with residential dwellings to a minor portion of the site on Farr Street (western boundary) and Victoria Road (eastern boundary). The site also has frontage to Sydenham Road to the south and Mitchell Street to the north (and encompassing a small lane off Mitchell Street). An aerial map is provided at **Figure 1** below.

| Lot/DP | Property Address |
|---|---|
| 1/724487 | 119A Sydenham Rd |
| 1/972534 | 121 Sydenham Rd |
| B/439802 | 129 Sydenham Rd |
| A/439802 | 131 Sydenham Rd |
| D/377270 | 133 Sydenham Rd |
| 1/700223 | 135 Sydenham Rd |
| B/343286 | 7 Farr St |
| A/304426 | 9 Farr St |
| A/304426 | 11 Farr St |
| 1/78883 | 13 Farr St |
| 1/252507 | 15 Farr St |
| 2/252507 | 17 Farr St |
| 345/587262 | 191 Victoria Rd |

| Lot/DP | Property Address |
|---|---|
| 1/572829 | 35 Farr St |
| 12/4590 | 14 Mitchell St |
| 13/4590 | 10 Mitchell St |
| 14/4590 | 8 Mitchell St |
| 15/4590 | 183 Victoria Rd |
| 16/4590 | 4 Mitchell St |
| 17/4590 | 2 Mitchell St |
| 3/4590 | 165 Victoria Rd |
| 2/4590 | 167 Victoria Rd |
| 1/4590 | 169 Victoria Rd |
| A/301985 | 171 Victoria Rd |
| B/301985 | 173 Victoria Rd |
| 1/315293 | 183 Victoria Rd |

| Lot/DP | Property Address |
|---|---|
| 3/252507 | 19 Farr St |
| 4/252507 | 21 Farr St |
| 5/252507 | 23 Farr St |
| 6/252507 | 25 Farr St |
| 7/252507 | 27 Farr St |
| 8/252507 | 29 Farr St |
| 9/252507 | 31 Farr St |
| 1/583801 | 33 Farr St |
| C/301985 | 175 Victoria Rd |
| D/301985 | 183 Victoria Rd |
| E/301985 | 175 Victoria Rd |
| A/166330 | 183 Victoria Rd |
| 20/667441 | 183 Victoria Rd |

*Figure 1 Aerial site map*



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## Purpose

This ASSMP has been prepared to address the *Secretary's Environmental Assessment Requirements* (SEARs) issued by the Department of Planning, Housing and Infrastructure (DPHI) for the subject SSDA, with specific SEAR(s) identified in the table below.

| SEAR | SEAR description | Report name or report section |
|---|---|---|
| ***Acid Sulfate Soils Management Plan ASSMP*** | *To provide a plan to excavate / manage construction at the site in a manner than ensures there is no unacceptable risk present or created as a result of disturbing potential / actual acid sulfate soils. All works and management is to be completed in accordance with the ASSMAC (1998).* | WEC201.ASSMP_v1.0 |

| | |
|---|---|
| Report Title | Acid Sulfate Soil Management Plan |
| Project Reference Number: | WEC201.ASSMP_v1.0 |
| Document Date: | 16 December 2024 |

**Document Control**

| | |
|---|---|
| **Recipient** | Mr Digby Harlow<br>RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust |
| **Original** | Waratah Environmental Consulting<br>Soft Copy |

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# 1. Introduction

## 1.1. Background

Mr. Digby Harlow on behalf of RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust ('RTL Co.') engaged Waratah Environmental Consulting (Waratah) to complete an Acid Sulfate Soils Management Plan (ASSMP) for the proposed development at 167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW (the Site). This ASSMP follows on from an Acid Sulfate Soil (ASS) Investigation prepared by Aargus (2014).

The subject site is located approximately 7.0 km south-west of Sydney CBD, within the Local Government Area of Inner West Council. The site is further defined as Lots 1-9 of DP252507; Lot 1 of DP583801; Lot 1 of DP572829; Lots 1-3 & 12-17 of DP4590; Lots A-E of DP301985; Lot A of DP166330; Lot 20 of DP667441; Lot 1 of DP315293; Lot 345 of DP587262; Lot 1 of DP724487; Lot 1 of DP972534; Lots A-B of DP439802; Lot D of DP377270; Lot 1 of DP700223; Lots A-B of DP304426 and Lot 1 of DP78883.

Waratah understands this ASSMP is required to facilitate excavation of PASS material identified by Aargus (2014). The ASSMP will detail the treatment and site management requirements for the identified PASS material.

## 1.2. Proposed Development

Waratah understands that this ASSMP is required as part of a data package for submission to *NSW Department of Planning, Housing & Infrastructure* as part of a *State Significant Development Application* (SSDA) to facilitate development of the site. Based on the approved development plans (Turner Architects, 2024) Waratah understands that the site is to be redeveloped into a high-density 'build-to-rent' residence. The development involves the construction of approximately seven residential buildings with ground floor commercial, open recreational space / pedestrian thoroughfare and two levels of basement car parking (totalling 279 car spaces). The tallest residential building will extend to a total of 13 levels (RL 49.00 mAHD) with the bulk excavation level (BEL) extending to a maximum depth of 7.1 mBGL (RL 0.580 mAHD).

A copy of the approved plans are available in **Appendix B**.

## 1.3. Objectives

The objective of the ASSMP is to complete the following:

- Document the actions necessary to minimise any impacts to the local environment and neighbouring properties, associated with disturbing AASS / PASS at the site;
- Detail the excavation, treatment and management requirements for the PASS material prior to offsite disposal;
- (Contingency); Detail the excavation, treatment and management requirements for the PASS material prior to onsite retention;
- Mitigation and management strategies at the site; and
- Monitoring and validation of treatment process by suitably qualified environmental scientist.

# 2. Site Information

## 2.1. Cadastral Information

| Attribute | Description |
|---|---|
| Site Address | 167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW |
| Lot / Section / Deposition Plan | Lots 1-9 of DP252507; Lot 1 of DP583801; Lot 1 of DP572829; Lots 1-3 & 12-17 of DP4590; Lots A-E of DP301985; Lot A of DP166330; Lot 20 of DP667441; Lot 1 of DP315293; Lot 345 of DP587262; Lot 1 of DP724487; Lot 1 of DP972534; Lots A-B of DP439802; Lot D of DP377270; Lot 1 of DP700223; Lots A-B of DP304426 and Lot 1 of DP78883. |
| Site Area | 22,564 m²<br>(https://maps.six.nsw.gov.au/#) |
| State Survey Marks | A total of four state survey marker (SS) and one permanent marker (PM) were identified within close proximity (<150m) to the site:<br>- SS49218 on Farr Street;<br>- SS47493 on Mitchell Street;<br>- SS46888D on Victoria Road;<br>- SS52705D on Victoria Road; and<br>- PM58523 on Sydenham Road. |
| Local Government Authority | Inner West Council |
| Current Zoning | MU1 – Mixed use;<br>R4 – High density residential |
| Current Land Use | The site is currently occupied by several commercial industrial lots and single level dwellings. |

## 2.2. Regional Geology

Based on *NSW Soil Landscapes of Sydney 1:100,000 Sheet* (Chapman & Murphy, 1989) the site is likely underlain by soils of the Birrong (bg) fluvial soil group with alluvial sediments at depth. Soils of the Birrong fluvial group are described as deep yellow podzolic soils and yellow solodic soils on older alluvial terraces; deep solodic soils and yellow solonetz on current floodplain. Underlying sediments are derived from the Wianamatta Group parent material.

## 2.3. Acid Sulfate Soils (ASS) Risk

The Inner West LEP (2022) indicates the site lies on the boundary of a Class 4 and Class 2b area with regards to the ASS risk. Chapman & Murphy (1989) indicates that the site lies within an area of *Low Probability of ASS occurring ≥4m below ground level*.

## 2.4. Definitions

Potential Acid Sulfate Soil (PASS) is defined as a sediment layer containing oxidisable iron sulfides which have the potential to generate acid. If the material remains undisturbed and unoxidized, it will remain relatively neutral. Oxidation of the material by exposure to air or lowering of the water table, must be completed under the controls of an ASSMP.

Actual Acid Sulfate Soil (AASS) is defined as a sediment containing highly acidic soils as a result of oxidation of iron sulfides. The oxidation produces hydrogen ions in excess of the sediment's capacity

to neutralise the acidity, resulting in a field pH 4 or less. These materials are typically identified by the presence of pale-yellow mottles, jarosite ores and shells.

## 2.5. Previous Investigations

The ASS assessment (Aargus, 2014), advanced a total of four boreholes to varying depths between 3.2 – 9.4 mBGL. Samples were collected from 0.5m increments and field screened with the use of pH / $pH_{fox}$ analysis, with five of the samples selected for SPOCAS analysis at a NATA accredited laboratory.

The report does not state whether groundwater was encountered.

All of the analysed samples were below the assessment criteria for sulfur trail (S-POS or %S), however a total of four samples exceeded the assessment criteria for the acid trail (mol $H^+$ / tonne). Aargus (2014), indicated that the presence of PASS need only be managed during the excavation phase of works without any requirements for managing of groundwater levels.

Waratah notes that all of the samples that exceeded the assessment criteria were collected from BH3 only (Aargus, 2014). Soil material investigated at other sampling locations were below the assessment criteria and did not contain PASS.

## 2.6. Assessment Guidelines

In NSW, the development of land subject to ASS risk is managed in accordance with the guidance of the ASSMAC (1998). **Table 2.1** presents the Site Acceptance Criteria (SAC) based on the ASS material laboratory analytical results for three broad textures of soil. The SAC is based on the percentage of oxidisable sulfur or equivalent acid trail.

*Table 2.1 Potential AEC and corresponding CoPCs*

| **Type of material** | | **Action Criteria (<1000 tonnes disturbed** | | **Action Criteria (>1000 tonnes disturbed** | |
|---|---|---|---|---|---|
| **Texture Range** | **Clay content (%)** | **Sulfur trail (%S)** | **Acid trail (mol $H^+$ /tonne)** | **Sulfur trail (%S)** | **Acid trail (mol $H^+$ /tonne)** |
| **Coarse** (SAND) | <5 | 0.03 | 18 | 0.03 | 18 |
| **Medium** (Clayey SAND; and Sandy CLAY mixtures) | 5-40 | 0.06 | 36 | 0.03 | 18 |
| **Fine** (CLAY; and Silty CLAY) | >40 | 0.1 | 62 | 0.03 | 18 |

## 2.7. Subject Area

Based on the findings of Aargus (2014), the PASS material was identified within sampling location BH3 only, three other sampling locations did not reveal the presence of suspected PASS in any of the materials investigated. As a conservative estimate, Waratah considers the area impacted with PASS to be halfway between BH3 and the nearest 'clean' sampling location (or nearest sampling location that displays no evidence of PASS). The subject area of this ASSMP, containing PASS material requiring management, is provided in **Appendix A**.

The proposed development includes the excavation of two levels of basement car parking, extending to a maximum depth of 7 mBGL (RL 0.600 mAHD). The basement construction will require the

disturbance of more than 1000 tonnes of material within a coarse-grained soil profile. The corresponding assessment criteria detailed in **table 2.1**, is to be adopted.

PASS material was identified extending from depths of 2.0 – 6.0 mBGL, in the vicinity of BH3 only (Aargus, 2014).

## 2.8. Suitability of Remaining Material

In order to ensure that all remaining soil material at the site is suitable for its intended use (offsite disposal or retention), a buffer (green) zone will be established (refer to **Appendix A**). Any soil material excavated from the green zone will field screened by the onsite environmental scientist with the use of pH / $pH_{fox}$. Any material that experiences a drop of pH of ≥2 or the $pH_{fox}$ is ≤4.5 will be subject to the same treatment as detailed in **Section 3.3**. A minimum of five sampling locations (horizontally), with one sample every 0.5 mBGL (vertically) is to be collected from the green zone and analysed for pH / $pH_{fox}$.

# 3. ASS Management Procedure

The following steps outline the management procedure to be undertaken whilst disturbing PASS (material existing from 2.0 – 6.0 mBGL, in the vicinity of BH3, refer to **Appendix A**).

## 3.1. ASS Material Transport

The preferred treatment procedure for the subject ASS material will involve onsite treatment and disposal at a waste receiving facility. The excavated PASS is to be placed on an impermeable surface as close to the source location as is practicable.

Following treatment, the material will be transported to the waste receiving facility with the use of a sealed truck with canopy. In accordance with the remediation action plan (RAP), it may be desirable to retain material onsite. Treated PASS may be retained within containment cells pending approval from the NSW EPA accredited site auditor.

## 3.2. ASS Material Storage

All excavated ASS materials shall be transferred immediately to the designated ASS treatment area. Following treatment, any excavated ASS material should be removed from site as soon as possible. The ASS material treatment area should be bunded and located away from local stormwater facilities. Water that comes into contact with the ASS material may not enter council stormwater nor leave the boundary of the site.

## 3.3. ASS Treatment

Disturbed ASS is to be treated / neutralised with the application of lime (ag-lime) onsite and then disposed of at a waste facility. Subject ASS material is to be placed on an impermeable layer surrounded by bunding, in layers no thicker than 300mm. The material is to be treated at a rate of **4.5 kg / tonne** (lime / PASS soil) and thoroughly mixed with the use of the excavator.

The material should be allowed approximately 30min to adequately neutralise. Once the material has been neutralised, the onsite environmental scientist will screen the material with the use of a pH probe. Once the onsite environmental scientist has validated that the material has adequately neutralised, they will issue a validation certificate so the material may be disposed of.

The designated treatment area should comprise an impermeable layer i.e. concrete hardstand or black builders' plastic; surrounded by bunding and sediment control sand bags. The designated treatment area should be located away from areas of significant plant traffic, sensitive vegetation areas or council stormwater drains.

## 3.4. ASS Sampling & Analysis

Following the neutralisation of the subject PASS material, the onsite environmental scientist will screen the neutralised material. A total of 5 pH field screen samples will be required per stockpile of neutralised material. Each stockpile may not exceed 50 $m^3$ (100 tonnes).

Each treated stockpile will be issued a corresponding clearance certificate by the onsite environmental scientist. The clearance certificate will detail the amount of lime applied to the material and field pH screening data.

## 3.5. ASS Field Trial

No field trial is considered necessary during the current works given the method for transporting, storing, neutralising, monitoring and disposal is well established and will be conducted within the fenced area of the site under the supervision of the assigned environmental scientist.

## 3.6. Modifications to Sit Buildings

The client should consult a suitably qualified engineer to ensure that all building products including but not limited to footings, piles, services, slabs or basement walls, that exist at depths ranging from 2.0-6.0 mBGL are suitably designed to be in contact with PASS.

## 3.7. Groundwater Discharge

The groundwater modelling report (JK Geotechnics, 2024) indicated that groundwater exists between 1.91-2.29 mBGL (RL 0.91-5.29 mAHD). Given that the basement excavation is anticipated to extend to a maximum depth of RL 0.588 mAHD, groundwater is likely to be encountered.

All groundwater should be managed in accordance with the site-specific groundwater management plan; all dewatering discharge will be conducted in accordance with DEC guidelines.

The dewatering contractor is to ensure that all groundwater discharged into the local council stormwater system is below the DEC acceptance criteria. The total titratable acid (TTA) and pH will be monitored regularly to ensure that water of pH <6 and TTA >40 mg/L does not enter the local stormwater system. Should these parameters be exceeded, the monitoring frequency will be increased and the samples submitted for laboratory analysis. The groundwater contractor may need to adjust the dewatering unit or halt dewatering until the discharged water quality improves to within the acceptable parameters.

# 4. Conclusions

Mr. Digby Harlow on behalf of RTL Co engaged Waratah Environmental Consulting (Waratah) to complete an Acid Sulfate Soils Management Plan (ASSMP) for the proposed development at 167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW (the Site). This ASSMP follows on from an Acid Sulfate Soil (ASS) Investigation prepared by Aargus (2014).

The subject site is located approximately 7.0 km south-west of Sydney CBD, within the Local Government Area of Inner West Council. The site is further defined as Lots 1-9 of DP252507; Lot 1 of DP583801; Lot 1 of DP572829; Lots 1-3 & 12-17 of DP4590; Lots A-E of DP301985; Lot A of DP166330; Lot 20 of DP667441; Lot 1 of DP315293; Lot 345 of DP587262; Lot 1 of DP724487; Lot 1 of DP972534; Lots A-B of DP439802; Lot D of DP377270; Lot 1 of DP700223; Lots A-B of DP304426 and Lot 1 of DP78883.

The material identified to contain PASS was limited to soils occurring from 2.0-6.0 mBGL within the vicinity of sampling location BH3 (refer to **Appendix A**).

Disturbed ASS is to be treated / neutralised with the application of lime (ag-lime) onsite and then disposed of at a waste facility. Subject ASS material is to be placed on an impermeable layer surrounded by bunding, in layers no thicker than 300mm. The material is to be treated at a rate of **4.5 kg / tonne** (lime / PASS soil) and thoroughly mixed with the use of the excavator.

Following the neutralisation of the subject PASS material, the onsite environmental scientist will screen the neutralised material. A total of 5 pH field screen samples will be required per stockpile of neutralised material. Each stockpile may not exceed 50 $m^3$ (100 tonnes).

Each treated stockpile will be issued a corresponding clearance certificate by the onsite environmental scientist. The clearance certificate will detail the amount of lime applied to the material and field pH screening data.

In order to ensure that all remaining soil material at the site is suitable for its intended use (offsite disposal or retention), a buffer (green) zone will be established (refer to **Appendix A**). Any soil material excavated from the green zone will field screened by the onsite environmental scientist to ensure it is suitable for its intended use.

In the event that excavation is required at depths below 9.0 mBGL, additional pH / $pH_{fox}$ analysis would be required to ensure the material does not contain PASS.

# 5. Statement of Limitations

This report has been prepared for the sole use of the client (defined above). Waratah take no responsibility for the use of this document by any third party. This report does not provide any legal advice and has been prepared under the direct instructions of the client.

Waratah accepts no liability for the incorrect implementation of recommendations made in this report.

Should any suspected hazardous materials be encountered at any stage of the development, a suitably qualified environmental scientist should be engaged to manage the material.

This report should be read in its entirety, this report should not be separated or read in part as this has the potential to affect the findings of the report.

This report has been prepared by a suitably trained professional with a degree of care and diligence considered to be in conjunction with industry standards. Waratah, however, does not accept any responsibility or liability for the loss, damage, injury or death suffered by any party arising from the use of this report.

This report has been developed to guide the construction process, Waratah does not accept any liability for the quality or standard of work produced by any third party throughout the duration of this project.

# References

Aargus (2014) Acid Sulfate Soils Assessment; *167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW* ref: ES5610/3, dated 7 May 2014

ASSMAC (1998) The Acid Sulfate Soils Assessment Guidelines, dated August 1998

Chapman, G.A & Murphy, C.L (1989) Soil Landscapes of the Sydney 1:100 000 sheet, Soil Conservation Service, Sydney September 1989;

DMR (1983) Sydney 1:100 000 Geological Series Sheet 9130 (Edition 1) *Geological Survey of NSW;* Department of Mineral Resources;

EPA (2014) *Waste Classification Guidelines*

JK Geotechnics (2024) Groundwater Model; *167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW* ref: 36478YCrpt rev3, dated 11 November 2024

SafeWork NSW (2019) *How to manage and control asbestos in the workplace;*

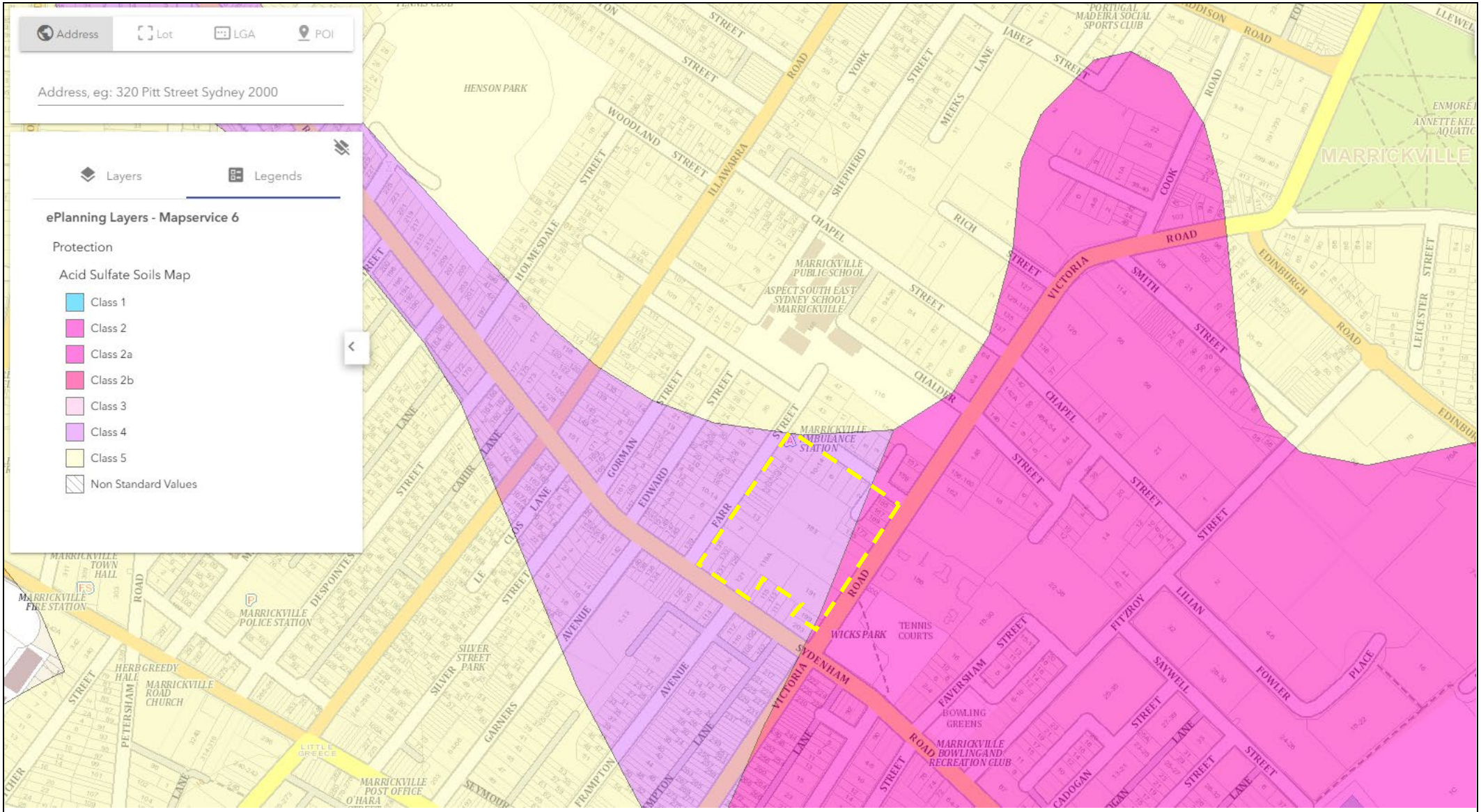
SafeWork NSW (2019) *How to safely remove asbestos*

# Abbreviations

| | |
|---|---|
| ACM | Asbestos Containing Material |
| ASS | Acid Sulfate Soils |
| ANZECC | Australian & New Zealand Environment Conservation Council |
| ARMCANZ | Agriculture & Resource Management Council of Australia & New Zealand |
| B(α)P | Benzo(α)pyrene |
| BH | Borehole |
| BTEX | Benzene, Toluene, Ethylbenzene, Xylenes |
| CoC | Chain of Custody |
| cVOC | Chlorinated volatile organic compound |
| DA | Development Application |
| DECC | Department of Environment & Climate Change (see OEH) |
| DECCW | Department of Environment &Climate Change & Water (see OEH) |
| DNAPL | Dense non-aqueous phase liquid |
| DO | Dissolved Oxygen |
| DP | Deposited Plan |
| EC | Electrical Conductivity |
| EIL | Environmental Investigation Level |
| EPA | Environmental Protection Authority |
| ESA | Environmental Site Assessment |
| ESL | Environmental Screening Level |
| GIL | Groundwater Investigation Level |
| GME | Groundwater Monitoring Event |
| HIL | Health-based Investigation Level |
| HM | Heavy Metals |
| HSL | Health-based Screening Levels |
| Km | Kilometre |
| LNAPL | Light non-aqueous phase liquid |
| LOR | Limit of report |
| mAHD | metres Australian Height Datum |
| mBGL | metres below ground level |
| mg/L | Milligrams per litre |
| µg/L | Micrograms per litre |
| mV | Millivolts |
| NATA | National Association of Testing Authorities, Australia |
| NEPC | National Environmental Protection Council |
| NEPM | National Environmental Protection Measures |
| NSW | New South Wales |
| OCP | Organochlorine pesticides |
| OEH | Office of Environment and Heritage |
| OPP | Organophosphorus pesticides |
| PAHs | Polycyclic Aromatic Hydrocarbons |
| PCB | Polychlorinated Biphenyls |
| pH | per Hydrogen (measurement of acidity / alkalinity) |
| PQL | Practical Quantitation Limit |
| QAQC | Quality Assurance / Quality Control |
| RAP | Remedial Action Plan |
| SAQP | Sample, Analysis & Quality Plan |

| | |
|---|---|
| SIL | Soil Investigation Level |
| SRA | Sample Receipt Advice |
| SWL | Standing Water Level |
| TDS | Total dissolved solids |
| TCLP | Toxicity Characteristics Leachate Procedure |
| TRH | Total recoverable hydrocarbons |
| UCL | Upper Confidence Limit |
| USEPA | United State Environmental Protection Agency |
| UPSS | Underground Petroleum Storage System |
| UST | Underground Storage Tank |
| VOCs | Volatile organic compounds |
| WADOH | Western Australia Department of Health |

# Appendix A – Figures




Site boundary

*All locations are approximate

# RTL Co

Timber Yards, Marrickville NSW

Figure 3 –ASS Risk Map

Scale: 1: 10 000

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Site boundary

Sample location (Aargus, 2014)

ASS management area

*All locations are approximate

# RTL Co

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Figure 2 –ASS Management Area

Scale: 1: 2000

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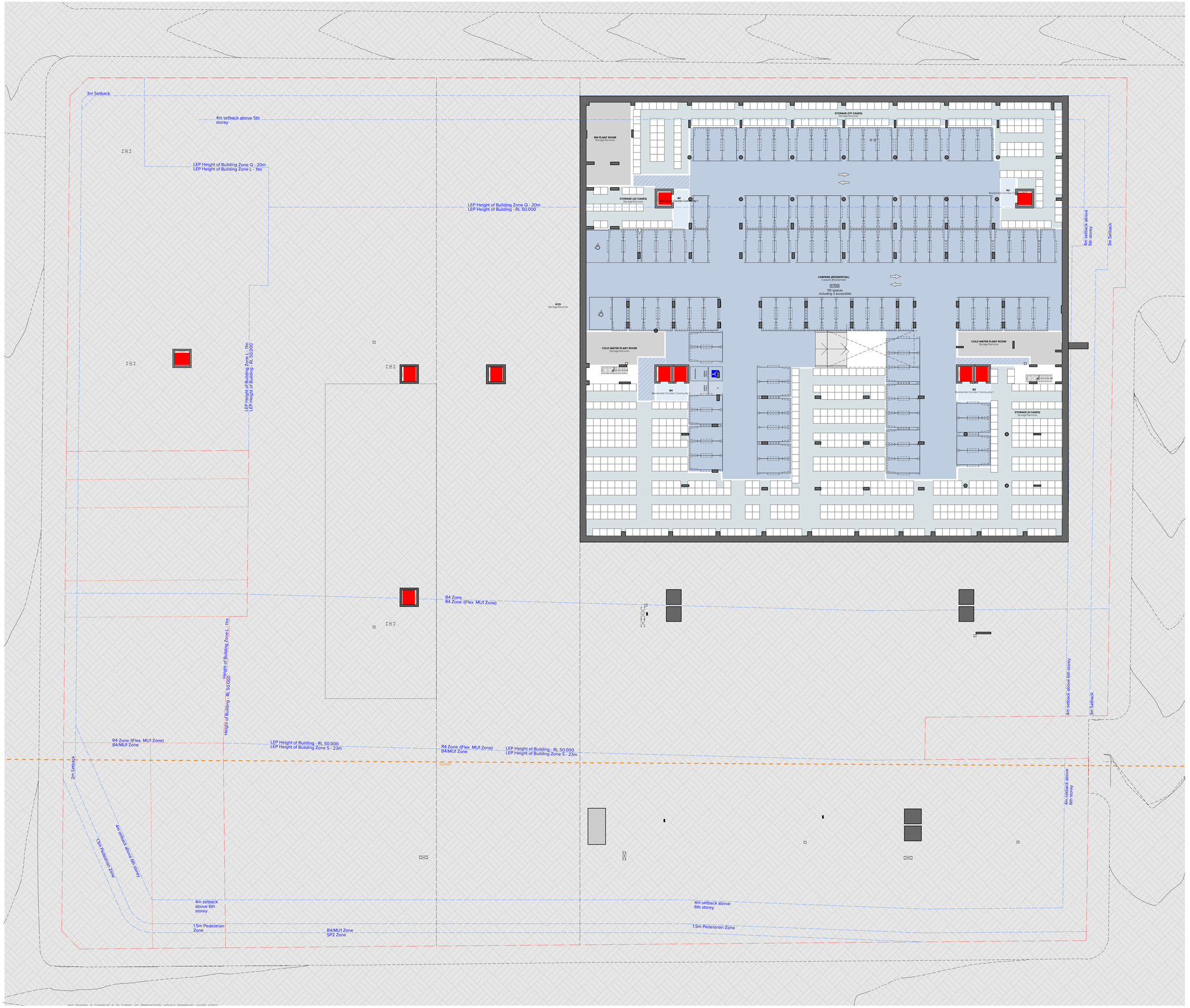
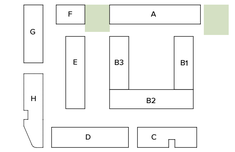
# Appendix B – Development Plans




Key Plan




Notes

| Rev | Date | Approved by | Change ID | Change Note |
|---|---|---|---|---|
| G | 04.09.24 | JF | | |
| F | 29.08.24 | JF | | |
| E | 26.08.24 | JF | | |

Collaborating Design Team

TURNER

Architecture AND

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YERRABINGIN

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Project Manager

neoscape

Client

RTLCo

Project Title

# Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

**Basement 01**

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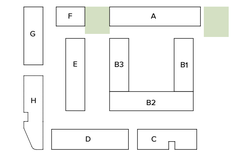
Nominated Architect: Nicholas Turner 6906, ABN 86 064 084 811

Key Plan




Notes

| Rev | Date | Approved by | Change ID | Change Note |
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Tribe Studio Architects Aileen Sage

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ARCADIA

YERRABINGIN Left Bank Co.

Project Manager

neoscape

Client

RTL Co

Project Title

# Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

**Ground Level - Victoria Road**

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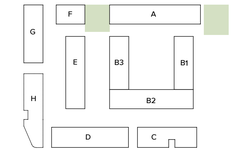


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# Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

**Upper Ground Level - Farr Street**

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Scale **1:250 @ B1**

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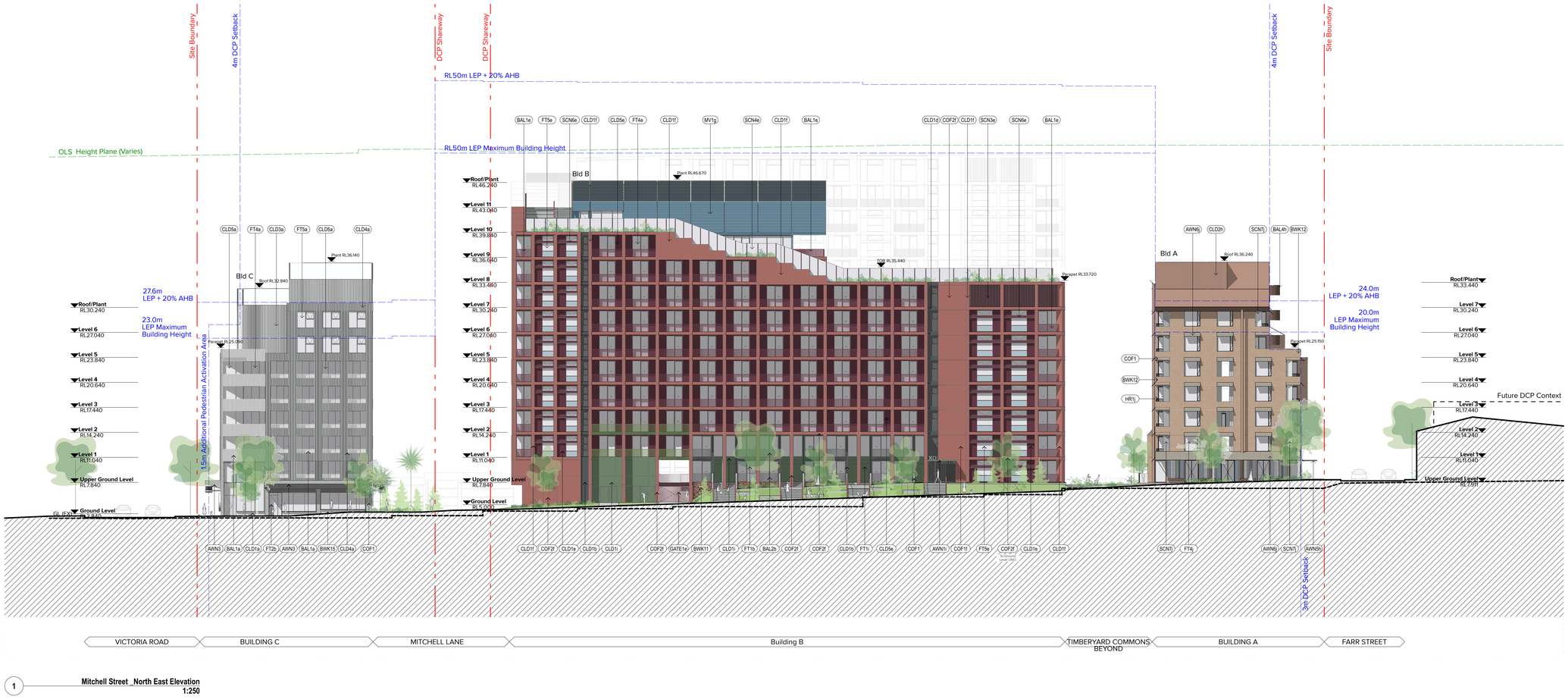
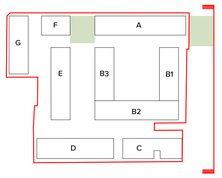



1 **Mitchell Street _North East Elevation**
**1:250**

Key Plan

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Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Elevations

**Mitchell Street_North East Elevation**

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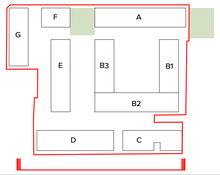
DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 4686, ABN 86 084 084 911

1 **Victoria Road _ South East Elevation**
**1:250**

Key Plan

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Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Elevations
**Victoria Road_South East Elevation**

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| For SSDA Submission | 23068 | 1 |

Scale
**1:250 @ B1**

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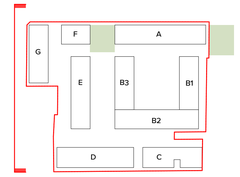
DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6690, ABN 86 064 084 911

1 **Sydenham Road _South West Elevation**
**1:250**

Key Plan

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Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Elevations

**Sydenham Road_South West Elevation**

| Status | Project No. | Rev |
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| Scale | Dwg No. |
|---|---|
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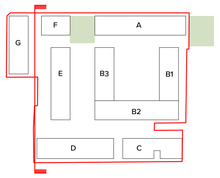
DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6608, ABN 86 064 084 911

1 **Residential Mews_South West Elevation**
**1:250**

Key Plan

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Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations
**Residential Mews_South West Elevatio**

| Status | Project No. | Rev |
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| For SSDA Submission | 23068 | 1 |

Scale
**1:250 @ B1**

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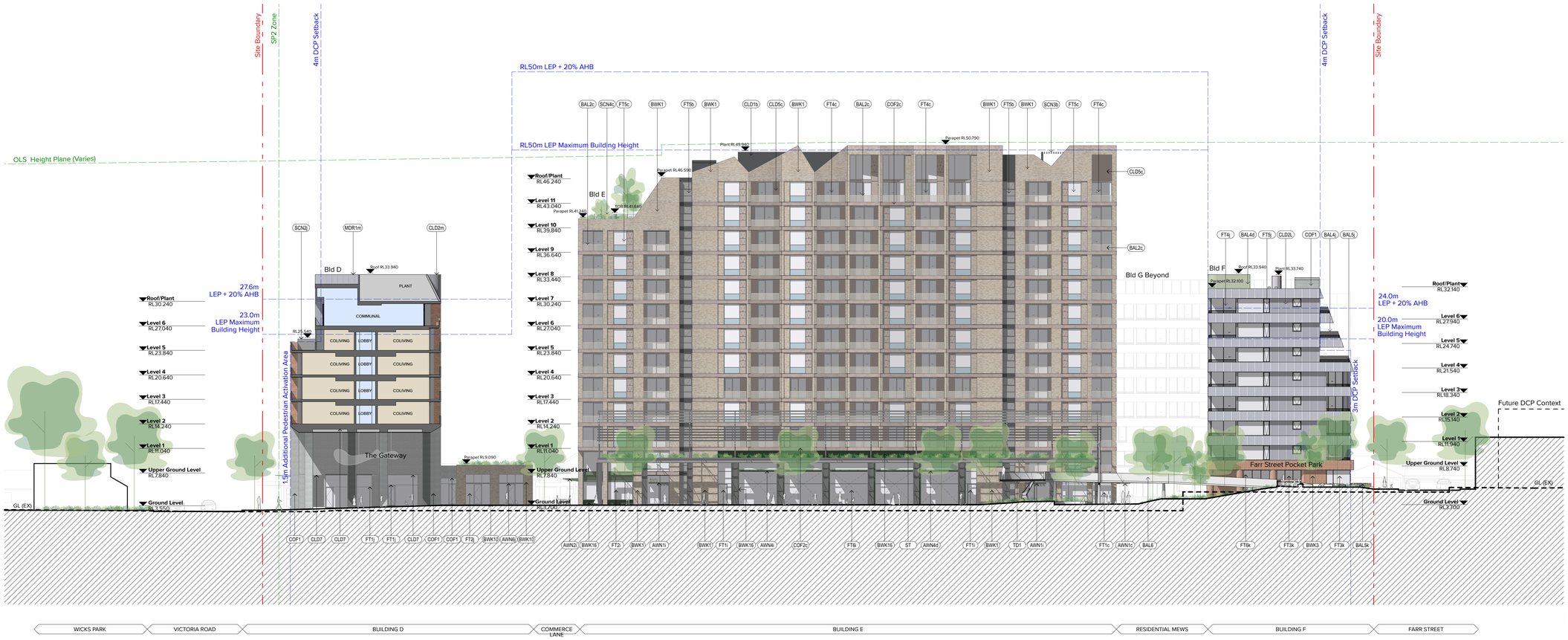
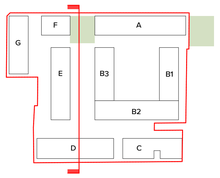



1 **Warehouse Place_North East Elevation**
**1:250**

Key Plan

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Drawing Title

Internal Elevations

**Warehouse Place_North East Elevation**

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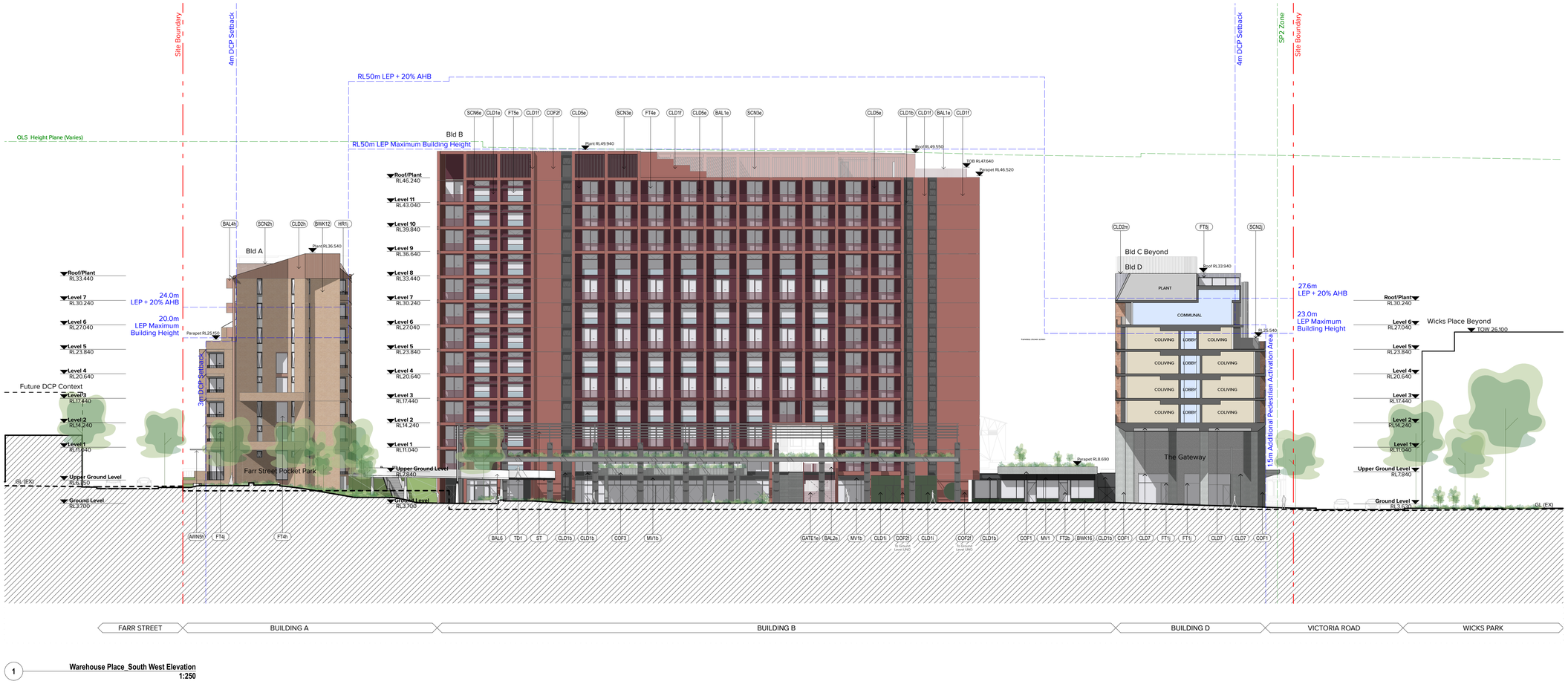
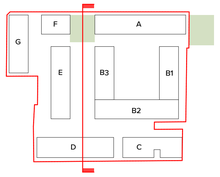



1 **Warehouse Place_South West Elevation**
**1:250**

Key Plan

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Drawing Title

Internal Elevations
**Warehouse Place_South West Elevatio**

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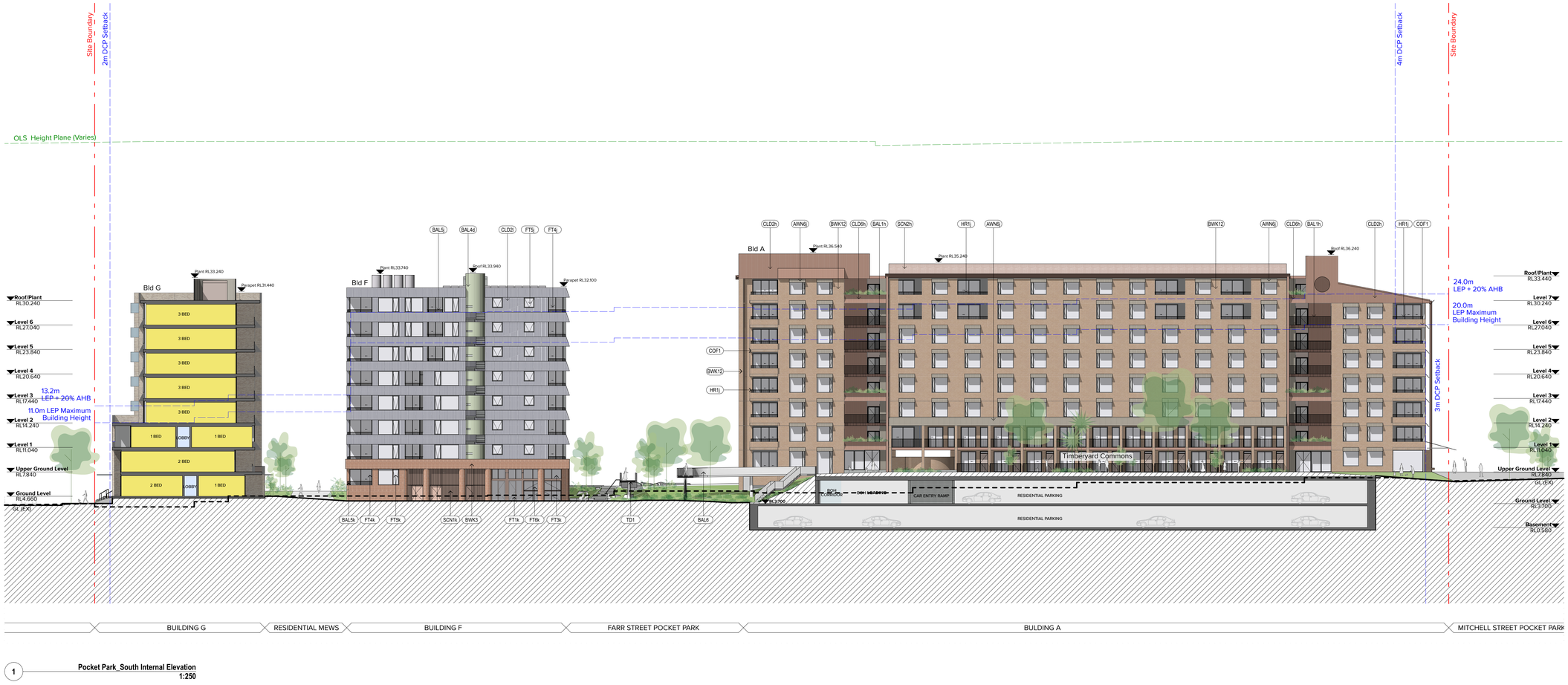
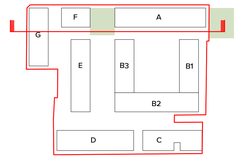



1 **Pocket Park_South Internal Elevation**
**1:250**

Key Plan

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Drawing Title

Internal Elevations
**Pocket Park_South East Elevation**

| Status | Project No. | Rev |
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Scale **1:250 @ B1**

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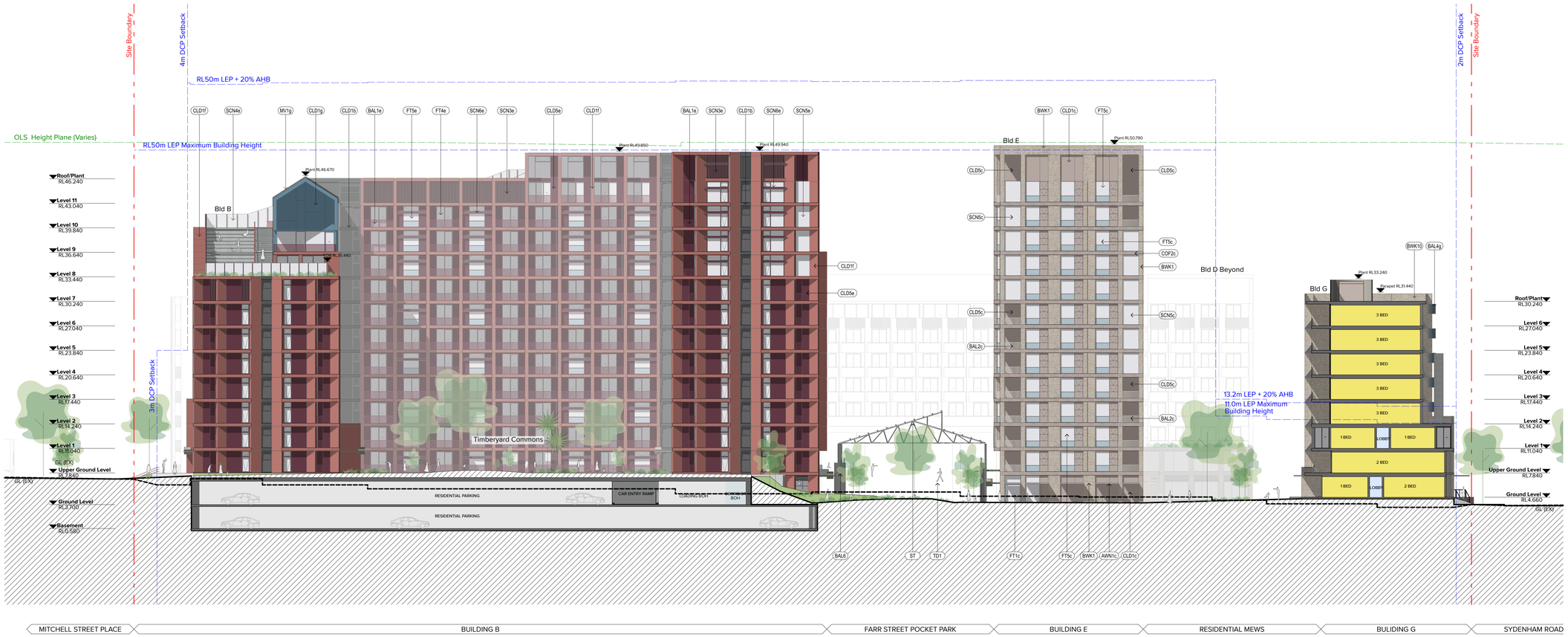
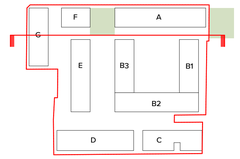



1 **Pocket Park_North West Elevation**
**1:250**

Key Plan

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Project Title

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Drawing Title

Internal Elevations
**Pocket Park_North West Elevation**

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 9600, ABN 86 064 084 911

# Appendix C – Previous Investigations

Aargus

Environmental - Remediation - Engineering - Laboratories - Drilling

# ACID SULPHATE SOILS ASSESSMENT

## 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street, 7, 13, 15-31 & 33 Farr Street, Marrickville NSW

**Prepared for**

## E & D Danias Pty Ltd

**7th May 2014**

HEAD OFFICE: PO Box 398 Drummoyne NSW 1470
Aargus Pty Ltd ACN 050 212 710 • Aargus Holdings Pty Ltd ACN 063 579 313
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APPENDIX D ASSMAC (1998) FIELD pH AND PEROXIDE TEST PROTOCOL

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# REFERENCES

- Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998) – *Acid Sulphate Soils Assessment Guidelines*.

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# ABBREVIATIONS

| | |
|---|---|
| AASS | Actual Acid Sulphate Soils |
| AHD | Above Height Datum |
| ANC | Acid Neutralising Capacity |
| ASS | Acid Sulphate Soils |
| ASSMAC | Acid Sulphate Soils Management Advisory Committee |
| ASSMP | Acid Sulphate Soils Management Plan |
| BGL | Below Ground Level |
| DNR&M | Department of Natural resources and Mines |
| DO | Dissolved Oxygen |
| EC | Electric Conductivity |
| EIL | Ecological Investigation Level |
| EPA | Environmental Protection Authority |
| HIL | Health-based Investigation Level |
| LOR | Limit of reporting |
| NV | Neutralising Value |
| PASS | Potential Acid Sulphate Soils |
| POCAS | Peroxide Oxidation Combined Acidity and Sulphate |
| PSI | Preliminary Site Investigation |
| QA/QC | Quality Assurance/Quality Control |
| QASSIT | Queensland Acid Sulphate Soils Investigation Team |
| SPOCAS | Suspended Peroxide Oxidation Combined Acidity and Sulphate |
| Spos | Peroxide Oxidisable |
| TAA | Total Actual Acidity |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TPA | Total Potential Acidity |
| TSA | Total Sulfidic Acidity |
| TSS | Total Suspended Solids |
| VENM | Virgin Excavated Natural Material |

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# 1.0 INTRODUCTION

Aargus Pty Ltd was commissioned by E & D Danias Pty Ltd to conduct an Acid Sulphate Soils Assessment within the property located at 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street and 7,13,15-31 & 33 Farr Street, Marrickville NSW ("the site"). The site is located in the Marrickville Council local government area.

The ASS is required as disturbances to Potential Acid Sulphate Soil (PASS) or Actual Acid Sulphate Soils, which may occur during construction and excavation works, can result in the formation of acid. The acid, once formed, could then damage infrastructure or harm ecological systems.

The results of the field parameters from this assessment should only be used as a preliminary study to determine if further investigations are required. If results meet the criteria no further work, including an ASS Management Plan, will be required.

# 2.0 OBJECTIVES

The purpose of the ASS Assessment is to determine the presence or absence of ASS at the site. In the absence of ASS it is essential to assess for the presence of Potential Acid Sulphate Soils (PASS). If the results do not meet criteria an Acid Sulphate Soil Management Plan will be required.

This Preliminary Assessment reviewed the presence of ASS / PASS in the portion of the site that may require excavation.

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# 3.0 SCOPE OF WORKS

The scope of works of the Preliminary ASS Assessment included:

- Review of previous environmental assessments;
- Site walkover;
- Targeted soil boring, sampling and testing for potential ASS at the site;
- Interpretation of field test and laboratory analysis and findings; and
- Reporting in accordance with relevant assessment guidelines / regulations.

# 4.0 ASSESSMENT CRITERIA

When assessing ASS at sites in NSW Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998) Acid Sulphate Soils Assessment Guidelines apply.

The purpose of this report is to determine whether there is a probable risk associated with ASS or PASS and to determine whether these types of soils actually exist on the site.

These maps do not detail the severity of the ASS, but only provide an indication that they may be present. The decision to classify certain areas as ASS is based on a number of geomorphic conditions and site criteria. The following points are used to determine if ASS are likely to exist (extracted from ASSMAC (1998) Acid Sulphate Soils Assessment Guidelines):

- Sediments of recent geological age (Holocene) ~ 10 000 y.o.
- Soil horizons less than 5m AHD (Australian Height Datum).
- Marine or estuarine sediments and tidal lakes.

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- In coastal wetlands or back swamp areas; waterlogged or scalded areas; interdune swales or coastal sand dunes.
- In areas where the dominant vegetation is mangroves, reeds, rushes and other swamp tolerant and marine vegetation.
- In areas identified in geological descriptions or in maps bearing sulphide minerals, coal deposits or former marine shales/sediments.
- Deeper older estuarine sediments >10m below the ground surface, Holocene or Pleistocene age.

The following soil indicators are used to determine if ASS are actually present on a site:

- field pH ≤4 in soils
- presence of shell
- any jarosite horizons or substantial iron oxide mottling in auger holes, in surface encrustations or in any material dredged or excavated and left exposed. Jarosite is not always found, however, in actual acid sulphate soils.

The following soil indicators are used to determine if PASS are actually present on a site:

- waterlogged soils, unripe muds (soft, buttery, blue grey or dark greenish grey) or estuarine silty sands or sands (mid to dark grey) or bottom sediments of estuaries or tidal lakes (dark grey to black)
- presence of shell
- soil pH usually neutral but may be acid -positive Peroxide Test (see section 7.2 Field pH results).

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# 5.0 SITE INFORMATION

## 5.1 Site Identification

The site property is located at 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street and 7,13,15-31 & 33 Farr Street, Marrickville NSW (refer to Figure 1 – Locality Map in Appendix A). The site is located in the Marrickville Council local government area.

The surrounding land uses identified are described in the table below:

| Orientation | Description |
|---|---|
| North | Mitchell Street, then commercial development (including Newtown Car Service Centre and Global Knitwear – Screen printing) |
| East | Victoria Road, then commercial development (including Sydney Prestige Autobody Smash Repairs) & Substation |
| South | Residential development (houses) & commercial development (including Café and Apec Locksmiths) then Sydenham Road |
| West | Farr Street then commercial development |

## 5.2 Site Description

A site visit was carried out on 25th and 26th September 2013 by an Aargus field scientist. At the time of the site inspection, the following observations were made:

- The site was irregular in shape and used for commercial, retail and residential purposes;
- The site was occupied by a main warehouse with awning area in the central southern portion of the site, a number of smaller buildings along the eastern and northern boundaries, concrete access ways through the property, two storage yards with unsealed areas, small brick warehouse in the western portion of the site, vacant concrete sealed residential block, eight residential terrace properties and grassed areas around the eastern perimeter;

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- The main access to the properties were along Victoria Road, on the eastern boundary and Farr Street, along the western boundary;
- The main warehouse was constructed of concrete and bricks. It was occupied by the Danias Timber yard and had an enormous amount of timber storage areas and timber milling plant machinery within and under the awning of the main warehouse.
- The smaller buildings were constructed of concrete with tin roofs. They were occupied by the Danias Timber yard and utilised for office space and retail service areas. A smaller building in the northern portion of the site was utilised for flooring retail sales and had a showroom area attached.
- An old terrace cottage was located in the Danias Timber yard and was inaccessible due to the height of timber stored around the cottage.
- The car park area was located in the southern half of the site and was sealed with concrete and was in poor condition. Cracks were visible on the surface;
- Grassed areas were observed along the site perimeter of Victoria Road at 171-175 Victoria Road. Unsealed areas were observed in the storage yard for Danias timber at 191 Victoria Road & the storage yard at 33 Farr Street;
- Some waste material, including concrete blocks, timber offcuts & old machinery were observed in the storage yard at 191 Victoria Road;
- The site boundaries were defined by timber & metal fencing along the perimeter of the site;
- No surface standing water was noticed at the site;
- There was evidence of chemical storage at the site. Oil drums were located in the storage yard and used for the plant machinery in regards to the timber milling processes;
- There were no indicators of underground storage tanks within the site; and
- Hazardous material was observed and included fibro cement sheeting.

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## 5.3 Topography

The site slopes towards the south at a gradient of approximately 3-5°. The regional topography appears undulating and generally sloping towards the south-east.

Stormwater runoff from the site is expected to flow in a southerly direction and discharge into the stormwater drain located along the site boundaries in the southern part of the site.

## 5.4 Local geology, hydrogeology, surface waters

Reference to the Sydney 1:100,000 Geological Series Sheet 9130 Edition 1, dated 1983, by the Geological Survey of New South Wales, Department of Mineral Resources, indicates the following:

- The northern portion of the site is located within an area underlain by Triassic Age Ashfield Shale of the Wianamatta Group. The Ashfield Shale is described as “black to dark grey shale and laminate” and denoted as (Rwa); and
- The southern portion of the site is located within an area underlain by alluvial deposits consisting of “peat, sandy peat and mud” and denoted as (Qhs).

Based on a search of the NSW Groundwater Works website database, the three closest bores were located within a 2.0 kilometre radius, with final drilling depths of 1.30m to 20.70m BGL, and used for monitoring purposes.

The nearest surface water body from the site is Alexandra Canal located approximately 2.3 km south-east of the site, which runs south westerly towards Wolli

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Creek. Water from the local and surrounding areas is likely to flow towards Wolli Creek and thence into Botany Bay.

# 6.0 SOIL BORING AND SAMPLING

A soil sampling and analysis program was used to consolidate the nature and degree of Acid Sulphate Soils present in the surface and subsurface geology. Samples were collected from four (4) boreholes (BH1 to BH4) drilled within the site. The boreholes were drilled to a maximum depth varying between 3.2m and 9.4m below ground level (BGL), with samples collected at varying depths depending on the soil profile (the borehole locations are presented in Figure 2 – Site Plan in Appendix A).

Field analysis was performed on the collected samples for $pH_f$ and $pH_{fox}$ in accordance with the required sampling techniques of the *ASSMAC (1998) Assessment Guidelines* (see Appendix D – ASSMAC (1998) Field pH and peroxide test protocol).

## 6.1 Health & Safety

Standard Health and Safety procedures were observed. Rubber gloves were worn to minimise exposure to any potential contaminants. Breathing apparatus and PPE suits were supplied but not worn.

## 6.2 Quality Assurance/Quality Control (QA/QC)

Standard QA/QC procedures were followed. The decontamination of sampling equipment and the hand auger was achieved by washing with phosphate-free detergent and tap water, followed by final rinsing with distilled water. This was conducted after the collection of samples.

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Standard sampling and analysing procedures are in accordance with and set out in the *NSW ASSMAC (1998) "Acid Sulphate Soils Assessment Guidelines"*.

# 7.0 FIELD RESULTS

## 7.1 Soil observations

Based on information from all boreholes, the surface and sub-surface profile across the site is generalised as follows:

- Fill materials
- NATURAL – Silty CLAY, Clayey SAND, Sility Sandy CLAY, CLAYSTONE & SILTSTONE

No unusual colouring was detected in the soil suggesting the presence of pyrite (iron sulphide) or Jarosite was unlikely. Unripe muds or mid to dark-grey estuarine sands were not detected. Sulphurous odours were not detected in any of the recovered samples.

For full details of the soil profile refer to the borehole logs in Appendix C.

## 7.2 Field pH results

The results of field pH tests are presented in Table 1 below.

**Table 1: Summary of field analysis results**

| Sample | Depth (m) | Soil Type | pH | pH |
|---|---|---|---|---|

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| | | | $H_2O$ | Soil $pH_f$ | $H_2O_2$ | Soil $pH_{fox}$ |
|---|---|---|---|---|---|---|
| BH1 | 0.1-0.4 | FILL | 7.0 | 7.2 | 5.0 | 6.0 |
| BH1 | 0.4-1.0 | Silty CLAY | 7.0 | 7.4 | 5.0 | 5.8 |
| BH1 | 2.0-2.5 | Silty CLAY | 7.0 | 7.3 | 5.0 | 5.3 |
| BH1 | 3.5-4.0 | Silty CLAY | 7.0 | 7.1 | 5.0 | 5.3 |
| BH1 | 5.0-5.5 | Silty CLAY | 7.0 | 7.1 | 5.0 | 5.0 |
| BH1 | 7.0-7.5 | Silty CLAY | 7.0 | 7.1 | 5.0 | 5.0 |
| BH1 | 8.4-9.0 | Clayey SAND | 7.0 | 7.1 | 5.0 | 5.0 |
| BH2 | 0.5-1.0 | Silty CLAY | 7.0 | 7.2 | 5.0 | 5.7 |
| BH2 | 2.0-2.5 | Silty CLAY | 7.0 | 7.0 | 5.0 | 5.0 |
| BH2 | 3.5-4.0 | Silty CLAY | 7.0 | 6.9 | 5.0 | 5.0 |
| BH2 | 4.0-4.3 | Silty Sandy CLAY | 7.0 | 7.0 | 5.0 | 5.1 |
| BH3 | 0.5-1.0 | Silty CLAY | 7.0 | 7.3 | 5.0 | 5.8 |
| BH3 | 2.0-2.5 | Silty CLAY | 7.0 | 6.8 | 5.0 | 4.6 |
| BH3 | 2.5-2.85 | Silty CLAY | 7.0 | 6.8 | 5.0 | 4.2 |
| BH3 | 3.5-4.0 | Siltstone | 7.0 | 6.8 | 5.0 | 4.8 |
| BH3 | 4.0-4.2 | Siltstone | 7.0 | 6.8 | 5.0 | 4.8 |
| BH3 | 5.5-5.9 | Clayey SAND | 7.0 | 6.8 | 5.0 | 5.0 |
| BH4 | 0.5-1.0 | Silty CLAY | 7.0 | 7.1 | 5.0 | 5.3 |
| BH4 | 2.0-2.5 | Silty CLAY | 7.0 | 6.9 | 5.0 | 5.0 |
| BH4 | 3.0-3.2 | Clayey SAND | 7.0 | 6.7 | 5.0 | 5.0 |

**Notes:**
- $pH_f$ refers to pH field (soil and distilled $H_2O$).
- $pH_{fox}$ refers to pH field oxidised (soil and peroxide).

To investigate the presence of Actual ASS (acid sulfate soils) of the soils water was added to the soil samples. The $pH_f$ of the investigated samples was well above 4. This indicates the soils from which the samples were collected did not contain Actual Acid Sulfate Soil (ASS).

To investigate the presence of PASS (potential acid sulfate soils), 30% peroxide ($H_2O_2$) was added to soil samples and the resulting pH of the mixture was measured. The pH of the soil peroxide solution ($pH_{fox}$) did not decrease below 3 pH units in any of the samples, which would indicate if PASS was present. The values for $pH_{fox}$ of

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greater than 5 indicate no net acid generating ability, however those below 5 may be considered to contain Potential Acid Sulfate Soils, these include samples only from BH3 at depths (m BGL): (2.0 – 2.5); (2.5 – 2.85); (3.5 – 4.0), (4.0 – 4.2) and (5.5 – 5.9). Therefore these samples can be considered to contain Potential Acid Sulfate Soil.

The addition of peroxide to the soil did not change colour or release sulfurous odours.

Further assessment was undertaken to determine the presence or otherwise of potential acid sulfate soils within the site. All samples were sent to a NATA certified laboratory to undertake SPOCAS testing.

### 7.3 SPOCAS Testing (Suspended Peroxide Oxidation Combined Acidity and Sulphate)

The soils were assessed against the guidelines set out in Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998) *Acid Sulphate Soils Assessment Guidelines*. The action criteria selected was based on if there will be between greater than 1,000 tonnes of soils disturbed within the site. The results are assessed against two available criteria regardless of the soil texture due to greater than 1,000 tonnes being disturbed, those being:

- Sulphur Trail ($S_{pos}$) = 0.03%
- Acid Trail (TPA) = 18 mol $H^+$/tonne

The laboratory analysis results are presented in the following Table 2.

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## Table 2: Laboratory SPOCAS Test Results

| Sample | S-POS (%) (sulfur trail) | TAA (mol $H^+$/ tonne) | TPA (mol $H^+$/ tonne) (acid trail) | TSA (mol $H^+$/tonne) (acid trail) | Lime Calculation (kg $CaCO_3/m^3$) (includes 1.5 safety factor |
|---|---|---|---|---|---|
| BH3 – (2.0 – 2.5)m | < 0.02 | 58 | **73** | 15 | 4.5 |
| BH3 – (2.5 – 2.85m | < 0.02 | 46 | **66** | **20** | 3.6 |
| BH3 – (3.5 – 4.0)m | < 0.02 | 28 | **39** | 11 | 2.3 |
| BH3 – (4.0 – 4.2)m | < 0.02 | 6.3 | 14 | 7.5 | < 1 |
| BH3 – (5.5 – 5.9)m | < 0.02 | 16 | **21** | **21** | 1.4 |
| ***ASSMAC Guidelines*** | ***0.03*** | | ***18*** | ***18*** | |

**Notes for Table 2:**

- Guidelines follow the ASSMAC "Acid Sulfate Soils Assessment Guidelines 1998".
- Criteria based upon clay content of >40%
- Criteria based upon more than 1000 tonnes disturbed
- **Bold** values exceed ASSMAC guidelines

The results shown above suggest that based on the soils described above it is considered that they most closely resemble the *"Fine Texture"* soils described in Table 4.4, Assessment Guidelines of the NSW Acid Sulphate Soil Management Advisory Committee (ASSMAC) *"Acid Sulphate Soil Manual"* (August 1998).

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When comparing the results summarised above in Table 3 to Table 4.4 (ASSMAC) for Fine Texture soils it can be determined that the percentage of oxidisable Sulphur (SPOS or equivalent TPA/TSA) in the samples analysed were above the action criteria for samples taken from BH3 at depths (m BGL): (2.0 – 2.5); (2.5 – 2.85); (3.5 – 4.0); and (5.5 – 5.9), indicating that there is an acid sulphate generating potential. Based on the TAA, TPA & TSA results it is indicated that the soil material has generated acid within the soil matrix.

Based on the observed soil profile, the results of the field tests and the laboratory analysis, it is unlikely that acid sulphate materials will be intercepted during the proposed excavations across the site, however, there is a potential for PASS in the natural soil profile within the site. The extent of the PASS to be intercepted, at present, was in the vicinity of borehole BH3 in the western portion of the site from a depth between1.2m to 5.9m BGL.

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# 8.0 CONCLUSIONS AND RECOMMENDATIONS

This report has been prepared as part of a due diligence process for investigation purposes.

To investigate the presence of PASS, 30% peroxide was added to soil samples and the resulting pH of the mixture was measured. The pH of the soil peroxide solution $pH_{f(ox)}$ did not decrease below 3 pH units in any of the samples, which would indicate if PASS was present. The values for $pH_{f(ox)}$ of greater than 5 indicate no net acid generating ability, however those below 5 may be considered to contain Potential Acid Sulphate Soils, as was the case in a number of samples recovered across the site.

Due to the indicators above, the site has been designated as possibly containing PASS, therefore further assessment was undertaken to determine the extent of acid sulphate soils on the site. A number of selected samples were sent to a NATA certified laboratory to undertake SPOCAS testing. The results of the laboratory analysis indicated that there is a low acid sulphate generating potential within the site.

Based on the observed soil profile, the results of the field tests and the laboratory analysis, it is unlikely that actual acid sulphate materials will be intercepted during the proposed excavations across the site, however, potential acid sulphate soils will be intercepted. The extent of the PASS to be intercepted, at present, was in the vicinity of borehole BH3 in the western portion of the site from a depth between1.2m to 5.9m BGL.

The soils at these locations would be considered to have a very low net acid generating potential based on the results and the liming rates applied. It should also be considered that it will be difficult to apply such small volumes of lime to the soil profile (a medium to high plasticity clay) and ensure that it is mixed thoroughly and distributed evenly throughout any treated soil. This may lead to lime overdosing of the soil which is considered neither environmentally or commercially necessary nor responsible.

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Based on the variable vertical and horizontal extent of the soils considered to contain PASS and the fact that all other soils immediately above and below these areas have no net acid generating potential, the treatment of the soils in these areas should occur during the excavation phase.

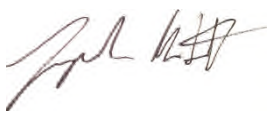
Therefore, it is recommended that during the excavation phase of the natural soils that Aargus are present to undertake field pH testing of the natural soils that are being excavated prior to loading onto the trucks for off-site disposal. Any natural soils with a field pH of less than 5.5 and/or soils that appear to contain characteristics of PASS, will be stockpiled, treated with appropriate lime content and disposed of accordingly.

Due to the presence of PASS it is recommended an Acid Sulphate Soils Management be prepared.

We would be pleased to provide further information or discuss any aspect of our report. Please do not hesitate to contact the undersigned should you have any queries.

For and on behalf of

**Aargus Pty Ltd**



**Joseph McDermott**
Environmental Scientist

**Reviewed By**

**Mark Kelly**
Environmental Manager

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# 9.0 LIMITATIONS

Whilst to the best of our knowledge, information contained in this report is accurate at the date of issue, although subsurface conditions, including groundwater levels and contaminant concentrations, can change in a limited time. This should be borne in mind if the report is used after a protracted delay.

There is always some disparity in subsurface conditions across a site that cannot be fully defined by investigation. Hence it is unlikely that measurements and values obtained from sampling and testing during environmental works carried out at a site will characterise the extremes of conditions that exist within the site.

There is no investigation that is thorough enough to preclude the presence of material that presently or in the future, may be considered hazardous at the site. Since regulatory criteria are constantly changing, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that require remediation.

Opinions are judgements that are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions.

Although the information provided by an Acid Sulphate Soils Assessment and Management Plan can reduce exposure to risks, no assessment, however diligently carried out, can eliminate them. It must be noted that these findings are professional findings and have limitations. Even a rigorous professional assessment may fail to detect all ASS and/or PASS on a site. Sulphates may be present in areas that were not surveyed or sampled.

Appendix B – Important information about your environmental report should also be read in conjunction with this report.

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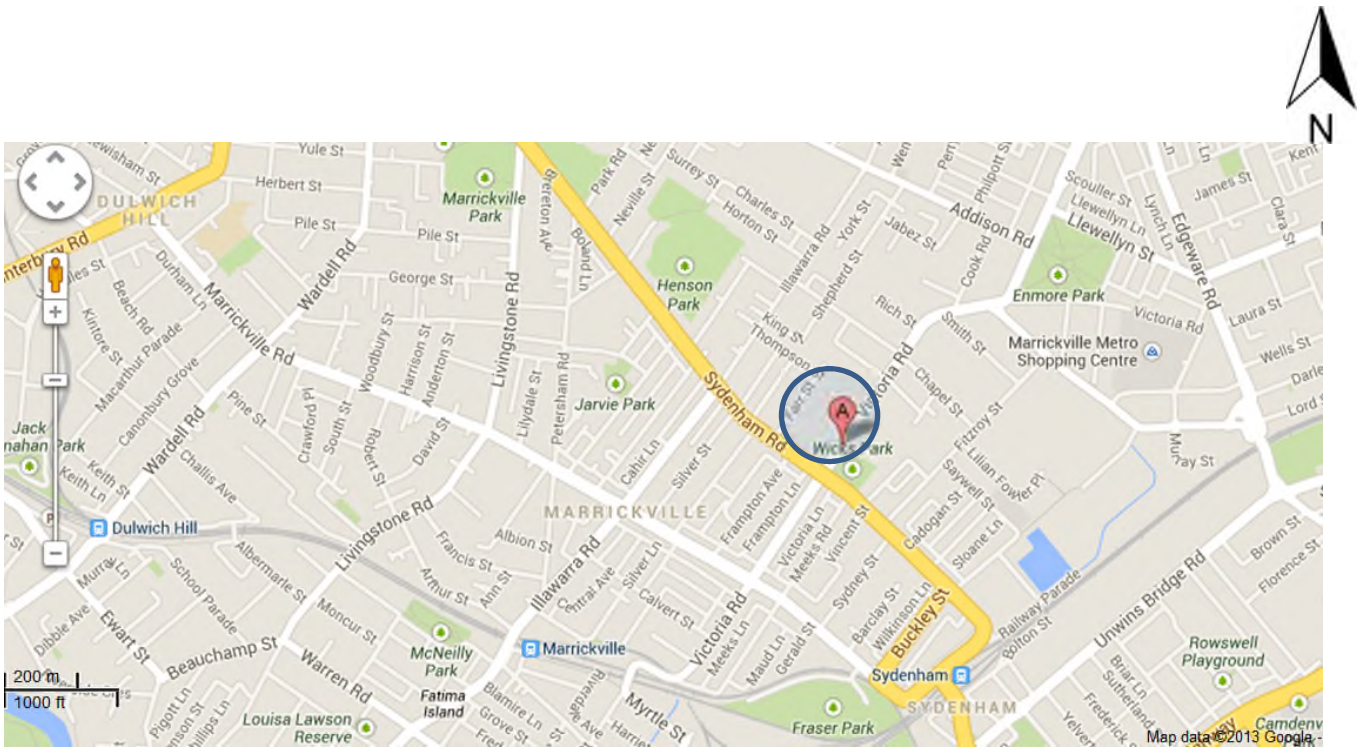
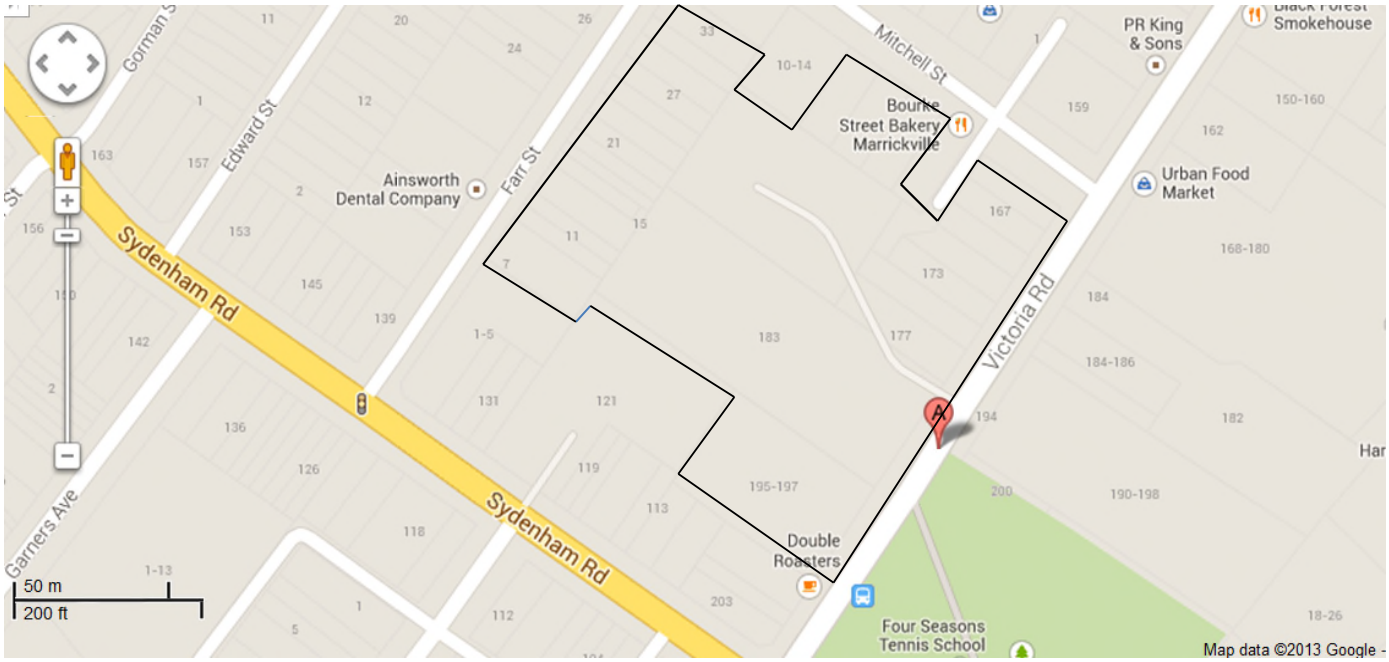
# APPENDIX A

## LOCALITY MAP & SITE PLAN

# SITE LOCALITY MAP




| PROJECT DETAILS | | | DRAWING DETAILS | | | |
|---|---|---|---|---|---|---|
| **Project Title** | Acid Sulphate Soils Assessment | | **Figure No.** | 1 | **Rev No.** | 0 |
| **Project No.** | ES5610/3 | | **Scale** | 50m & 200m | **Size** | A4 |
| **Client** | E & D Danias Pty Ltd | | **Drawn by** | MS | **Date** | 8.10.13 |
| **Site Address** | Victoria Road, Marrickville NSW | | **Approved by** | MK | **Date** | 8.10.13 |

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# SAMPLING LOCATION PLAN

**Legend**

- Site Boundary
- Borehole Location

ABN 75 050 212 710 Aargus Pty Limited Environment – Remediation – Geotechnical Engineering

**Source: Six Maps 2013**

| | |
|---|---|
| Drawn | MS |
| Approved | MK |
| Date | 8.10.2013 |
| Approx Scale | 1:2,257 |

**Acid Sulphate Soils Assessment**
**E & D Danias Pty Ltd**
**167-169, 171-175, 183 & 191 Victoria Road,**
**4-8 Mitchell Street,**
**7, 13, 15-31 & 33 Farr Street**
**Marrickville NSW**

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Fig 2

ES5610/3

# APPENDIX B

## IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL REPORT

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# IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Aargus (Australia) Pty Ltd and its associated companies using guidelines prepared by ASFE (The Association) of Engineering Firms Practising in the Geo-sciences. They are offered to help you in the interpretation of your Environmental Site Assessment (ESA) reports.

## REASONS FOR CONDUCTING AN ESA

ESA's are typically, though not exclusively, carried out in the following circumstances:

- as pre-acquisition assessments, on behalf of either purchaser or vender, when a property is to be sold;
- as pre-development assessments, when a property or area of land is to be redeveloped or have its use changed for example, from a factory to a residential subdivision;
- as pre-development assessments of greenfield sites, to establish "baseline" conditions and assess environmental, geological and hydrological constraints to the development of, for example, a landfill; and
- as audits of the environmental effects of an ongoing operation.

Each of these circumstances requires a specific approach to the assessment of soil and groundwater contamination. In all cases however, the objective is to identify and if possible quantify the risks that unrecognised **c**ontamination poses to the proposed activity. Such risks may be both financial, for example, cleanup costs or limitations on site use, and physical, for example, health risks to site users or the public.

## THE LIMITATIONS OF AN ESA

Although the information provided by an ESA could reduce exposure to such risks, no ESA, however, diligently carried out can eliminate them. Even a rigorous professional assessment may fail to detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled.

## AN ESA REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental report should not be used:

- when the nature of the proposed development is changed, for example, if a residential development is proposed instead of a commercial one;
- when the size or configuration of the proposed development is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership
- or for application to an adjacent site.

To help avoid costly problems, refer to your consultant to determine how any factors, which have changed subsequent to the date of the report, may affect its recommendations.

## ESA "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of contamination, its likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to help minimise its impact. For this reason owners should retain the services of their consultants

through the development stage, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

## SUBSURFACE CONDITIONS CAN CHANGE

Natural processes and the activity of man change subsurface conditions. As an ESA report is based on conditions, which existed at the time of subsurface exploration, decisions should not be based on an ESA report whose adequacy may have been affected by time. Speak with the consultant to learn if additional tests are advisable.

## ESA SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Every study and ESA report is prepared in response to a specific brief to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Other persons should not use a report for any purpose, or by the client for a different purpose. No individual other than the client should apply a report even apparently for its intended purpose without first conferring with the consultant. No person should apply a report for any purpose other than that originally contemplated without first conferring with the consultant.

## AN ESA REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when design professionals develop their plans based on misinterpretations of an ESA. To help avoid these problems, the environmental consultant should be retained to work with appropriate design professionals to explain relevant findings and to review the adequacy of their plans and specifications relative to contamination issues.

## LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final borehole or test pit logs are developed by environmental scientists, engineers or geologists based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final logs customarily included in our reports. These logs should not under any circumstances be redrawn for inclusion in site remediation or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimise the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To reduce the likelihood of boring log misinterpretation, the complete report must be available to persons or organisations involved in the project, such as contractors, for their use. Those who o not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing all the available information to persons and organisations such as contractors helps prevent costly construction problems and the adversarial attitudes that may aggravate them to disproportionate scale.

## READ RESPONSIBILITY CLAUSES CLOSELY

Because an ESA is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in transmittals. These are not exculpatory clauses designed to foist liabilities onto some other party. Rather, they are definitive clauses that identify where your consultant’s responsibilities begin and end. Their use helps all parties involved recognise their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your ESA report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

# APPENDIX C

## BOREHOLE LOGS

Aargus Pty Ltd
446 Parramatta Road
PETERSHAM N.S.W.
Telephone: (61) 1300137038
Fax: (61) 1300136038

# BOREHOLE NUMBER BH1



**CLIENT** E & D Danias Pty Ltd **PROJECT NAME** Detailed Site Investigation

**PROJECT NUMBER** ES5610-2 **PROJECT LOCATION** Victoria Rd, Mitchell St & Farr St

**DATE STARTED** 23/9/13 **COMPLETED** 23/9/13 **R.L. SURFACE** --- **DATUM** ---

**DRILLING CONTRACTOR** Aargus **SLOPE** 90° **BEARING** ---

**EQUIPMENT** Drilling Rig **HOLE LOCATION** ---

**HOLE SIZE** 100mm **LOGGED BY** MM **CHECKED BY** MK

**NOTES** ---

| Method | Water | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description | Samples Tests Remarks | Moisture | Cons./Dens. | Additional Observations |
|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | | | | | Concrete | | | | |
| | | | | | | Fill: Silty Sandy Clay, low to medium plasticitiy, dark grey, with some gravel. | | M | S | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | | | | | CH | Silty CLAY, medium to high plasticity, grey to light brown, red mottling, traces of siltstone. | | M | F | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | Seepage | | 1 | | | | | | | |
| | | | 2 | | | | | | | |
| | | | 3 | | | | | | | |
| | | | 4 | | | | | | | |
| | | | 5 | | | | | | | |
| | | | | | CH | Silty Clay, medium to high plasticity, reddish grey, traces of ironstone. | | W | VSt | |
| | | | 6 | | | | | | | |
| | | | 7 | | | | | | | |
| | | | 8 | | | | | | | |
| ADT | | | | | SC | Clayey SAND, fine to coase grained, yellow and brown. | | W | D | |
| | | | 9 | | | | | | | |
| | | | | | | Borehole BH1 terminated at 9.4m | | | | |
| | | | 10 | | | | | | | |

BOREHOLE / TEST PIT ES5610 GINT.GPJ GINT STD AUSTRALIA.GDT 4/4/14

Aargus Pty Ltd
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PETERSHAM N.S.W.
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Fax: (61) 1300136038

# BOREHOLE NUMBER BH2



**CLIENT** E & D Danias Pty Ltd **PROJECT NAME** Detailed Site Investigation

**PROJECT NUMBER** ES5610-2 **PROJECT LOCATION** Victoria Rd, Mitchell St & Farr St

**DATE STARTED** 24/9/13 **COMPLETED** 24/9/13 **R.L. SURFACE** **DATUM**

**DRILLING CONTRACTOR** Aargus **SLOPE** 90° **BEARING** ---

**EQUIPMENT** Drilling Rig **HOLE LOCATION**

**HOLE SIZE** 100mm **LOGGED BY** MM **CHECKED BY** MK

**NOTES**

| Method | Water | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description | Samples Tests Remarks | Moisture | Cons./Dens. | Additional Observations |
|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | | 0 | | | Concrete | | | | |
| | | | | | CI | Silty CLAY, medium plasticity, dark grey, yellow & brown mottling, with some sand, fine to coarse grained. | | M | S | |
| | | | 1 | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | | | | | CI | Silty CLAY, medium to high plasticity, grey, red and yellow mottling. | | M | F | |
| | | | 2 | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | Seepage ▼ | | 3 | | CI | Silty CLAY, medium to high plasticity, grey, red mottling with trace of siltstone. | | W | VSt | |
| | | | 4 | | | | | | | |
| ADT | | | | | CI | Silty Sandy CLAY, medium to high plasticity, reddish grey, yellow and red mottling, traces of siltstone. | | W | VSt | |
| | | | | | | CLAYSTONE, dark grey, red mottling, traces of siltstone. | | W | H | |
| | | | | | | Borehole BH2 terminated at 4.5m | | | | |
| | | | 5 | | | | | | | |
| | | | 6 | | | | | | | |
| | | | 7 | | | | | | | |
| | | | 8 | | | | | | | |
| | | | 9 | | | | | | | |
| | | | 10 | | | | | | | |

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# BOREHOLE NUMBER BH3



**CLIENT** E & D Danias Pty Ltd **PROJECT NAME** Detailed Site Investigation

**PROJECT NUMBER** ES5610-2 **PROJECT LOCATION** Victoria Rd, Mitchell St & Farr St

**DATE STARTED** 24/9/13 **COMPLETED** 24/9/13 **R.L. SURFACE** **DATUM**

**DRILLING CONTRACTOR** Aargus **SLOPE** 90° **BEARING** ---

**EQUIPMENT** Drilling Rig **HOLE LOCATION**

**HOLE SIZE** 100mm **LOGGED BY** MM **CHECKED BY** MK

**NOTES**

| Method | Water | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description | Samples Tests Remarks | Moisture | Cons./Dens. | Additional Observations |
|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | | 0 | | | Concrete | | | | |
| | | | | | CI | Silty CLAY, low to medium plasticity, dark grey with yellow & red mottling, with some gravel. | | M | S | |
| | | | 1 | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | | | | | CI | Silty CLAY, medium to high plasticity, grey with red and yellow mottling, traces of siltstone. | | W | F | |
| | | | 2 | | | | | | | |
| | | | | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | Seepage ▼ | | 3 | | | | | | | |
| | | | | | | SILTSTONE, with some Silty clay, light red with grey and yellow mottling, low plasticity. | | W | VSt | |
| | | | 4 | | | | | | | |
| | | | | | SC | Clayey SAND, fine to coarse grained, grey, red & yellow mottling, traces of siltstone. | | W | VD | |
| ADT | | | 5 | | | | | | | |
| | | | 6 | | | Borehole BH3 terminated at 5.9m | | | | |
| | | | 7 | | | | | | | |
| | | | 8 | | | | | | | |
| | | | 9 | | | | | | | |
| | | | 10 | | | | | | | |

BOREHOLE / TEST PIT ES5610 GINT.GPJ GINT STD AUSTRALIA.GDT 4/4/14

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Fax: (61) 1300136038

# BOREHOLE NUMBER BH4



**CLIENT** E & D Danias Pty Ltd **PROJECT NAME** Detailed Site Investigation

**PROJECT NUMBER** ES5610-2 **PROJECT LOCATION** Victoria Rd, Mitchell St & Farr St

**DATE STARTED** 24/9/13 **COMPLETED** 24/9/13 **R.L. SURFACE** **DATUM**

**DRILLING CONTRACTOR** Aargus **SLOPE** 90° **BEARING** ---

**EQUIPMENT** Drilling Rig **HOLE LOCATION**

**HOLE SIZE** 100mm **LOGGED BY** MM **CHECKED BY** MK

**NOTES**

| Method | Water | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description | Samples Tests Remarks | Moisture | Cons./Dens. | Additional Observations |
|---|---|---|---|---|---|---|---|---|---|---|
| ADV DT | | | 0.0 | | | Concrete | | | | |
| | | | | | CI | Silty CLAY, low to medium plasticity, dark grey with yellow and red mottling. | | M | S | |
| | | | 0.5 | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | | | 1.0 | | | | | | | |
| | | | | | CI | Silty CLAY, medium to high plasticity, grey with red mottling, with some siltstone. | | M | S | |
| | | | 1.5 | | | | | | | |
| | | | 2.0 | | | | | | | No hydrocarbon odour, No Staining, No fibro-cement material observed |
| | | | 2.5 | | | | | | | |
| | | | | | SC | Clayey SAND, grey with red mottling. | | M | VD | |
| ADT | Seepage ▼ | | 3.0 | | | | | | | |
| | | | | | | Borehole BH4 terminated at 3.2m | | | | |
| | | | 3.5 | | | | | | | |
| | | | 4.0 | | | | | | | |
| | | | 4.5 | | | | | | | |
| | | | 5.0 | | | | | | | |

BOREHOLE / TEST PIT ES5610 GINT.GPJ GINT STD AUSTRALIA.GDT 4/4/14

# APPENDIX D

## ASSMAC (1998) FIELD pH AND PEROXIDE TEST PROTOCOL

Aargus

# APPENDIX 1. Field pH and the Peroxide Test

## 1. Field pH Test

The field pH ($pH_F$) of actual acid sulfate soils tends to be ≤ 4 while the field pH of potential acid sulfate soils tends to be neutral. Field pH provides a useful quick indication of the likely presence and severity of "actual" acid sulfate soils. The field pH is a qualitative method only that cannot be used as a substitute for laboratory analysis in the identification of acid sulfate soils for assessment purposes.

Field pH readings should be taken at regular intervals down the soil profile. It is recommended this test be done every 0.25 m down the profile but at least every 0.5 m interval or horizon whichever is the lesser.

- pH readings of pH ≤4, indicates that actual acid sulfate soil are present with the sulfides having been oxidised in the past, resulting in acid soil (and soil pore water) conditions.
- pH values >4 and <5.5 are extremely acid and may be the result of some previous or limited oxidation of sulfides, but is not confirmatory of actual ASS. Substantial exchangeable/soluble aluminium and hydrogen ions usually exist at these pH values. Other factors such as excessive fertiliser use, organic acids or strong leaching can cause pH >4 - <5.5. Field pH alone cannot indicate potential ASS as they may be neutral to slightly alkaline when unoxidised.

In order to test for potential acid sulfate soils that contain unoxidised sulfides, peroxide is used to rapidly oxidise the iron sulfides (usually pyrite), resulting in the production of acid with a corresponding drop in pH.

**Notes on pH equipment**

Preferably a battery powered, field pH meter with a robust, spear point, double reference pH electrode should be used. The probe can be inserted directly into soft wet soils or soil mixed up into a paste with deionised water. Care must be exercised not to scratch the electrode on sandy or gravely soils. The probe should be standardised prior to use and regularly during use against standard solutions according to the manufacturers instructions.

Alternatively, an approximate 1:5 soil:deionised water suspension can be made up in small tubes, hand shaken and pH of the solution measured. pH test strips can be used to give an approximate value (pH +/- 0.25). Raupach soil pH test kits should be used with caution as they can give erroneous results. Both these latter methods are based on mixed indicator solutions that give a pH dependant colour and are subject to interferences.

## 2. Field Peroxide pH Test

To test for the presence of unoxidised sulfides and therefore potential acid sulfate soils, the oxidation of the soil with 30% (100 volume) hydrogen peroxide can be performed in the field. The most common method is:

- a small sample of soil is placed in a small glass container (eg short clear centrifuge tubes or clear tissue culture clusters) and a small volume of peroxide is dropped onto the soil.

*Note: Allow the digested solution to cool after the reaction.*
*A pH probe will only measure to 60°C.*

The reaction should be observed and rated. In some cases, the reaction may be instantaneous; in others, it may take 10 minutes or more. Heating over hot water or in the sun may be necessary to start the reaction on cool days, particularly if the peroxide is cold.

Potentially positive reactions includes one or more of the following:

- change in colour of the soil from grey tones to brown tones
- effervescence
- the release of sulfurous odours
- a substantial depression in pH below $pH_F$
- pH < 3

The strength of the reaction is a useful indicator. The peroxide test is most useful and reliable with clays and loams containing low levels of organic matter. It is least useful on coffee rock, sands or gravels, particularly dredged sands with low levels of sulfidic material (eg <0.05 % S). With soils containing high organic matter (such as surface soils, peats, mangrove/estuarine muds and marine clays), care must be exercised when interpreting the reaction as high levels of organic matter and other soil constituents particularly manganese oxides can also cause a reaction.

**Note of caution with the use of peroxide**

30 % hydrogen peroxide is a strong oxidising agent and should be handled carefully with appropriate eye and skin protection. This test should be only undertaken by trained operators.

The pH of analytical grade peroxide may be as low as 3 as manufacturers stabilise technical grade peroxide with acid, The peroxide pH should be checked on every new container and regularly before taking to the field and adjusted to 4.5 - 5.5 with a few drops of 0.1M NaOH if necessary. False field $pH_{FOX}$ readings could result if this step is not undertaken.

## 3. pH after oxidation

The measurement of the change in the $pH_{FOX}$ following oxidation can give a useful indication of the presence of sulfidic material and can give an early indication of the distribution of sulfide down a core/ profile or across the site. The pH after oxidation test is not a substitute for analytical test results.

If the $pH_{FOX}$ value is at least one unit below field $pH_F$, it may indicate potential acid sulfate soils. The greater the difference between the two measurements, the more indicative the value is of a potential acid sulfate soils. The lower the final $pH_{FOX}$ value is, the better the indication of a positive result.

- If the $pH_{FOX} < 3$ and there was a strong reaction to the peroxide, there is a high level of certainty of a potential acid sulfate soils. The more the $pH_{FOX}$ drops below 3, the more positive the presence of sulfides.
- A $pH_{FOX}$ 3-4 is less positive and laboratory analyses are needed to confirm if sulfides are present. Sands particularly may give confusing field test results and must be confirmed by laboratory analysis.
- For $pH_{FOX}$ 4-5 the test is neither positive nor negative. Sulfides may be present either in small quantities and be poorly reactive under quick test field conditions. In some cases, the sample may contain shell/carbonate that neutralises some or all acid produced by oxidation. In other cases, the $pH_{FOX}$ value may be due to the production of organic acids and there may be no sulfides present. In these cases, analysis for sulfur using the POCAS method would be the best to check for the presence of oxidisable sulfides.
- For $pH_{FOX} > 5$ and little or no drop in pH from the field value, little net acid generating ability is indicated. Again, the sulfur trail of the POCAS method should be used to check some samples to confirm the absence of oxidisable sulfides.

Care is needed with interpretation of the result on highly reactive soils. Some soil minerals other than pyrite react vigorously with peroxide, particularly manganese but may only show small pH changes. When selecting soil for testing it is advisable to avoid material high in organic matter as the oxidation of organic matter can lead to the generation of acid. However, pH of soils containing organic matter and no pyrite do not generally stay below 4 on extended oxidation. In general, positive tests on 'apparently well drained' surface soils should always be treated with caution and followed up with laboratory confirmation.

The field peroxide tests can be made more consistent if a fixed volume of soil (using a small scoop) is used, a consistent volume of peroxide is added and left to react for an hour, and the sample is made up to a fixed volume with deionised water before reading. However, such procedures take time in the field and are more suited to a 'field shed' situation. When effervescence (sometimes violent) has ceased, a few additional mL of peroxide should be added until the reaction appears complete. If the reaction is violent, it is recommended that deionised water be added to cool and dilute the reaction. The test may have to be repeated with a small amount of water added to the soil prior to peroxide addition. The $pH^{FOX}$ of the resultant mixture is then measured.

## 4. Reporting the results

All $pH_F$ and $pH_{FOX}$ results along with the strength of reaction should be tabulated by site and depth and reported in the ASS report. An example of a recording sheet is attached.

# APPENDIX E

## LABORATORY CERITIFICATES

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# Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

**Aargus P/L**
**446 Parramatta Road**
**Petersham**
**NSW 2049**

**Attention:** **Lubos Melicharek**

**Report** **394535-S**
Client Reference SITE INVESTIGATION ES5610/2
Received Date Sep 30, 2013

| **Client Sample ID** | | | **BH3 2.0-2.5** | **BH3 2.5-2.85** | **BH3 3.5-4.0** | **BH3 4.0-4.2** |
|---|---|---|---|---|---|---|
| **Sample Matrix** | | | **Soil** | **Soil** | **Soil** | **Soil** |
| **Eurofins \| mgt Sample No.** | | | **S13-Se22437** | **S13-Se22438** | **S13-Se22439** | **S13-Se22440** |
| **Date Sampled** | | | **Sep 24, 2013** | **Sep 24, 2013** | **Sep 24, 2013** | **Sep 24, 2013** |
| Test/Reference | LOR | Unit | | | | |
| **Acidity Trail** | | | | | | |
| Acid trail - Titratable Actual Acidity | 2 | mol H+/t | 58 | 46 | 28 | 6.3 |
| Acid trail - Titratable Peroxide Acidity | 2 | mol H+/t | 73 | 66 | 39 | 14 |
| Acid trail - Titratable Sulfidic Acidity | 2 | mol H+/t | 15 | 20 | 11 | 7.5 |
| sulfidic - Titratable Actual Acidity | 0.02 | % pyrite S | 0.09 | 0.07 | 0.04 | < 0.02 |
| sulfidic - Titratable Peroxide Acidity | 0.02 | % pyrite S | 0.12 | 0.11 | 0.06 | 0.02 |
| sulfidic - Titratable Sulfidic Acidity | 0.02 | % pyrite S | 0.03 | 0.03 | 0.02 | < 0.02 |
| **Sulfur Trail** | | | | | | |
| acidity - Peroxide Oxidisable Sulfur | 10 | mol H+/t | < 10 | < 10 | < 10 | < 10 |
| Sulfur - KCl Extractable | 0.02 | % S | 0.02 | < 0.02 | < 0.02 | < 0.02 |
| Sulfur - Peroxide | 0.02 | % S | 0.02 | < 0.02 | < 0.02 | < 0.02 |
| Sulfur - Peroxide Oxidisable Sulfur | 0.02 | % S | < 0.02 | < 0.02 | < 0.02 | < 0.02 |
| **pH Measurements** | | | | | | |
| pH-KCL | 0.1 | units | 4.4 | 4.4 | 4.4 | 5.0 |
| pH-OX | 0.1 | units | 3.9 | 3.8 | 4.1 | 4.4 |
| **Calcium Values** | | | | | | |
| Acid Reacted Calcium | 0.02 | % Ca | < 0.02 | < 0.02 | < 0.02 | < 0.02 |
| acidity - Acid Reacted Calcium | 10 | mol H+/t | < 10 | < 10 | < 10 | < 10 |
| Calcium - KCl Extractable | 0.02 | % Ca | 0.03 | < 0.02 | 0.02 | < 0.02 |
| Calcium - Peroxide | 0.02 | % Ca | 0.03 | < 0.02 | 0.02 | < 0.02 |
| sulfidic - Acid Reacted Calcium | 0.02 | % S | < 0.02 | < 0.02 | < 0.02 | < 0.02 |
| **Magnesium Values** | | | | | | |
| Acid Reacted Magnesium | 0.02 | % Mg | < 0.02 | < 0.02 | < 0.02 | < 0.02 |
| acidity - Acid Reacted Magnesium | 10 | mol H+/t | < 10 | < 10 | < 10 | < 10 |
| Magnesium - KCl Extractable | 0.02 | % Mg | 0.02 | 0.02 | 0.02 | 0.02 |
| Magnesium - Peroxide | 0.02 | % Mg | 0.02 | 0.02 | 0.02 | 0.02 |
| sulfidic - Acid Reacted Magnesium | 0.02 | % S | < 0.02 | < 0.02 | < 0.02 | < 0.02 |
| **Acid Base Accounting (SPOCAS)** | | | | | | |
| ANC Fineness Factor | 0.5 | units | 1.5 | 1.5 | 1.5 | 1.5 |
| Liming rate - SPOCAS | 1 | kg CaCO3/t | 4.5 | 3.6 | 2.3 | < 1 |
| Net Acidity (acidity units) - SPOCAS | 10 | mol H+/t | 59 | 48 | 32 | < 10 |
| Net Acidity (sulfur units) - SPOCAS | 0.02 | % S | 0.10 | 0.078 | 0.05 | < 0.02 |
| | | | | | | |
| % Moisture | 0.1 | % | 15 | 13 | 16 | 18 |

| Client Sample ID | | | BH3 5.5-5.9 |
|---|---|---|---|
| Sample Matrix | | | Soil |
| Eurofins \| mgt Sample No. | | | S13-Se22441 |
| Date Sampled | | | Sep 24, 2013 |
| Test/Reference | LOR | Unit | |
| **Acidity Trail** | | | |
| Acid trail - Titratable Actual Acidity | 2 | mol H+/t | 16 |
| Acid trail - Titratable Peroxide Acidity | 2 | mol H+/t | 21 |
| Acid trail - Titratable Sulfidic Acidity | 2 | mol H+/t | 5.0 |
| sulfidic - Titratable Actual Acidity | 0.02 | % pyrite S | 0.03 |
| sulfidic - Titratable Peroxide Acidity | 0.02 | % pyrite S | 0.03 |
| sulfidic - Titratable Sulfidic Acidity | 0.02 | % pyrite S | < 0.02 |
| **Sulfur Trail** | | | |
| acidity - Peroxide Oxidisable Sulfur | 10 | mol H+/t | < 10 |
| Sulfur - KCl Extractable | 0.02 | % S | < 0.02 |
| Sulfur - Peroxide | 0.02 | % S | 0.02 |
| Sulfur - Peroxide Oxidisable Sulfur | 0.02 | % S | < 0.02 |
| **pH Measurements** | | | |
| pH-KCL | 0.1 | units | 4.6 |
| pH-OX | 0.1 | units | 4.3 |
| **Calcium Values** | | | |
| Acid Reacted Calcium | 0.02 | % Ca | < 0.02 |
| acidity - Acid Reacted Calcium | 10 | mol H+/t | < 10 |
| Calcium - KCl Extractable | 0.02 | % Ca | < 0.02 |
| Calcium - Peroxide | 0.02 | % Ca | < 0.02 |
| sulfidic - Acid Reacted Calcium | 0.02 | % S | < 0.02 |
| **Magnesium Values** | | | |
| Acid Reacted Magnesium | 0.02 | % Mg | < 0.02 |
| acidity - Acid Reacted Magnesium | 10 | mol H+/t | < 10 |
| Magnesium - KCl Extractable | 0.02 | % Mg | 0.02 |
| Magnesium - Peroxide | 0.02 | % Mg | 0.02 |
| sulfidic - Acid Reacted Magnesium | 0.02 | % S | < 0.02 |
| **Acid Base Accounting (SPOCAS)** | | | |
| ANC Fineness Factor | 0.5 | units | 1.5 |
| Liming rate - SPOCAS | 1 | kg CaCO3/t | 1.4 |
| Net Acidity (acidity units) - SPOCAS | 10 | mol H+/t | 18 |
| Net Acidity (sulfur units) - SPOCAS | 0.02 | % S | 0.029 |
| | | | |
| % Moisture | 0.1 | % | 25 |

## Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

| Description | Testing Site | Extracted | Holding Time |
|---|---|---|---|
| SPOCAS (Acid Sulphate Soils) | | | |
| Acidity Trail | Melbourne | Oct 07, 2013 | 7 Day |
| - Method: Acid Sulphate Soils Laboratory Methods Guidelines Version 2.1 - June 2004 | | | |
| Sulfur Trail | Melbourne | Oct 07, 2013 | |
| pH Measurements | Melbourne | Oct 07, 2013 | |
| Calcium Values | Melbourne | Oct 07, 2013 | |
| Magnesium Values | Melbourne | Oct 07, 2013 | |
| - Method: Acid Sulphate Soils Laboratory Methods Guidelines Version 2.1 - June 2004 | | | |
| Acid Base Accounting (SPOCAS) | Melbourne | Oct 07, 2013 | |
| - Method: Acid Sulphate Soils Laboratory Methods Guidelines Version 2.1 - June 2004 | | | |
| % Moisture | Melbourne | Oct 02, 2013 | 14 Day |
| - Method: Method 102 - ANZECC - % Moisture | | | |

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ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

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NATA # 1261
Site # 1254 & 14271

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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

**Brisbane**
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

| | | | | | |
|---|---|---|---|---|---|
| **Company Name:** | Aargus P/L | **Order No.:** | | **Received:** | Sep 30, 2013 2:45 PM |
| **Address:** | 446 Parramatta Road | **Report #:** | 394535 | **Due:** | Oct 8, 2013 |
| | Petersham | **Phone:** | 1300 137 038 | **Priority:** | 5 Day |
| | NSW 2049 | **Fax:** | 1300 136 038 | **Contact Name:** | Lubos Melicharek |
| **Client Job No.:** | SITE INVESTIGATION ES5610/2 | | | | |

**Eurofins | mgt Client Manager: Ruth Callander**

| Sample Detail | | | | | % Moisture | SPOCAS (Acid Sulphate Soils) |
|---|---|---|---|---|---|---|
| **Laboratory where analysis is conducted** | | | | | | |
| **Melbourne Laboratory - NATA Site # 1254 & 14271** | | | | | X | X |
| **Sydney Laboratory - NATA Site # 18217** | | | | | | |
| **Brisbane Laboratory - NATA Site # 20794** | | | | | | |
| **External Laboratory** | | | | | | |
| **Sample ID** | **Sample Date** | **Sampling Time** | **Matrix** | **LAB ID** | | |
| BH3 2.0-2.5 | Sep 24, 2013 | | Soil | S13-Se22437 | X | X |
| BH3 2.5-2.85 | Sep 24, 2013 | | Soil | S13-Se22438 | X | X |
| BH3 3.5-4.0 | Sep 24, 2013 | | Soil | S13-Se22439 | X | X |
| BH3 4.0-4.2 | Sep 24, 2013 | | Soil | S13-Se22440 | X | X |
| BH3 5.5-5.9 | Sep 24, 2013 | | Soil | S13-Se22441 | X | X |

## Eurofins | mgt Internal Quality Control Review and Glossary

### General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

### UNITS

**mg/kg:** milligrams per Kilogram

**ug/l:** micrograms per litre

**ppb:** Parts per billion

**org/100ml:** Organisms per 100 millilitres

**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

**mg/l:** milligrams per litre

**ppm:** Parts per million

**%:** Percentage

**NTU:** Units

### TERMS

| | |
|---|---|
| **Dry** | Where a moisture has been determined on a solid sample the result is expressed on a dry basis. |
| **LOR** | Limit of Reporting. |
| **SPIKE** | Addition of the analyte to the sample and reported as percentage recovery. |
| **RPD** | Relative Percent Difference between two Duplicate pieces of analysis. |
| **LCS** | Laboratory Control Sample - reported as percent recovery |
| **CRM** | Certified Reference Material - reported as percent recovery |
| **Method Blank** | In the case of solid samples these are performed on laboratory certified clean sands.<br>In the case of water samples these are performed on de-ionised water. |
| **Surr - Surrogate** | The addition of a like compound to the analyte target and reported as percentage recovery. |
| **Duplicate** | A second piece of analysis from the same sample and reported in the same units as the result to show comparison. |
| **Batch Duplicate** | A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis. |
| **Batch SPIKE** | Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis. |
| **USEPA** | United States Environment Protection Authority |
| **APHA** | American Public Health Association |
| **ASLP** | Australian Standard Leaching Procedure (AS4439.3) |
| **TCLP** | Toxicity Characteristic Leaching Procedure |
| **COC** | Chain of Custody |
| **SRA** | Sample Receipt Advice |
| **CP** | Client Parent - QC was performed on samples pertaining to this report |
| **NCP** | Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within |

### QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

### QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

| Test | Units | Result 1 | | | Acceptance Limits | Pass Limits | Qualifying Code |
|---|---|---|---|---|---|---|---|
| **Method Blank** | | | | | | | |
| **Acidity Trail Acid Sulphate Soils Laboratory Methods Guidelines Version 2.1 - June 2004** | | | | | | | |
| Acid trail - Titratable Actual Acidity | mol H+/t | < 2 | | | 2 | Pass | |
| Acid trail - Titratable Peroxide Acidity | mol H+/t | < 2 | | | 2 | Pass | |
| Acid trail - Titratable Sulfidic Acidity | mol H+/t | < 2 | | | 2 | Pass | |
| sulfidic - Titratable Actual Acidity | % pyrite S | < 0.02 | | | 0.02 | Pass | |
| sulfidic - Titratable Peroxide Acidity | % pyrite S | < 0.02 | | | 0.02 | Pass | |
| sulfidic - Titratable Sulfidic Acidity | % pyrite S | < 0.02 | | | 0.02 | Pass | |
| **Method Blank** | | | | | | | |
| **Sulfur Trail Sulfur Trail** | | | | | | | |
| acidity - Peroxide Oxidisable Sulfur | mol H+/t | < 10 | | | 10 | Pass | |
| Sulfur - KCl Extractable | % S | < 0.02 | | | 0.02 | Pass | |
| Sulfur - Peroxide | % S | < 0.02 | | | 0.02 | Pass | |
| Sulfur - Peroxide Oxidisable Sulfur | % S | < 0.02 | | | 0.02 | Pass | |
| **Method Blank** | | | | | | | |
| **Calcium Values Calcium Values** | | | | | | | |
| Acid Reacted Calcium | % Ca | < 0.02 | | | 0.02 | Pass | |
| acidity - Acid Reacted Calcium | mol H+/t | < 10 | | | 10 | Pass | |
| Calcium - KCl Extractable | % Ca | < 0.02 | | | 0.02 | Pass | |
| Calcium - Peroxide | % Ca | < 0.02 | | | 0.02 | Pass | |
| sulfidic - Acid Reacted Calcium | % S | < 0.02 | | | 0.02 | Pass | |
| **Method Blank** | | | | | | | |
| **Magnesium Values Acid Sulphate Soils Laboratory Methods Guidelines Version 2.1 - June 2004** | | | | | | | |
| Acid Reacted Magnesium | % Mg | < 0.02 | | | 0.02 | Pass | |
| acidity - Acid Reacted Magnesium | mol H+/t | < 10 | | | 10 | Pass | |
| Magnesium - KCl Extractable | % Mg | < 0.02 | | | 0.02 | Pass | |
| Magnesium - Peroxide | % Mg | < 0.02 | | | 0.02 | Pass | |
| sulfidic - Acid Reacted Magnesium | % S | < 0.02 | | | 0.02 | Pass | |

| Test | Lab Sample ID | QA Source | Units | Result 1 | | | Acceptance Limits | Pass Limits | Qualifying Code |
|---|---|---|---|---|---|---|---|---|---|
| **Duplicate** | | | | | | | | | |
| **Acidity Trail** | | | | Result 1 | Result 2 | RPD | | | |
| Acid trail - Titratable Actual Acidity | S13-Se22437 | CP | mol H+/t | 58 | 60 | <1 | 30% | Pass | |
| Acid trail - Titratable Peroxide Acidity | S13-Se22437 | CP | mol H+/t | 73 | 73 | 4.0 | 30% | Pass | |
| Acid trail - Titratable Sulfidic Acidity | S13-Se22437 | CP | mol H+/t | 15 | 13 | 17 | 30% | Pass | |
| sulfidic - Titratable Actual Acidity | S13-Se22437 | CP | % pyrite S | 0.09 | 0.10 | <1 | 30% | Pass | |
| sulfidic - Titratable Peroxide Acidity | S13-Se22437 | CP | % pyrite S | 0.12 | 0.12 | 4.0 | 30% | Pass | |
| sulfidic - Titratable Sulfidic Acidity | S13-Se22437 | CP | % pyrite S | 0.03 | 0.02 | 17 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| **Sulfur Trail** | | | | Result 1 | Result 2 | RPD | | | |
| acidity - Peroxide Oxidisable Sulfur | S13-Se22437 | CP | mol H+/t | < 10 | < 10 | <1 | 30% | Pass | |
| Sulfur - KCl Extractable | S13-Se22437 | CP | % S | 0.02 | < 0.02 | 8.0 | 30% | Pass | |
| Sulfur - Peroxide | S13-Se22437 | CP | % S | 0.02 | 0.02 | 6.0 | 30% | Pass | |
| Sulfur - Peroxide Oxidisable Sulfur | S13-Se22437 | CP | % S | < 0.02 | < 0.02 | <1 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| **Calcium Values** | | | | Result 1 | Result 2 | RPD | | | |
| Acid Reacted Calcium | S13-Se22437 | CP | % Ca | < 0.02 | < 0.02 | <1 | 30% | Pass | |
| acidity - Acid Reacted Calcium | S13-Se22437 | CP | mol H+/t | < 10 | < 10 | <1 | 30% | Pass | |
| Calcium - KCl Extractable | S13-Se22437 | CP | % Ca | 0.03 | 0.03 | 2.0 | 30% | Pass | |
| Calcium - Peroxide | S13-Se22437 | CP | % Ca | 0.03 | 0.04 | 2.0 | 30% | Pass | |
| sulfidic - Acid Reacted Calcium | S13-Se22437 | CP | % S | < 0.02 | < 0.02 | <1 | 30% | Pass | |

| Duplicate | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Magnesium Values** | | | | Result 1 | Result 2 | RPD | | | |
| Acid Reacted Magnesium | S13-Se22437 | CP | % Mg | < 0.02 | < 0.02 | <1 | 30% | Pass | |
| acidity - Acid Reacted Magnesium | S13-Se22437 | CP | mol H+/t | < 10 | < 10 | <1 | 30% | Pass | |
| Magnesium - KCl Extractable | S13-Se22437 | CP | % Mg | 0.02 | 0.02 | <1 | 30% | Pass | |
| Magnesium - Peroxide | S13-Se22437 | CP | % Mg | 0.02 | 0.02 | 1.0 | 30% | Pass | |
| sulfidic - Acid Reacted Magnesium | S13-Se22437 | CP | % S | < 0.02 | < 0.02 | <1 | 30% | Pass | |

## Comments

## Sample Integrity

| | |
|---|---|
| Custody Seals Intact (if used) | N/A |
| Attempt to Chill was evident | Yes |
| Sample correctly preserved | Yes |
| Organic samples had Teflon liners | Yes |
| Sample containers for volatile analysis received with minimal headspace | Yes |
| Samples received within HoldingTime | No |
| Some samples have been subcontracted | No |

## Authorised By

| | |
|---|---|
| Ruth Callander | Client Services |
| Glenn Jackson | Senior Analyst-SPOCAS (VIC) |

**Dr. Bob Symons**
**Laboratory Manager**

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

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#394535

# AARGUS PTY LTD

## Laboratory Test Request / Chain of Custody Record


446 Parramatta Road PETERSHAM NSW 2049
P O Box 398 DRUMMOYNE NSW 1470
Tel: 1300 137 038
Fax: 1300 136 038
email: admin@aargus.net & MuraliMu@aargus.net




TO: EUROFIN MGT
UNIT F3, BUILDING F
16 MARS ROAD
LANE COVE WEST NSW 2066

PH: 02 8215 6222 FAX: 02 9420 2977
ATTN:

| | | | |
|---|---|---|---|
| **Sampling Date:** | 24.09.2013 | **Job No:** | ES5610/2 |
| **Sampled By:** | MM | **Project:** | Site Investigation |
| **Project Manager:** | LM | **Location:** | Victoria Road Corridor - Site 1, Marrickville, NSW |

**Results required by: 5 DAYS TURN AROUND**

| Sampling details | | Sample type | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Depth (m) | Soil | Vate | SPOCAS | | | | | | | SUITES | KEEP SAMPLE |
| BH3 | 2.0-2.5 | USG | | ✓ | | | | | | | | YES |
| | 2.5-2.85 | USG | | ✓ | | | | | | | | YES |
| | 3.5-4.0 | USG | | ✓ | | | | | | | | YES |
| | 4.0-4.2 | USG | | ✓ | | | | | | | | YES |
| | 5.5-5.9 | USG | | ✓ | | | | | | | | YES |
| | | | | | | | | | | | | |
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| Relinquished by | | | Received by | | |
|---|---|---|---|---|---|
| Name | Signature | Date | Name | Signature | Date |
| Murali Muralitharan | MM | 30.09.2013 | C. ALIMANE | | 30/9/13 |

Legend:

| | | | | | |
|---|---|---|---|---|---|
| WG | Water sample, glass bottle | USG | Undisturbed soil sample (glass jar) | DSP | Disturbed soil sample (small plastic bag) |
| WP | Water sample, plastic bottle | DSG | Disturbed soil sample (glass jar) | ✓ | Test required |

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26.5

30/9/13 2-45pm.