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HICKORY CONSTRUCTIONS REDFERN PTY LTD
AND BRIDGE HOUSING LIMITED

Acid Sulfate Soils Management Plan

600-660 Elizabeth Street, Redfern
(Redfern Place)

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Copies		Recipient
1	Soft Copy (PDF – Secured, issued by email)	Hickory Construction Redfern Pty Ltd and Bridge Housing Limited Level 5, 68 Clarke Street, Southbank VIC 3006
2	Original (Saved to Digital Archives)	EI Australia Suite 6.01, 55 Miller Street, Pyrmont NSW 2009

Author	Project Manager	Technical Reviewer
GEISIANE TORRES Environmental Engineer	**SHARON LI** Environmental Engineer	**WARWICK HAYES** Environmental Scientist EIANZ CEnvP 1401 Licences Asbestos Assessor LAA001080

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1. Introduction

1.1 Background

EI Australia (EI) was engaged by Hickory Construction Redfern Pty Ltd & Bridge Housing Limited to prepare an acid sulfate soils management plan for 600-660 Elizabeth Street, Redfern (Redfern Place) in New South Wales (henceforth referred to as 'the site').

The site is located 2.4 kilometres south of the Sydney central business district (CBD), within the local government area (LGA) of City of Sydney Council (**Appendix A**, **Figure 1**). The site was designated for redevelopment. Previous environmental investigations established that acid sulphate soils (ASSs) were present in natural (non-fill) soils from 1.4 metres below ground level (m BGL) onwards. Consequently, an ASS management plan was required, in support of the corresponding development proposal with City of Sydney Council and to comply with Condition 13 *Ground and Water Conditions* of the NSW Government *Planning Secretary's Environmental Assessment Requirements* (SEARs) for Application SSD-51274973 (**Table 1-1**).

This report accompanies a detailed State Significant Development Application (SSDA) that seeks approval for a mixed-use development at 600-660 Elizabeth Street, Redfern (Redfern Place). The development proposes four buildings comprising community facilities, commercial/office, affordable/social/specialist disability housing apartments and new public links and landscaping.

The project site comprises Lot 1 in DP 1249145. It has an area of approximately 10,850m2. Part of the site currently accommodates the existing Police Citizens Youth Club (PCYC) (to be demolished and replaced). The remaining portion of the site is vacant with remnant vegetation.

The SSDA seeks approval for redevelopment of the site, including:

- *Demolition of existing buildings.*
- *Tree removal.*
- *Bulk earthworks including excavation.*
- *Construction of a community facility building known as Building S1.*
- *Construction of two residential flat buildings (known as Buildings S2 and S3) up to 14 and 10 storeys respectively, for social and affordable housing.*
- *Construction of a five-storey mixed use building (known as Building S4) comprising commercial uses on the ground level and social and specialist disability housing above.*
- *Construction of one basement level below Buildings S2, S3 and part of S4 with vehicle access from Kettle Street.*
- *Site-wide landscaping and public domain works including north-south and east-west pedestrian through-site link.*

For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

Table 1-1 Planning Secretary's Environmental Assessment Requirements

SEARS Requirement	Relevant Section of Report
13. Ground and Water Conditions Assesses potential impacts on soil, riparian land and infrastructure on and near the site, including erosion, salinity and acid sulfates; and Provide a Surface and Groundwater Impact Assessment that assesses potential impacts on: ▪ surface water resources (quality and quantity) including related infrastructure, hydrology, dependent ecosystems, drainage lines, downstream assets and watercourses; ▪ groundwater resources in accordance with the Groundwater Guidelines.	Management of ASS – **Section 4.0**

1.2 Proposed Development

Based on the supplied plans (**Appendix B**), the proposed development involves the demolition of all existing structures, followed by the construction of multiple apartment buildings, ranging from two to fourteen storeys, overlying a partial basement, as well as a new community facility.

The basement will cover part of the site footprint, with a finished floor level at 29.00m Australian Height Datum (AHD), requiring soil excavations to depths of 2-3m BGL. Areas of retained soils will be limited to the north, south, east and central portions of the site.

The total amount of soil expected to be disturbed during basement construction is about 9,606m^3, assuming an area of 4,803m^2 is excavated to an average depth of 2m BGL (**Appendix A**, **Figure 2**).

Notes:
Locally deeper excavations could be required for footings, lift overrun pits, crane pads and service trenches, creating a greater amount of spoil.
The groundwater table occurs at 1.2-2.1m BGL, indicating that dewatering will be required during the basement construction phase.

1.3 Project Objective

The objective of this plan is to provide the framework for the management and monitoring of ASSs during the proposed development, focusing on the bulk excavation stage.

1.4 Scope

In order to achieve the project objective, the scope of this management plan includes:

- Review of relevant topographic, (hydro)geological and soil landscape information, including the relevant ASS planning and risk maps;
- A review of the previous environmental investigations relating to the site;
- Description of the procedures to treat and dispose ASSs, when encountered on-site, including the minimisation and control of acid leachates;
- Determination of monitoring measures for soils and surface / ground waters; and
- Description of contingency procedures to be implemented in the case of failure of management procedures.

1.5 Definition of Acid Sulfate Soils

Acid sulfate soils are naturally occurring sediments containing iron sulfides, which have been deposited in estuarine conditions. As they comprise natural materials, their occurrence is not related to site boundaries or anthropogenic contamination; rather, they extend across regions suitable for their deposition.

When ASSs are exposed to air (e.g. due to bulk excavation or dewatering), oxygen reacts with the iron sulfides, producing sulfuric acid (and iron oxides). The acid can be produced in large quantities and drain into waterways causing severe short and long term socio-economic and environmental impacts, including damage to manmade structures and natural ecosystems.

ASS can be classified as either:

- Actual acid sulfate soil (AASS), within which are materials that have already reacted with oxygen to produce acid; or
- Potential acid sulfate soil (PASS), within which are materials that contain iron sulfides, but have not been exposed to oxygen (e.g. soils below the water table) and therefore have not produced sulfuric acid (though they have the capacity to do so).

Aquatic organisms are extremely sensitive to acid drainage. The impacts from ASS leachates include:

- Dissolved metals (aluminium in particular) can be toxic to both aquatic life forms;
- Dissolved sulfate salts can increase the salinity of freshwater; and
- Acidic sediment may “fix” phosphates and other nutrients, preventing their uptake by plants.

1.6 Regulatory Framework

The work reported herein was completed with reference to the following documents:

- EPA (1995) *Assessing and Managing Acid Sulfate Soils - Guidelines for Land Management in NSW Coastal Areas*;
- EPA (2014) *Waste Classification Guidelines*;
- Sullivan *et al*. (2018) *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Sampling and Identification Methods Manual*; and
- *Sydney Local Environmental Plan 2012.*

2. Site Description

2.1 Property Identification, Location and Physical Setting

The site identification details and associated information are presented in **Table 2-1**. Refer to **Appendices A** and **B** for site plans.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	600-660 Elizabeth Street, Redfern NSW
Location and Description	2.4 kilometres south of the Sydney CBD. The site is rectangular in shape and occupied by a grassed reserve over the northern part and a brick building and recreational (sporting) facilities in the south.
Geographical Coordinates	Northern-eastern corner of the site (datum GDA2020-MGA56): ▪ Easting: 334288.581 ▪ Northing: 6248056.932 (Source: http://maps.six.nsw.gov.au)
Site Area	Approximately 1.085 hectares (10,850 m^2)
Cadastral Identification	Lot in Deposited Plan 1249145
LGA	City of Sydney Council
Current Zoning	R1 – General Residential (*Sydney Local Environmental Plan 2012*)
Current Land Use	Northern area – parkland Southern Area – PCYC building and youth sporting facilities
Surrounding Land Use	North: Kettle Street, followed by residential properties East: Walker Street, followed by residential properties South: Phillip Street, followed by commercial and residential properties West: Elizabeth Street, followed by Redfern Oval

2.2 Regional Setting

Local topography, (hydro)geology and soil landscape information is summarised in **Table 2-2**.

Table 2-2 Regional Setting Information

Attribute	Description
Topography	Overall the site is flat. Relative elevations range between 31.00m to 32.70m AHD.
Drainage	Likely to be consistent with the general slope of the site, with runoff discharging into pit and pipe systems of the municipal stormwater system in Elizabeth Street.
Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources *Sydney 1:100,000 Geological Series Sheet 9130* (DMR 1983), indicates the site is underlain by Quaternary-age (Cainozoic Holocene) sedimentary deposits (*Qhd*), typically comprised of medium to fine-grained “marine” sands with podsols. The dune deposits are likely to be underlain by Hawkesbury Sandstone (*Rh*), which forms the regional bedrock. Hawkesbury Sandstone comprises “medium to coarse-grained quartz sandstone, with very minor shale and laminite lenses”.

Attribute	Description
Soil Landscape	The Soil Conservation Service of NSW *Sydney 1:100,000 Soil Landscapes Series Sheet 9130* indicates the site lies within a Tuggerah (*tg*) aeolian landscape. This landscape type typically comprises gently undulating to rolling coastal dune fields. Soils are generally deep (>2m), with podzols on dunes and humus podzol intergrades on swales, and highly permeable, presenting very high erosion hazard. They are associated with permanently high water tables.
Depth of Filling	Based on observations from the investigation phase (**Section 3** and **Appendix C**), a layer of anthropogenic filling, ranging from 0.1m to 1.4m in thickness, is present across the site, beneath which are organic peat and Botany Sands. The depth to bedrock (sandstone) ranges from 7.5-12.9m BGL.
Nearest Surface Water Feature	Sheas Creek, located approximately 1 kilometre to the south west of the site.
Groundwater Conditions	Based on observations from the investigation phase (**Section 3** and **Appendix C**), the groundwater table is encountered at 1.2-2.1m BGL, within an unconfined sand aquifer. The hydraulic gradient is inferred to be south westerly, towards Sheas Creek. **Note:** The site is located within Zone 2 of the *Botany Groundwater Management Area*.

2.3 Acid Sulfate Soil Risk Mapping

In accordance with the *Sydney Local Environmental Plan 2012 - Acid Sulfate Soils Map* (Sheet ASS_010), the site is situated within *Class 5* land. With reference to the *Botany Bay Acid Sulfate Soil Risk Map* (1:25,000 scale, Murphy, 1997), the site within an area having '*No Known Occurrence*.' In such cases, ASSs are not known or expected to occur and "land management activities are not likely to be affected by ASS materials".

2.4 Geomorphic and Site Characteristics

The likelihood of ASS occurrence on-site was considered against various geomorphic criteria given in ASSMAC (1998) *Acid Sulfate Soil Manual*. The considerations are given in **Table 2-3**.

Table 2-3 Consideration of Geomorphic Indicators for ASS

Geomorphic Indicator	Is geomorphic feature present on-site?
Holocene Sediments	Yes Maps indicate site is situated on Quaternary-aged sands / Tuggerah aeolian landscape Borelogs from previous investigations confirmed alluvial soils to 7.5-12.9m BGL (**Appendix C**)
Soil horizons less than 5m AHD	No Site elevations 31.00-32.70m AHD Sandstone bedrock intercepted at 7.5-12.9m BGL (≥20m AHD)
Marine / estuarine sediments or tidal lakes	Possible Based on maps and borelogs from previous investigations
Coastal wetland; backwater swamps; waterlogged or scaled areas; inter-dune swales or coastal sand dunes.	No Based on maps and borelogs from previous investigations
Dominant vegetation is mangroves, reeds, rushes and other swamp or marine tolerant species	No
Geologies containing sulfide bearing material	No Based on borelogs from previous investigations
Deep older (Pleistocene) estuarine sediments	No Based on maps and borelogs from previous investigations

3. Previous Investigations

3.1 Available Reports

The site investigation phase was documented under the following reports:

- AECOM (2018) *Draft - Phase 1 Environmental Site Assessment and Geotechnical Desktop Study* (AECOM Pty Ltd Reference 60568920_Phase1 ESA & Geotech Desktop_20180522_B, dated 22 May 2018);
- Douglas Partners (2020) *Geotechnical Investigation* (Douglas Partners Pty Ltd Reference 99510.00, dated January 2020);
- EMM (2020) *Stage 2 Contamination Assessment* (EMM Pty Ltd Reference J190730 RP1, dated 29 May 2020);
- JBS&G (2022) *Material Assessment* (JBS&G Pty Ltd Reference 59618/145427, dated 28 June 2022);
- EI (2023a) *Additional Geotechnical Investigation; 600-660 Elizabeth Street, Redfern NSW* (EI Australia Report E25947.G04, dated 15 March 2023);
- EI (2023b) *Additional Site Investigation; 600-660 Elizabeth Street, Redfern NSW* (EI Australia Report E25947.E03_Rev0, dated 31 March 2023);
- EI (2023c) *Groundwater Take Assessment; Proposed Residential Development, 600-660 Elizabeth Street, Redfern NSW* (EI Australia Report E25947.G12, dated 15 November 2023); and
- EI (2023d) *Groundwater Monitoring Report No. 1; 600-660 Elizabeth Street, Redfern NSW* (EI Australia Report E25947.G11.01, dated 15 November 2023).

A summary of the findings relating to ASSs is provided below. Refer to **Appendix C** for supporting information derived from these reports. **Appendix A** includes site plans with sampling locations.

Subsurface Conditions

Based on the combined borehole logs (thirty seven drilling / sampling locations, in total), the sub-surface conditions of the site are generalised as:

- Concrete pavement (southern portion of the site); overlying/or
- Gravelly sand fill (0.1-1.4m thickness), described as:
  - fine to coarse grained, brown/grey/yellow, with sub-angular to angular gravels, glass, ceramic tiles, brick, metal, concrete, slag, wood fragments, plant roots, dry to moist, no odour; or
  - medium to coarse grained, yellow/grey, with glass, ceramic tile, brick and sandstone fragments, dry to moist, no odour; overlying
- Natural, organic (peaty) clays and sands, described as dark brown, with organic (decomposing plant) material, low plasticity (clay) / fine to medium grained (sand), moist to wet, hydrogen sulphide (H_2S) odour.

The groundwater table is encountered at 1.2-2.1m BGL.

Presence of ASSs

Based on the laboratory analytical results for more than a hundred discrete soil samples:

- pH_f ranged from 5.0-9.0 (indicating variable pH conditions, with some soils being acidic, though not AASSs);
- pH_{fox} ranged from 2.1-6.3 (establishing there is acid generating ability and possibly PASSs in the natural materials, consistent with the presence of organic (peaty) clays and sands); and
- SPOCAS and chromium suite analyses confirmed the presence of PASSs in the dark brown, natural (organic / peaty) clays and sands from 1.4m BGL onwards (consistent with the detection of H_2S odours).

3.2 Occurrence of ASSs

The previous environmental investigations established that the natural (organic / peaty) soils from 1.4m BGL contained unoxidised sulfur compounds (i.e. PASSs). As the proposed development involved bulk excavation to depths of 2-3m BGL, in order to construct the single level basement, an ASS management plan was necessary. The requirement for such a plan was consistent with the *Sydney Local Environmental Plan 2012*, as well as Schedule 3 of the NSW *Environmental Planning and Assessment Regulation 1994*.

Notes:
The total amount of soil expected to be disturbed during basement construction is about 9,214m^3, assuming an area of 4,607m^2 is excavated to an average depth of 2m BGL (although locally deeper excavations could be required for footings, lift overrun pits, crane pads and service trenches, creating a greater amount of spoil).
The amount of PASS requiring management (i.e. lime treatment) is predicted to be approximately 4,607m^3, assuming an area of 4,607m^2 and 1.0m average thickness of dark brown, natural (organic / peaty) clays and sands.
The groundwater table occurs at 1.2-2.1m BGL, indicating that dewatering will also be required during the basement construction phase.

4. Management of ASS

4.1 Preliminary Considerations

Based on the findings of the site investigation phase, PASSs are present in the dark brown, natural (organic / peaty) clays and sands. The aim of this plan, therefore, is to guide the management (treatment and disposal) of such soils during the bulk (basement) excavation stage of the proposed development, including any piling / shoring / retention system works.

The extent of any adverse impacts associated with ASSs will depend on the following factors:

- Amount of excavated soil identified as being ASS;
- Physical characteristics of the ASSs, such as grain size and natural buffering capacity;
- Time that ASSs are exposed to air; and
- Rate of oxidation and transport of the oxidation products (i.e. acidic leachates).

It is assumed that all excavated / piled ASS material will be disposed off-site at an appropriately licensed landfill facility. If material is to be disposed without lime neutralisation treatment, it shall be placed below the water table at the designated landfill. No ASS should be used for structural or general filling above the groundwater table.

The time that ASSs (both excavated and remaining surface materials) are exposed to air is critical in the generation of acid leachates. The shortest possible time of air exposure will be permitted, to minimise the extent of oxidation and transport of reaction products. Ideally, any stockpiled ASSs will be treated on the same day that they are excavated, while remaining surface soils will be lime treated as soon as possible upon exposure (<12-24 hours).

Effective control of acidic leachate generation/release will rely on adequate identification (monitoring) and on-going management.

Note: All soils to be removed from the site, whether they be ASS or not, will require appropriate classification in accordance with the EPA (2014) *Waste Classification Guidelines,* prior to disposal.

4.2 Potential Environmental Impacts

Soils identified as PASS will require appropriate management, to minimise environmental impacts that may be caused by soil and groundwater disturbance during the proposed development. The management options commonly adopted for ASS comprise:

- Avoidance, or minimisation of ASS disturbance;
- Soil neutralisation (typically with lime);
- Strategic reburial under water; and/or
- Off-site treatment and disposal.

All disturbed ASS should be either neutralised and disposed off-site at a licensed waste facility, or placed below the water table at a licensed landfill. No PASS, treated or otherwise, should be used for structural or general filling above the groundwater table.

The following issues need to be considered during construction in a PASS environment:

- Exposure and oxidation of excavated material and the consequent discharge of acidic groundwater and continued acid leachate;
- Release of acidic subsurface water during the excavation; and
- The on-going oxidation of excess ASS generated by excavations and the consequent generation of acidic groundwater.

Effective management of these issues, along with an appropriate monitoring program with specified contingencies, will ensure impacts do not occur and there is no incremental contribution of acid leachates during the proposed development.

4.3 Extent of Soil Disturbance During Development

Site development involves the demolition of all existing structures, followed by the construction of multiple apartment buildings, ranging from two to fourteen storeys, overlying a partial basement facility, as well as a new community facility (**Section 1.2** and **Appendix B**). The basement will cover part of the site footprint, with a finished floor level at 29.00m AHD, requiring soil excavations to depths of 2-3m BGL. Areas of retained soils will be limited to the north, south, east and central portions.

The total amount of soil expected to be disturbed during basement construction is 9,606m^3, assuming an area of 4,803m^2 is excavated to an average depth of 2m BGL (acknowledging locally deeper excavations could be required for footings, lift overrun pits, crane pads and service trenches, creating a greater amount of spoil).

The dark brown, natural (organic / peaty) clays and sands pose the greatest risk for acid leachate generation (i.e. contain PASSs). Hence, all such soils from 1.4m BGL onwards must be segregated and treated. During excavation works, if any signs of potential acid sulfate soils (PASS) or actual acid sulfate soils (AASS) are observed, including hydrogen sulfide odours, shell fragments, and waterlogged soils at shallower depths, the management protocols outlined in **Section 4.4** should be followed.

The amount of PASS requiring management (i.e. lime treatment) is predicted to be approximately 4,803m^3, assuming an area of 4,803m^2 and 1.0m average thickness of natural (organic / peaty) soils.

Note: ASS management may also be required for spoil generated from piling, as well as deeper footings, service trenches and/or lift overrun pits etc that exceed 2-3m depth, in which case the measures described below would be triggered.

4.4 Excavation of ASS

Soil excavation shall proceed as follows:

- Due to access constraints, the excavation works should be performed in stages. At each stage, surface fill shall be stripped and removed, with care taken to ensure no fill material (0.1-1.0m thickness) is mixed with PASS from beneath.
- The site surface shall be stripped and prepared, with existing fill materials (0.1-1.0m thickness) excavated and stored separately in covered stockpiles. Stockpiled material may be screened to minimise the amount of waste to landfill.
- The sides of the excavation shall also be stripped a further 200mm to ensure potential fill soils do not fall into the pit and cross contaminate PASS materials.

In addition, the following management strategies shall also be considered and implemented, as required, to manage risk:

- Installation of a leachate collection and treatment system.
- Construction of supplementary erosion and sediment control structures. Once fill material is removed, the surface shall be inspected by a qualified environmental consultant and a representative of the receiving landfill facility, prior to excavation of PASS.
- When (surface) clearance is granted, PASS materials shall be excavated to the required depth and stockpiled separately, within a designated (treatment) area, or loaded directly onto waiting trucks (if *Alternative Disposal* is to be carried out; refer to **Section 4.5** below).

- The application of lime to PASS should be carried out on a treatment pad, with adequate sediment erosion control measures in place.
- The treatment pad should consist of a minimum 300mm thickness of compacted crushed limestone, or other appropriate neutralisation material. The level of compaction used should produce an appropriately low permeability base to prevent infiltration of leachate.
- The treatment pad is to be bunded with a minimum 150mm high perimeter of compacted, crushed limestone to contain potential leachate runoff within the area and prevent infiltration of surface water runoff.
- On-site neutralisation of acidic soils (<pH 6.0) will be carried out using powdered, agricultural lime. In order to facilitate mixing, the soils should be thinly spread (<0.5m) over the pad. Lime should be added by hand and/or excavator bucket, followed by mixing using light-weight rotators and/or shovels. The lime shall be thoroughly mixed with the excavated materials.
- If lime treatment on excavated ASS cannot be performed immediately, plastic sheeting shall be placed over the stockpile to reduce oxidation. For every day a stockpile remains on-site, representative samples will be monitored for pH; where pH_f falls below pH 6.0, (additional) lime will be applied for neutralisation purposes.
- Following treatment, the soil must chemically assessed and waste classified for off-site disposal purposes, in accordance with the EPA (2014a) *Waste Classification Guidelines* and EPA (2022) *Sampling Design Guidelines*. The testing program is to include SPOCAS and chromium suite analyses, which shall assist the confirmation (validation) of soil neutralisation.

Determination of Lime Requirement

- Based on the available data (**Section 3** and **Appendix C**), the quantity of lime required to neutralise the theoretical maximum amount of acid that could be generated from the complete oxidation of the PASS is **181 kilograms** calcium carbonate ($CaCO_3$) per tonne of soil (Table 1).

Validation Post Lime Treatment

- Post lime treatment and prior to off-site disposal, in-field (pH_f) and laboratory testing on representative samples will be performed to ensure that sufficient neutralisation of ASS has occurred.
    - In-field pH_f testing shall be performed at the nominal frequency of 1 sample / test per $50m^3$. Should field pH_f fall below pH 6.0, the corresponding material shall remain on-site and (additional) lime neutralisation shall proceed.
    - The validation program shall include chromium suite (S_{Cr}) analyses. In accordance with Table 8-1 Validation Sampling Design, presented under the EI (2024) *Remediation Action Plan; 600-660 Elizabeth Street, Redfern (Redfern Place), NSW* (EI Australia Reference E25947.E06_Rev3, dated 12 June 2024), stockpiles of lime-treated soil shall be sampled at a rate of 1 per $25m^3$ up to $250m^3$. Thereafter, for larger (>$250m^3$) piles, a minimum of ten samples shall be collected for analysis. Soil neutralisation will be verified when the acid neutralising capacity of the treated soil (in % S w/w) exceeds the net acidity (in % S w/w) and the liming rate is below the contracted laboratory's limit of reporting (LOR).

4.5 Disposal of ASS

Transport of ASS material to the receiving waste facility shall take place as soon as possible after lime treatment and/or waste classification certification. Transportation shall be by licensed tipper trucks. The receiving facility must be licensed with the EPA to accept (treated) ASS.

According to JBS&G (2022), "if the PASS materials be excavated and delivered to the disposal facility within a period of 8 hours, the pH of the soils will likely remain above a pH of 5.5. However, it is noted that this is highly contingent on the appropriate management of soils prior to excavation (e.g. appropriate dewatering activities) as well as during excavation and off-site disposal."

In the case that lime treatment of peaty PASS is warranted, transport of ASS material to the receiving landfill facility shall take place as soon as possible after lime treatment and waste classification certification. Transportation shall be by licensed tipper trucks. The receiving facility must be licensed with the EPA to accept (treated) ASS.

Stockpiled, non-treated PASSs shall be covered if immediate disposal is not possible. Such materials must leave the site within 16 hours of excavation, otherwise lime neutralisation techniques shall proceed as described above.

Alternative Disposal (Non-Lime Treated PASS)

In accordance with the EPA (2014) *Waste Classification Guidelines - Part 4: Acid Sulfate Soils*, PASS may be disposed at a landfill without prior treatment, provided:

- PASS is buried at least 2m below the lowest historical level of the permanent water table;
- Disposal occurs within 24 hours of excavation (disturbance);
- The PASS otherwise meets the definition of *virgin excavated natural material* (VENM) under the *Protection of the Environment Operations Act 1997*, even though it contains sulfidic ores or soils; and
- The landfill facility is licensed by the EPA to accept untreated PASS (below the water table).

The PASS must be kept wet at all times and buried below the permanent water table (≥2m below the lowest historical level of the water table at the disposal site), within 8 hours of their receipt by the landfill.

Documentation

Documentation must be provided to the operator of the landfill for each waste stream and truckload of (treated) PASS received, indicating that the soil classification, treatment and transport have been in accordance with this management plan and ASSMAC (1998) *Acid Sulfate Soil Manual*. Such documentation will include the corresponding waste classification certificate, completed in accordance with the EPA (2014) *Waste Classification Guidelines*.

The occupier of the disposal site must also test the pH of each load of soil received immediately prior to its placement under water, using the test method(s) in ASSMAC (1998) *Acid Sulfate Soil Manual* (Methods 21A and/or 21AF). These details, together with the pH of the soil recorded at the time of its extraction, must be retained by the occupier of the landfill site.

Soil that has dried out, undergone any oxidation of its sulfidic minerals, or which has a pH of less than pH 5.5 must be treated by neutralisation and disposed of at a landfill that can lawfully accept it.

The pH of the water at the landfill into which the potential ASS is placed must not be less than pH 5.5 at any time. Landfill licence conditions require the occupiers of potential ASS disposal sites to regularly monitor the pH of ground and surface waters at their premises.

4.6 Management of *In Situ* ASS

PASS which becomes exposed (oxidised) on an excavation surface may produce acid. For every day that such a surface is in an exposed state, its pH_f shall be monitored, by way of testing representative samples. Sampling for field pH_f testing should be evenly spaced, conducted at a frequency of 1 sample per 250m^2 (sample depth of 0-0.1m).

Where soil pH_f is below 6.0, lime will be applied to the ASS horizon(s). Plastic sheeting can be placed over the corresponding surface (where possible) to reduce the oxidation rate.

4.7 Disposal of Used Limestone Pad and Footprint Validation

At the completion of ASS treatment and contamination remedial works, the materials forming the limestone treatment pad must be waste classified in accordance with the EPA (2014a) *Waste Classification Guidelines*, prior to for off-site disposal. The testing program is to include pH_f, SPOCAS and chromium suite analyses, to determine whether lime treatment is required for the pad materials.

Upon removal of the pad, validation sampling of the corresponding footprint will occur at a rate of 1 sample per 100m^2 (with a minimum of three equally spaced samples per footprint). Sampling methodology should adhere to that describe in the EI (2024) RAP.

4.8 Water Management and Disposal

4.8.1 Excavation Dewatering Method

According to the EI (2023c) *Groundwater Take Assessment* (GTA), a sheet pile wall of about 340m total length will be installed along the basement perimeter. In order to evaluate the effects on groundwater take and associated hydraulic impacts, three different shoring scenarios were modelled, as follows:

- sheet pile wall socketed 3m below the bulk excavation level (i.e. to 25.4m AHD);
- sheet pile wall socketed 6m below the bulk excavation level (i.e. to 22.4m AHD); and
- sheet pile wall socketed at least 0.5m into residual clay (i.e. to 16.6m AHD).

Temporary dewatering will achieve a drawdown of the water table to 27.4m AHD, while the design groundwater level (ambient groundwater level) is at 29.5m AHD. For a 3m socket design, the expected water level drawdown would be 0.154m behind the shoring wall. For a 6m socket design, the expected water level drawdown would be 0.122m behind the shoring wall. For a sheet pile wall installed 0.5m into the residual clay, the drawdown would be negligible.

Drawdown Induced Settlement

Settlement analysis formed part of the EI (2023c) GTA, using *PLAXIS 2D* to estimate the potential drawdown-induced settlements as a result of the above works. The predicted drawdown over the zone of influence and settlement is shown in **Table 4-1**, noting that the predicted settlement is from **drawdown only** and does not account for any other factors such as deflection of the shoring wall, surcharge loading and other construction factors.

The predicted ground settlements immediately outside of the shoring wall range between ‘negligible’ to 15.4mm depending on the shoring wall depth. These settlement values linearly decrease to ‘negligible’ at a distance of 65m away from the basement. Settlements greater than 10mm and less than 50mm due to dewatering are considered to pose ‘slight’ risk in regards to potential infrastructure damage (Cashman and Preene, 2021).

Note: Although the *PLAXIS 2D* modelling provides predicted drawdown-induced ground settlement values, it would be prudent for a thorough assessment of potential risks posed on neighbouring structures to be completed by a qualified and experienced structural engineer.

Table 4-1 Predicted Ground Settlement due to Groundwater Drawdown

Shoring System		Distance from Shoring Wall (m)	Drawdown (m)	Ground Settlement (mm)
Sheet pile wall	3m socket below the bulk excavation level	0	1.70	15.4
		5	1.60	14.8
		10	1.50	13.9
		20	1.20	11.8
		40	0.65	6.9
		65	0.00	Negligible
	6m socket below the bulk excavation level	0	1.30	12.2
		5	1.20	11.9
		10	1.10	11.4
		20	0.90	9.0
		40	0.50	5.2
		65	0.00	Negligible
	0.5m into residual clay	Negligible drawdown and settlement		

4.8.2 Groundwater Management

The removal (pumping) of any groundwater from an excavation area may cause alterations to the existing groundwater table. During the dewatering process, extracted groundwater will be pumped to a holding vessel (tank) for assessment of pH and other quality parameters (see Section 4.8.4).

Extracted water that is acidic (pH<6) will be treated with hydrated lime to display a pH level of pH 6.5-8, prior to off-site disposal. Powdered hydrated lime should be added to the water by hand and/or excavator bucket and mixed. Field pH testing on representative samples should be performed to ensure that sufficient neutralisation has occurred, prior to disposal.

In addition to the above, an appropriately designed (bunded) truck wash area will be required to capture liquids and solids, prior to vehicles exiting the site. Treatment and neutralisation of liquids and solids shall be in accordance with **Sections 4.4** and **4.5**. All wash water shall be transferred to the (or a dedicated) holding vessel.

4.8.3 Leachate Management

The ASS treatment pad shall be bunded, in order to capture any leachate, including runoff. The leachate collection can be integrated into the groundwater management system, described in Section 4.8.2. No leachate shall be permitted to migrate across the site in an uncontrolled manner.

Once pumped to the (or a dedicated) holding vessel, the leachate shall be assessed for pH and other quality parameters (see Section 4.8.4).

Leachate that is acidic (pH<6) will be treated with hydrated lime to display a pH level of pH 6.5-8, prior to off-site disposal. Powdered hydrated lime should be added to the water by hand and/or excavator bucket and mixed. Field pH testing on representative samples should be performed to ensure that sufficient neutralisation has occurred, prior to disposal.

4.8.4 Groundwater Disposal

It is anticipated that extracted groundwater from the dewatering process, as well as (treated) leachate, will be disposed to the municipal stormwater system. Any permits / licences from Council and Water NSW shall be obtained prior to off-site discharge.

Water for disposal will be tested routinely (weekly intervals) for the duration of dewatering activities, to ensure the quality of water entering the stormwater system is compliant with permit and licence conditions. Monitoring results will be available to Council or Water NSW on request.

Should it be found that groundwater quality is not suitable for disposal to the stormwater system, further treatment or a Sydney Water (trade waste) permit to dispose to sewer shall be required.

Water quality monitoring for disposal to the municipal stormwater system shall include the following:

- Daily monitoring of field parameters (volume, pH, TDS/EC, turbidity) using data logging equipment.
- Weekly sampling and laboratory analysis of treated water for dissolved metals (aluminium, arsenic, cadmium, chromium, copper, iron, lead, nickel, zinc and mercury), total recoverable hydrocarbons (TRHs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), total nitrogen and total phosphorus. Laboratory results should be compared to trigger values provided in the ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, specifically those providing a 95% level of species protection for slightly - moderately disturbed ecosystems.
- Weekly sampling shall be performed by a suitably qualified environmental consultant and submitted to a NATA-accredited laboratory for analysis of the above parameters, depending on the time frame required to complete the works.

4.9 Risk Management

This management plan has been based on the assumption that ASSs are present in the dark brown, natural (organic / peaty) clays and sands of this site, with these soils posing the greatest risk for acid leachate generation. Such soils will be disturbed and exposed during the proposed development (basement excavation phase, at least).

Prior to the commencement of any excavation works, the applicant shall nominate an appropriately qualified environmental consultant to supervise the management of ASS. The consultant shall:

- Provide an acceptance in writing to supervise the aforementioned works and ensure compliance with this management plan and conditions of consent. This must be provided to City of Sydney Council prior to works commencing.
- On completion of all ASS management, certify that the aforementioned works were conducted in compliance with the approved plan(s), specifications and conditions of consent. This certification shall be submitted to City of Sydney Council within 30 days of the completion of works.

During the proposed basement excavations, or indeed any soil disturbance that exceeds 1.4m depth, site inspection is to be conducted by the appointed environmental consultant, in order to check that the assumptions made in this plan are consistent with field evidence and practices. The consultant will be responsible for ensuring that:

- Erosion and sediment control structures are installed;
- ASS materials are kept separate from other soils (i.e. stockpiled / loaded separately);
- Suitable groundwater / leachate collection and treatment measures are in place;
- Testing of excavated / exposed ASS is performed;
- Testing of (ground / surface) water seepage and/or leachate is performed.

All contractors must employ best practices in managing any off-site water and soil quality impacts during site redevelopment. All waste materials must be contained and disposed at appropriate waste treatment / landfill facilities, in accordance with the EPA (2014) *Waste*

Classification Guidelines. Any soils to be imported onto the site for the purpose of back-filling or landscaping will require some form of validation, to confirm their suitability for the proposed land use.

During the excavation works, it is expected that PASS horizons will be disturbed and aerated. This suggests that acid-resistant concrete be used for the basement shell (base and walls). It is recommended that the specifications for acid resistant concrete be determined by the appointed structural engineer.

4.10 Contingency Measures

Contingency measures for the site are detailed in **Table 4-2**. This table provides a list of potential events that may arise during bulk excavation, piling and or shoring, and the actions to be undertaken if unexpected conditions occur.

Table 4-2 Contingency Measures

Unexpected Condition	Action
Potential ASS identified at unexpected depths	Stop excavations. Have material assess by an environmental consultant. Follow management procedures adopted in the ASS management plan.
Neutralisation of ASS was not effective	Re-assess liming rates and add additional lime to material. Re-test material to check neutralisation.
Neutralisation of ASS indicates that too much lime has been added and soils are highly alkaline	Remediate soils before use. Remediation comprises mixing additional ASS with the material (i.e. use excess lime to neutralise more ASS). Re-test material to check neutralisation.
Bunded ASS treatment area is damaged	Repair bund as soon as practicable. Clean-up any ASS that escaped the treatment area and place back into the treatment area. Check surrounding area for impact from the ASS or leachate, and undertake remedial action as required.
Groundwater level falls below the top of areas defined as containing ASS	Stop dewatering. Review ASS exposure by checking the ASS and non-ASS interface in the affected area. Consult GTA. Determine potential causes by reviewing construction practises, weather, baseline groundwater monitoring data, and performing additional groundwater monitoring as necessary on groundwater monitoring present at the site. Review and confirm mitigation measures to be implemented, including: ▪ Maintenance of soil moisture levels through targeted groundwater recharge; ▪ Adjustment of the construction activities or schedule; and ▪ Treatment of additional PASS in treatment area. ▪ Sentinel groundwater testing at the monitoring wells outside the basement should be carried out.

5. Consultation and Records

During ASS management, regard must be given to the needs of the following organisations:

- New South Wales Environment Protection Authority (EPA), concerning their requirements with respect to the various contamination control issues associated with the project and the detail required in the ASS management plan;
- EPA accredited site auditor (if required);
- WaterNSW, for dewatering conditions and permit; and
- City of Sydney Council, for Development Application compliance and the handling requirement for ASS situations.

All records associated with ASS investigation, management and monitoring shall be maintained by the appointed environmental consultant for the duration of the project. Such records will comprise, though are not limited to:

- Further ASS assessment results, as determined by any waste classification analysis;
- Field records of ASS monitoring, such as daily field pH screening results on stockpiled materials or truck loads leaving the site, excavation surfaces, application of lime, groundwater level and pH level monitoring;
- Records of ASS transportation, including truck registers, and waste dockets issued by the receiving landfill facility; and
- Environmental incident reports in cases of non-conformance and subsequent mitigation measures adopted.

A file should be established on-site, to store all hard copy records associated with the management and monitoring of PASS for the project. All analysis and monitoring information shall also be stored electronically to permit ease of access and data interpretation.

6. Statement of Limitations

This plan has been prepared for the exclusive use of Hickory Construction Redfern Pty Ltd & Bridge Housing (the client), whom is the only intended beneficiary of EI's work. Its scope is limited to that agreed with the client.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised for similar plans by reputable members of the environmental industry in Australia, as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this plan must be read in conjunction with the whole of this report, including its appendices.

The findings presented in this report are the result of discrete sampling methodologies, used in accordance with best industry practices. Due to the specific nature of soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program. Neither EI, nor any other reputable consultant, can provide unqualified warranties, nor does EI assume any liability for site conditions not observed or accessible during the time of the assessment.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from regulatory agencies (e.g. Council, EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

This plan was prepared for the above named client and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This plan does not purport to provide legal advice.

This plan and associated documents remain the property of EI, subject to payment of all fees due for its drafting. The plan shall not be reproduced except in full and with prior written permission by EI.

7. References

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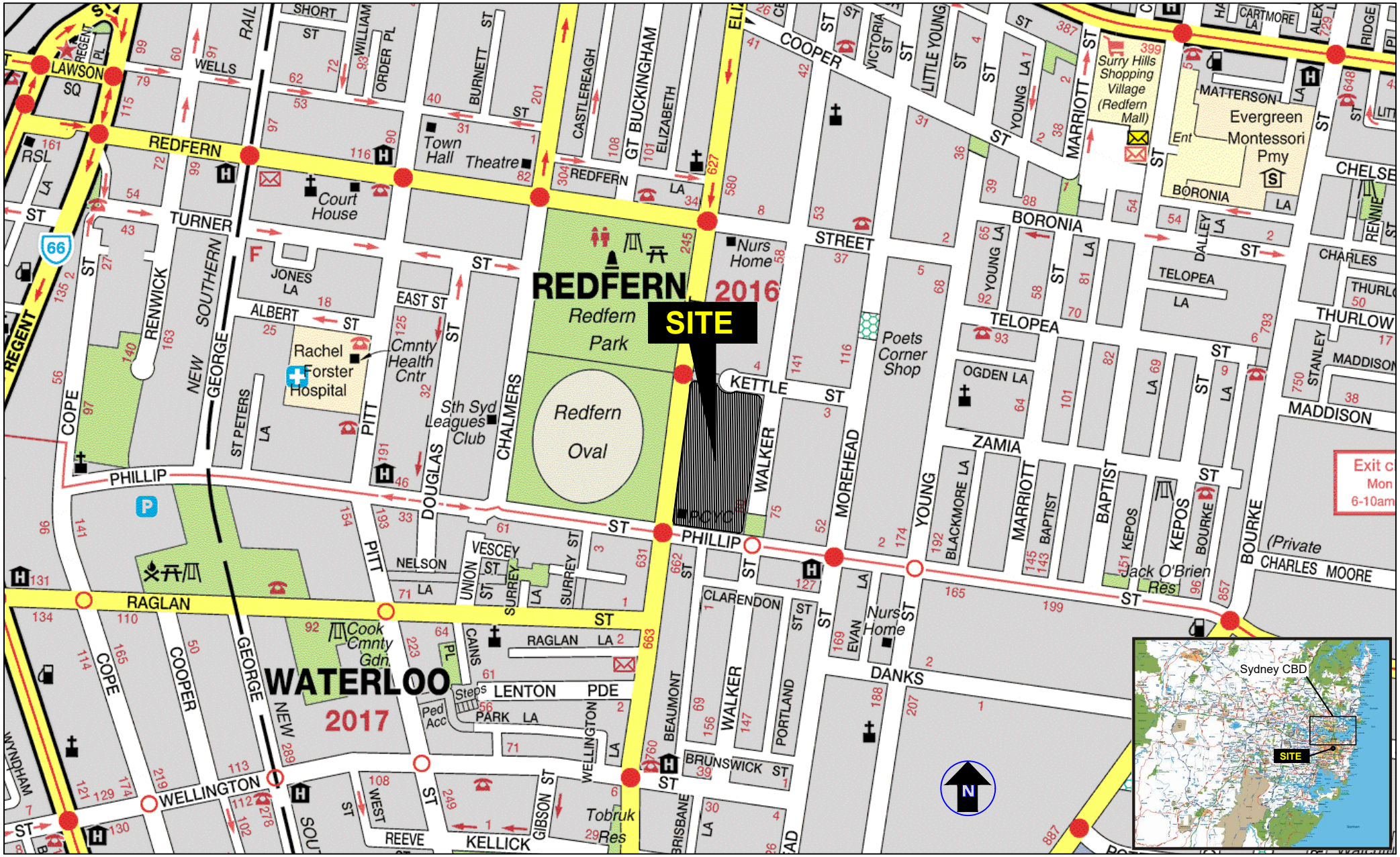
Appendix A – Figures



eiaustralia Contamination | Remediation | Geotechnical Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	A.N.	**Hickory Constructions Pty Ltd** Acid Sulfate Soil Management Plan 600-660 Elizabeth Street, Redfern NSW Site Locality Plan
	Approved:	NK	
	Date:	10-3-23	
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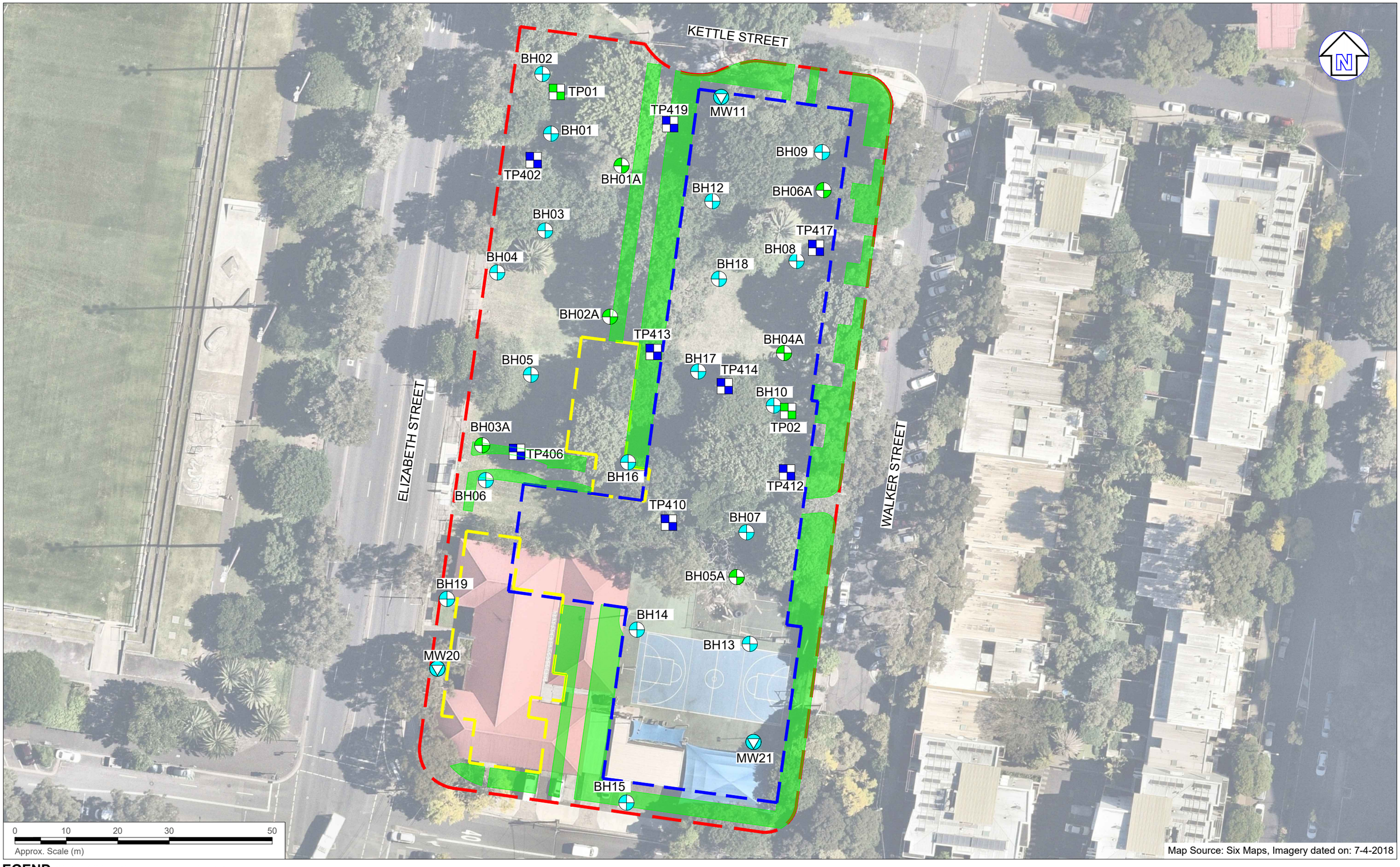
Figure:
1

Project: E25947.E14



LEGEND **(Note: All locations are approximate)**

- Site boundary
- Proposed basement footprint
- Flood storage and OSD tank excavation area
- Proposed deep soil area
- Previous borehole location (EMM, 2020)
- Previous monitoring well location (EMM, 2020)
- Previous borehole location (JBS&G, 2022)
- Previous test pit location (JBS&G, 2022)
- Test pit location

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Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	C.L.
Approved:	-
Date:	20-6-24

Hickory Constructions Pty Ltd
Acid Sulfate Soil Management Plan
600-660 Elizabeth Street, Redfern NSW

Sampling Location Plan

Figure: 2

Project: E25947.E14_Rev0

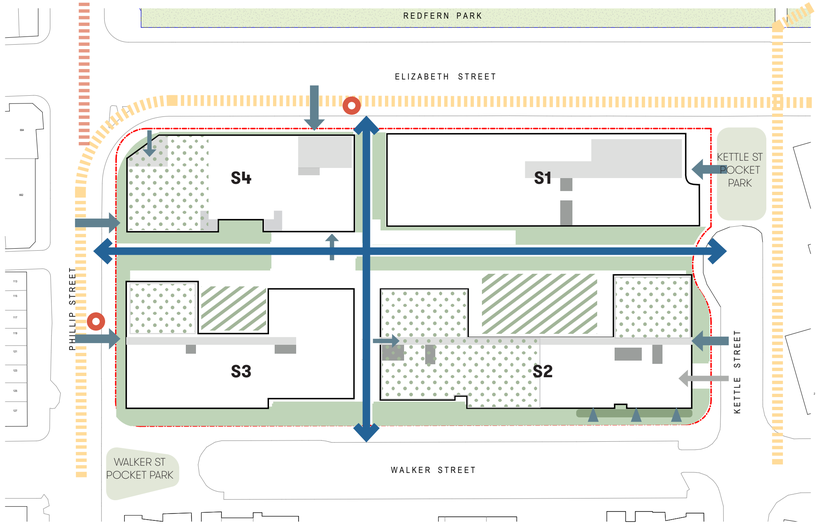
Appendix B – Proposed Development Plans

03 Built Form and Urban Design

SITE PLAN

THE DIAGRAM SHOWS THE PROPOSED MASTERPLAN AND THE HIERARCHY OF LANDSCAPE SPACES INCLUDING:

- Site layout which providing through-site links as recommended in the Design Guide to ensure visual permeability through the site.
- Multiple central courtyard space providing legible landscape spaces for public movement through the site and communal resident use.
- Street facing residential entries for S2, S3 and S4.
- At grade entries into PCYC, Commercial and Community spaces.
- Rooftop communal resident spaces on S2, S3 and S4
- Private terrace entries to S2 Walker St dwelling where required
- Vehicle Entry on Kettle St with basement carparking, waste collection and deliveries.

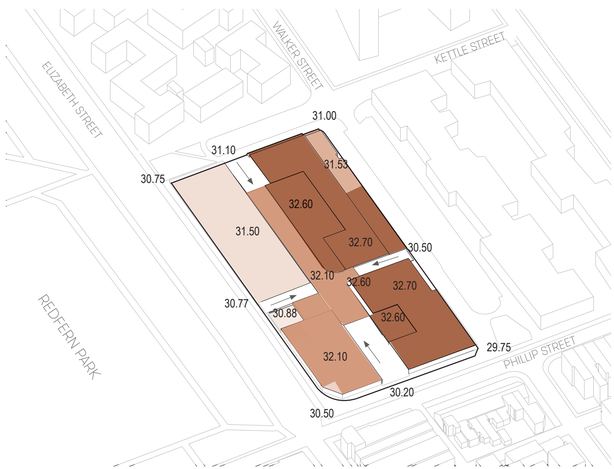


CoS Cycling Priority Street
CoS Pedestrian & Cycle Network
Public Pedestrian Link
Primary Entry
Secondary Entry
Private Entry
Bus Stop
Vehicle Entry
Building Core
Building Circulation
Communal Open Space
Private Open Space
Deep Soil
Rooftop Garden

Scale 1 : 750
0 30m

03 Built Form and Urban Design

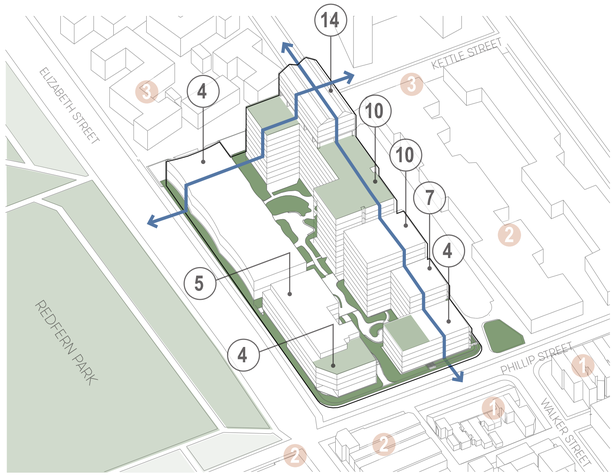
LEVELS AND MASSING



MOVEMENT LEVELS STUDY

- Ground floor residential areas and all connections to the basement set at the 32.70 PMF FPL.
- Commercial and community uses sit between the 1% AEP and PMF as advised by the flooding engineer.
- Central courtyard level set at 32.1 to allow for ease of movement between building levels and the street interfaces.

RL 32.70 / 32.60
RL 32.20 / 32.10
RL 31.90
RL 31.50
RL 30.80



MASSING STUDY

- Overall form steps down from north to south towards the residential scale of Phillip Street
- Overall form steps down from east to west to ensure sun access to Redfern Park.
- Consistent height along Elizabeth and Phillip St responds to the adjacent urban context
- Central landscape between buildings provides public and resident space amenity, with additional communal amenity located on rooftops of S2, S3 and S4.

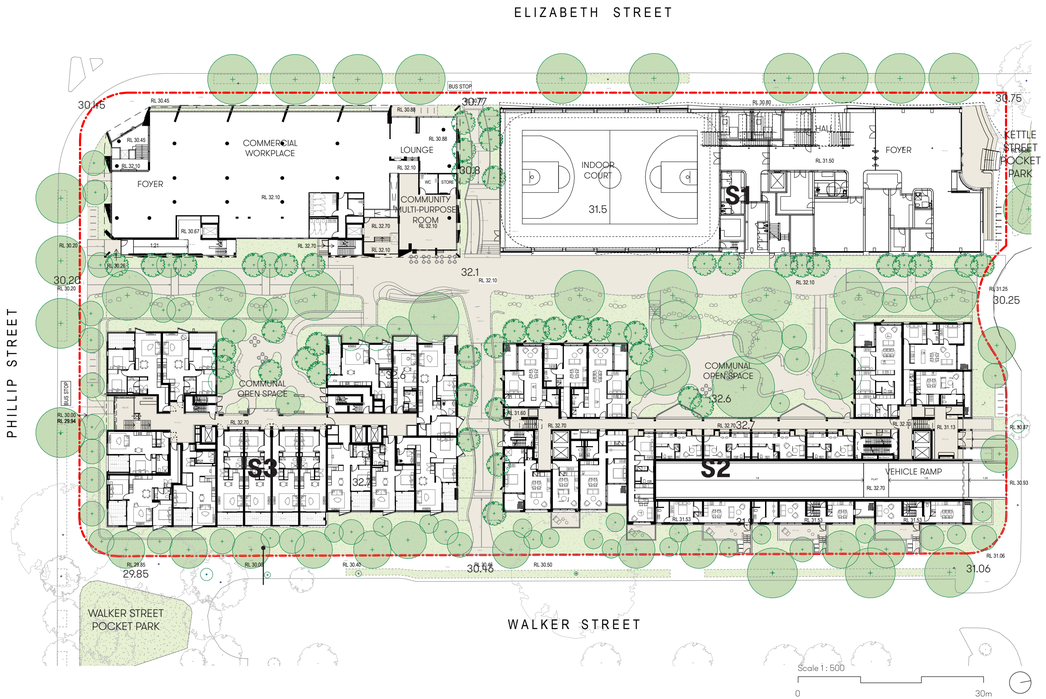
(X) Surrounding Building Heights
(X) Building Height in Storeys

03 Built Form and Urban Design

GROUND PLAN

KEY ELEMENTS IN THE GROUND PLAN INCLUDE:

- Central landscape space sitting 1-1.6m above street level providing access and activation to the internal facades of the development.
- Ramped through site links provide clear and legible pedestrian movement through the site.
- Clear residential entries on Kettle St and Phillip St, and PCYC entry on Kettle St.
- PCYC Multi courts located at southern end of S1 with large areas of glazing to activate the central courtyard space
- Activate entrances on all corners of S4 to activate the through site links and central courtyard space
- Vehicle entry on Kettle St with a long ramp with peak at PMF to access basement.
- Refer to Aspect's design report for further detail on the landscape response.



Scale 1 : 500

0 30m

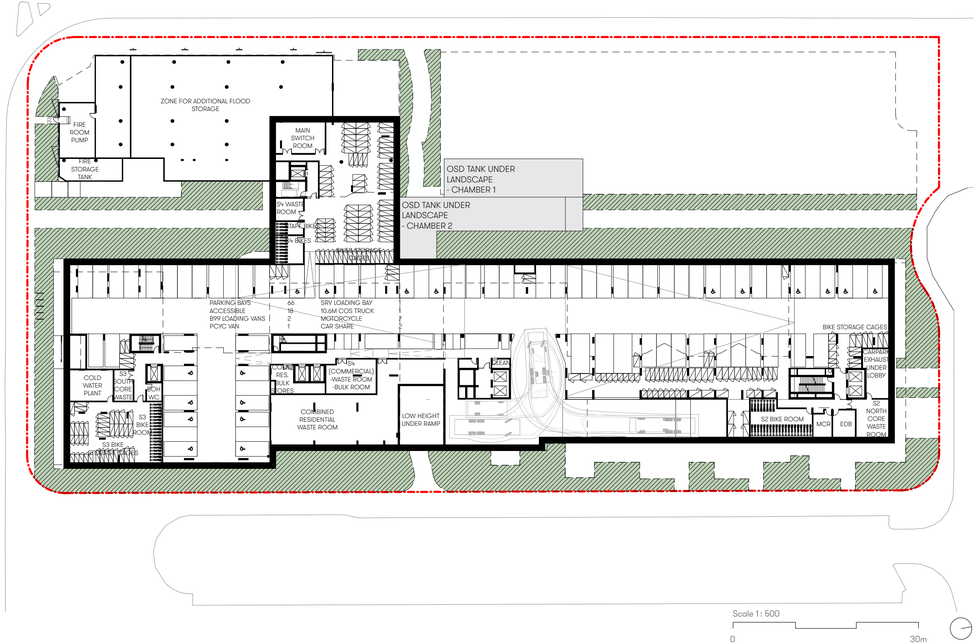
03 Built Form and Urban Design

BASEMENT PLAN

KEY ELEMENTS IN THE BASEMENT PLAN INCLUDE:

- 66 car parking spaces including 18 for adaptable apartments.
- Vehicle entry on Kettle St with a long ramp with peak at PMF to access basement.
- Loading for two trucks (10.6m CoS Waste and SRV) and 3 vans accommodated in basement
- Waste collection in basement with waste rooms provide adjacent to loading area.
- Bicycle storage and/or storage cages provided for every unit, and S1/S4 staff.
- Services located in basement where possible to provide active ground frontages.
- Flood storage located under S4 to mitigate flood impacts of the development
- OSD and Rainwater tanks located under central landscape zone.
- Deep soil target achieved, refer to Aspect report for calculation.

Deep soil



Scale 1 : 500

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03 Built Form and Urban Design

3D OVERVIEW

The precinct forms a diverse and cohesive village. A variety of architectural expressions provides variety, whilst a considered material palette and a cohesive ground plane establishes commonality between buildings.

Design of all buildings is responsive to site context including the character, scale and grain of existing surrounding buildings.

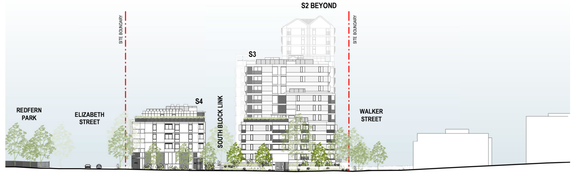
Refer to sections 04, 05, 06 and 07 of the report for detailed descriptions each building.

03 Built Form and Urban Design

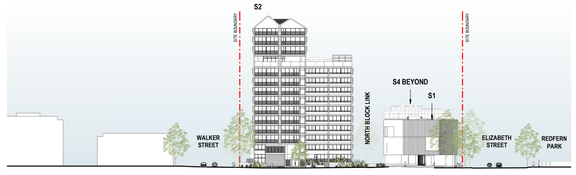
ELEVATIONS

WALKER STREET ELEVATION

ELIZABETH STREET ELEVATION



PHILLIP STREET ELEVATION



KETTLE STREET ELEVATION

Appendix C – Supporting Information from the Investigation Phase

Table 1 - Summary of Acid Sulfate Soil Analytcial Results for 600-660 Elizabeth Street, Redfern NSW

Sample ID	Sampling Date	Soil type	pH Assessment				Lab pH		SPOCAS					CRS Suite			Liming Rate (kg $CaCO_3$/t)
			pH_F	pH_{FOX}	pH Difference (pH_F - pH_{FOX})	Reaction Rate (pHfox)	pH KCl	pH OX	TAA (moles H^+/tonne)	TPA (moles H^+/tonne)	TSA (moles H^+/tonne)	S_{POS} (as %S)	Net Acidity (moles H+/tonne)	TAA (as %S)	CRS (as %S)	Net Acidity (as %S)	
Previous Investigation - soils (EMM,2019)																	
BH01_0.5_191127	27/11/2019	Fill	NA	NA	NA	NA	9.1	7.6	<2	<2	<2	<0.020	<10	<0.020	NA	NA	<1
BH01_2.5_191127	27/11/2019	Natural	NA	NA	NA	NA	4.5	1.6	171	6940	6770	2.61	1800	0.274	NA	NA	135
BH02_1.5	29/11/2019	Natural	NA	NA	NA	NA	5.3	3.1	18	98	80	0.07	61	0.028	NA	NA	4
BH02_2.5_191127	27/11/2019	Natural	NA	NA	NA	NA	4.5	1.8	199	5380	5180	1.52	1150	0.319	NA	NA	86
BH03_1.5_191127	27/11/2019	Natural	NA	NA	NA	NA	6.3	2.4	5	743	738	0.919	578	<0.020	NA	NA	43
BH03_2.5_191127	27/11/2019	Natural	NA	NA	NA	NA	4.5	2.7	70	581	511	0.168	176	0.113	NA	NA	13
BH04_1.5_191127	27/11/2019	Natural	NA	NA	NA	NA	4.3	1.8	312	4730	4420	1.54	1270	0.5	NA	NA	95
BH05_0.9_191127	27/11/2019	Fill	NA	NA	NA	NA	6.8	3.8	<2	<2	<2	0.045	28	<0.020	NA	NA	<1
BH05_1.2_191127	27/11/2019	Natural	NA	NA	NA	NA	5.2	2	108	6030	5920	1.65	1140	0.174	NA	NA	85
BH06_2.2_191127	27/11/2019	Natural	NA	NA	NA	NA	4.1	2	218	3020	2800	1.07	887	0.35	NA	NA	66
BH07_0.9_191127	27/11/2019	Natural	NA	NA	NA	NA	6.3	5.4	<2	<2	<2	0.053	33	<0.020	NA	NA	2
BH07_1.1_191127	27/11/2019	Natural	NA	NA	NA	NA	5.7	2.5	8	319	311	0.156	105	<0.020	NA	NA	8
BH08_0.5_191127	27/11/2019	Fill	NA	NA	NA	NA	10.6	7.6	<2	<2	<2	0.026	16	<0.020	NA	NA	<1
BH09_1.0_191127	27/11/2019	Natural	NA	NA	NA	NA	7	7.3	<2	<2	<2	0.02	12	<0.020	NA	NA	<1
BH10_2.5_191128	28/11/2019	Fill	NA	NA	NA	NA	4.1	1.7	214	6630	6420	1.93	1420	0.344	NA	NA	107
BH12_1.5_191128	28/11/2019	Fill	NA	NA	NA	NA	3.8	1.7	437	7310	6870	2.39	1870	0.701	NA	NA	141
BH12_2.5_191128	28/11/2019	Natural	NA	NA	NA	NA	5.7	3.8	<2	<2	<2	<0.020	<10	<0.020	NA	NA	<1
BH13_1.5_191128	28/11/2019	Natural	NA	NA	NA	NA	4	1.5	332	8040	7710	2.18	1690	0.532	NA	NA	127
BH14_0.3_191128	28/11/2019	Fill	NA	NA	NA	NA	10.9	8.4	<2	<2	<2	0.048	30	<0.020	NA	NA	<1
BH14_3.0_191128	28/11/2019	Natural	NA	NA	NA	NA	4.6	2	102	1750	1650	0.669	519	0.163	NA	NA	39
BH15_1.5_191128	28/11/2019	Natural	NA	NA	NA	NA	5	1.8	80	5720	5640	1.98	1320	0.128	NA	NA	99
BH15_2.5_191128	28/11/2019	Natural	NA	NA	NA	NA	4.1	1.8	171	5160	4980	1.78	1280	0.274	NA	NA	96
BH16_1.7_191128	28/11/2019	Natural	NA	NA	NA	NA	3.7	1.6	342	7660	7320	2.46	1860	0.548	NA	NA	140
BH17_0.5_191128	28/11/2019	Fill	NA	NA	NA	NA	7.4	6.3	<2	<2	<2	<0.020	<10	<0.020	NA	NA	<1
BH17_2.5_191128	28/11/2019	Natural	NA	NA	NA	NA	4.6	2.1	26	1180	1150	0.564	377	0.041	NA	NA	28
BH18_2.8_191129	29/11/2019	Natural	NA	NA	NA	NA	5.7	3.2	<2	<2	<2	0.034	21	<0.020	NA	NA	2
BH19_1.5_191129	29/11/2019	Natural	NA	NA	NA	NA	4.9	1.7	137	7140	7000	2.36	1610	0.22	NA	NA	120
BH19_2.5_191129	29/11/2019	Natural	NA	NA	NA	NA	4.4	2.4	56	875	818	0.299	243	0.091	NA	NA	18
MW11_3.5_191128	28/11/2019	Natural	NA	NA	NA	NA	5.1	2.6	10	198	188	0.094	68	<0.020	NA	NA	5
MW11_5.0_191128	28/11/2019	Natural	NA	NA	NA	NA	5.3	2.7	5	100	95	0.046	34	<0.020	NA	NA	2
MW20_1.8_191129	29/11/2019	Natural	NA	NA	NA	NA	5.2	2	108	4930	4820	1.67	1150	0.172	NA	NA	86
MW20_4.0_191129	29/11/2019	Natural	NA	NA	NA	NA	5.1	2.2	22	879	857	0.444	299	0.035	NA	NA	22
MW21_4.4_191129	29/11/2019	Natural	NA	NA	NA	NA	4	1.5	319	5500	5180	3.38	2410	0.511	NA	NA	181
Previous Investigation - soils (JBS&G,2022)																	
BH02A_7.0-8.0	26/04/2022	Sand	6.1	5	1.1	NA	6	NA	7	NA	NA	NA	<10	NA	0.008	NA	<1
BH02A_6.5-6.6	26/04/2022	Sand	7	4.2	2.8	NA	5.5	NA	3	NA	NA	NA	<11	NA	<0.005	NA	<1
BH02A_6.2-6.3	26/04/2022	Sand	6.7	2.1	4.6	NA	5.8	NA	5	NA	NA	NA	<12	NA	0.011	NA	<1
BH02A_5.9-6.0	26/04/2022	Sand	6.6	2.3	4.3	NA	5.3	NA	5	NA	NA	NA	<13	NA	0.016	NA	1.2
BH02A_5.3-5.4	26/04/2022	Sand	6.8	2.6	4.2	NA	5.5	NA	3	NA	NA	NA	<14	NA	<0.005	NA	<1
BH02A_5.0-5.1	26/04/2022	Sand	6.6	2.8	3.8	NA	6.1	NA	<2	NA	NA	NA	<15	NA	0.009	NA	<1
BH02A_4.7-4.8	26/04/2022	Sand	6.9	2.3	4.6	NA	5.5	NA	3	NA	NA	NA	<16	NA	<0.005	NA	<1
BH02A_4.3-4.4	26/04/2022	Sand	6.8	2.3	4.5	NA	5.8	NA	5	NA	NA	NA	<17	NA	0.013	NA	<1
BH02A_3.9-4.0	26/04/2022	Sand	6.9	2.3	4.6	NA	5.6	NA	5	NA	NA	NA	<18	NA	0.012	NA	<1
BH02A_3.8-3.9	26/04/2022	Sand	6.8	2.4	4.4	NA	5.6	NA	5	NA	NA	NA	<19	NA	0.02	NA	1.3
BH02A_3.5-3.6	26/04/2022	Sand	6.7	2.5	4.2	NA	5.2	NA	5	NA	NA	NA	<20	NA	0.027	NA	1.6
BH02A_2.9-3.0	26/04/2022	Sand	7.2	2.1	5.1	NA	5.3	NA	6	NA	NA	NA	<21	NA	0.021	NA	1.4
BH02A_2.5-2.6	26/04/2022	Peat	6.4	3.8	2.6	NA	5.5	NA	4	NA	NA	NA	<22	NA	0.006	NA	<1
BH02A_2.2-2.3	26/04/2022	Peat	6	2.8	3.2	NA	7.2	NA	<2	NA	NA	NA	<23	NA	0.012	NA	<1
BH02A_1.8-1.9	26/04/2022	Peat	6.1	2.7	3.4	NA	4.3	NA	100	NA	NA	NA	<24	NA	0.013	NA	8.4
BH02A_1.5-1.6	26/04/2022	Peat	5	3.1	1.9	NA	3.9	NA	420	NA	NA	NA	<25	NA	0.11	NA	37
BH02A_1.2-1.3	26/04/2022	Peat	5.5	4.3	1.2	NA	5.1	NA	42	NA	NA	NA	<26	NA	0.011	NA	3.7
BH02A_0.3-0.4	26/04/2022	Fill	7.9	5.5	2.4	NA	6.6	NA	<2	NA	NA	NA	<27	NA	0.012	NA	<1
BH01A_7.9-8.0	26/04/2022	Sand	8.4	5.9	2.5	NA	5.8	NA	5	NA	NA	NA	<28	NA	<0.005	NA	<1
BH01A_7.4-7.5	26/04/2022	Sand	8.1	6	2.1	NA	8.8	NA	<2	NA	NA	NA	<29	NA	<0.005	NA	<1
BH01A_7.0-7.1	26/04/2022	Sand	8	5.9	2.1	NA	5.7	NA	5	NA	NA	NA	<30	NA	<0.005	NA	<1
BH01A_6.4-6.5	26/04/2022	Sand	7.2	6.0	1.2	NA	5.4	NA	3	NA	NA	NA	<31	NA	<0.005	NA	<1
BH01A_5.6-5.7	26/04/2022	Sand	7.9	6.0	1.9	NA	5.5	NA	2	NA	NA	NA	<32	NA	<0.005	NA	<1
BH01A_5.1-5.2	26/04/2022	Sand	7.5	5.8	1.7	NA	7.9	NA	<2	NA	NA	NA	<33	NA	<0.005	NA	<1
BH01A_4.7-4.8	26/04/2022	Sand	7.6	5.9	1.7	NA	5.9	NA	<2	NA	NA	NA	<34	NA	<0.005	NA	<1
BH01A_4.1-4.2	26/04/2022	Sand	7.5	5.9	1.6	NA	6	NA	<2	NA	NA	NA	<35	NA	<0.005	NA	<1
BH01A_3.7-3.8	26/04/2022	Sand	7.2	6.0	1.2	NA	5.9	NA	<2	NA	NA	NA	<36	NA	<0.005	NA	<1
BH01A_3.1-3.2	26/04/2022	Sand	7.3	5.3	2.0	NA	5.8	NA	2	NA	NA	NA	<37	NA	0.011	NA	<1
BH01A_2.7-2.8	26/04/2022	Sand	7.5	3.9	3.6	NA	4.7	NA	15	NA	NA	NA	<38	NA	0.008	NA	1.5
BH01A_2.4-2.5	26/04/2022	Peat	7.4	4.0	3.4	NA	4.6	NA	56	NA	NA	NA	<39	NA	0.013	NA	4.8
BH01A_2.1-2.2	26/04/2022	Peat	7.6	4.2	3.4	NA	4.3	NA	310	NA	NA	NA	<40	NA	0.09	NA	28
BH01A_1.9-2.0	26/04/2022	Peat	7.7	4.3	3.4	NA	4.5	NA	180	NA	NA	NA	<41	NA	0.25	NA	25
BH01A_1.6-1.7	26/04/2022	Peat	7.9	4.4	3.5	NA	4.9	NA	190	NA	NA	NA	<42	NA	0.13	NA	20
BH01A_1.1-1.2	26/04/2022	Peat	8.2	5.1	3.1	NA	5.9	NA	23	NA	NA	NA	<43	NA	0.038	NA	3.5
BH01A_0.7-0.8	26/04/2022	Fill	8.8	6.2	2.6	NA	8.4	NA	<2	NA	NA	NA	<44	NA	<0.005	NA	<1
BH01A_0.5-0.6	26/04/2022	Fill	9.0	6.3	2.7	NA	8.9	NA	<2	NA	NA	NA	<45	NA	<0.005	NA	<1
BH05A_7.25-7.35	26/04/2022	Sand	6.8	4.6	2.2	NA	5.3	NA	6	NA	NA	NA	<46	NA	0.17	NA	8.3
BH05A_6.75-6.85	26/04/2022	Sand	7.2	5.8	1.4	NA	4.9	NA	15	NA	NA	NA	<47	NA	0.13	NA	7.1
BH05A_6.25-6.35	26/04/2022	Sand	6.8	5	1.8	NA	4.9	NA	19	NA	NA	NA	<48	NA	0.078	NA	5.1
BH05A_5.75-5.85	26/04/2022	Sand	6.5	5.2	1.3	NA	5.2	NA	9	NA	NA	NA	<49	NA	0.13	NA	6.9
BH05A_5.25-5.35	26/04/2022	Sand	7	5.1	1.9	NA	5	NA	10	NA	NA	NA	<50	NA	0.1	NA	5.6
BH05A_4.75-4.85	26/04/2022	Sand	6.6	5.3	1.3	NA	5.1	NA	10	NA	NA	NA	<51	NA	0.072	NA	4.1
BH05A_4.25-4.35	26/04/2022	Sand	6	5.9	0.1	NA	5	NA	15	NA	NA	NA	<52	NA	0.16	NA	8.5
BH05A_4-4.1	26/04/2022	Sand	6.7	5.8	0.9	NA	4.8	NA	8	NA	NA	NA	<53	NA	0.17	NA	8.5
BH05A_3.75-3.85	26/04/2022	Peat	6.9	5	1.9	NA	4	NA	150	NA	NA	NA	<54	NA	0.2	NA	21
BH05A_3.5-3.6	26/04/2022	Peat	6	5.3	0.7	NA	4.2	NA	120	NA	NA	NA	<55	NA	0.02	NA	10
BH05A_3.25-3.35	26/04/2022	Peat	6.4	4.7	1.7	NA	3.9	NA	200	NA	NA	NA	<56	NA	0.53	NA	40
BH05A_2.75-2.85	26/04/2022	Peat	6.5	4.8	1.7	NA	4.1	NA	230	NA	NA	NA	<57	NA	0.033	NA	20
BH05A_2.5-2.6	26/04/2022	Peat	6.5	4	2.5	NA	4.3	NA	230	NA	NA	NA	<58	NA	0.081	NA	22
BH05A_2.25-2.35	26/04/2022	Peat	6.2	5.1	1.1	NA	4.1	NA	270	NA	NA	NA	<59	NA	0.19	NA	29
BH05A_1.75-1.85	26/04/2022	Peat	6.7	5.3	1.4	NA	3.9	NA	460	NA	NA	NA	<60	NA	0.036	NA	36
BH04A_7.9-8	26/04/2022	Sand	6.1	5.2	0.9	NA	4.6	NA	16	NA	NA	NA	<61	NA	0.021	NA	2.2
BH04A_7.75-7.85	26/04/2022	Sand	6.6	4.5	2.1	NA	4.4	NA	33	NA	NA	NA	<62	NA	0.022	NA	3.9
BH04A_7.25-7.35	26/04/2022	Sand	7	4.9	2.1	NA	4.9	NA	15	NA	NA	NA	<63	NA	0.01	NA	1.6
BH04A_6.75-6.85	26/04/2022	Sand	6.8	4.8	2.0	NA	5.1	NA	17	NA	NA	NA	<64	NA	0.016	NA	2
BH04A_6.25-6.35	26/04/2022	Sand	6	4.8	1.2	NA	4.9	NA	20	NA	NA	NA	<65	NA	0.014	NA	2.1
BH04A_5.25-5.35	26/04/2022	Sand	6.5	5.6	0.9	NA	4.9	NA	28	NA	NA	NA	<66	NA	0.017	NA	2.9
BH04A_5-5.1	26/04/2022	Sand	7	5.2	1.8	NA	4.5	NA	25	NA	NA	NA	<67	NA	0.03	NA	3.3
BH04A_4.5-4.6	26/04/2022	Sand	7.5	5.8	1.7	NA	4.6	NA	22	NA	NA	NA	<68	NA	0.019	NA	2.5
BH04A_4-4.1	26/04/2022	Sand	7.3	5.2	2.1	NA	5.9	NA	<2	NA	NA	NA	<69	NA	<0.005	NA	<1
BH04A_3.5-3.6	26/04/2022	Sand	6.5	5.1	1.4	NA	5.1	NA	7	NA	NA	NA	<70	NA	0.036	NA	2.2
BH04A_3.25-3.35	26/04/2022	Peat	7.3	5.6	1.7	NA	4.5	NA	55	NA	NA	NA	<71	NA	0.04	NA	6
BH04A_3-3.1	26/04/2022	Sand	6.9	5.1	1.8	NA	4.2	NA	54	NA	NA	NA	<72	NA	0.011	NA	5
BH04A_2.5-2.6	26/04/2022	Peat	6.8	4.7	2.1	NA	4.2	NA	180	NA	NA	NA	<73	NA	0.052	NA	16
BH04A_2-2.1	26/04/2022	Peat	7.2	5.7	1.5	NA	4.1	NA	220	NA	NA	NA	<74	NA	0.049	NA	19
BH04A_1.75-1.85	26/04/2022	Peat	7.1	5.1	2.0	NA	4.3	NA	200	NA	NA	NA	<75	NA	0.055	NA	18
BH04A_1.25-1.35	26/04/2022	Fill	6.9	5.2	1.7	NA	5.2	NA	84	NA	NA	NA	<76	NA	0.028	NA	7.6
BH03A_7.3-7.4	26/04/2022	Sand	6.2	5.9	0.3	NA	5.6	NA	<2	NA	NA	NA	<77	NA	<0.005	NA	<1
BH03A_6.9-7.0	26/04/2022	Sand	6.1	5.7	0.4	NA	5	NA	10	NA	NA	NA	<78	NA	<0.005	NA	<1
BH03A_6.6-6.7	26/04/2022	Sand	6.2	5.7	0.5	NA	4.7	NA	12	NA	NA	NA	<79	NA	0.008	NA	1.3
BH03A_6.3-6.4	26/04/2022	Sand	6.2	5.7	0.5	NA	5.7	NA	5	NA	NA	NA	<80	NA	<0.005	NA	<1
BH03A_5.9-6.0	26/04/2022	Sand	6.2	5.7	0.5	NA	5.4	NA	3	NA	NA	NA	<81	NA	<0.005	NA	<1
BH03A_5.3-5.4	26/04/2022	Sand	6.2	5	1.2	NA	5.9	NA	5	NA	NA	NA	<82	NA	0.046	NA	2.5
BH03A_4.9-5.0	26/04/2022	Sand	6.2	5.6	0.6	NA	5.8	NA	5	NA	NA	NA	<83	NA	0.006	NA	<1
BH03A_4.3-4.4	26/04/2022	Sand	6.3	5.5	0.8	NA	5.1	NA	5	NA	NA	NA	<84	NA	0.016	NA	1.1
BH03A_3.9-4.0	26/04/2022	Sand	6.4	5	1.4	NA	5.5	NA	3	NA	NA	NA	<85	NA	0.011	NA	<1
BH03A_3.7-3.8	26/04/2022	Sand	6.6	5.1	1.5	NA	5.4	NA	<2	NA	NA	NA	<86	NA	0.016	NA	<1
BH03A_3.1-3.2	26/04/2022	Peat	6.8	5.4	1.4	NA	4.6	NA	150	NA	NA	NA	<87	NA	0.075	NA	15
BH03A_2.9-3.0	26/04/2022	Peat	7	4.9	2.1	NA	4.2	NA	270	NA	NA	NA	<88	NA	0.12	NA	26
BH03A_2.3-2.4	26/04/2022	Sand	6.8	5.1	1.7	NA	5.1	NA	61	NA	NA	NA	<89	NA	0.029	NA	5.9
BH03A_1.9-2.0	26/04/2022	Sand	6.8	5.7	1.1	NA	4.4	NA	62	NA	NA	NA	<90	NA	0.013	NA	5.9
BH03A_1.6-1.7	26/04/2022	Peat	6.9	5.6	1.3	NA	4.4	NA	79	NA	NA	NA	<91	NA	0.009	NA	7
BH03A_1.3-1.4	26/04/2022	Peat	7	5.5	1.5	NA	4.2	NA	52	NA	NA	NA	<92	NA	0.015	NA	4.9
BH03A_1.0-1.1	26/04/2022	Peat	7.1	5.1	2.0	NA	4.1	NA	180	NA	NA	NA	<93	NA	0.22	NA	24
TP02_3.4-3.5	28/04/2022	Peat	NA	NA	NA	NA	8.22	NA	3	NA	NA	NA	<94	NA	0.018	NA	1
QA07 (duplicate pair of TP02_3.25-3.35)	28/04/2022	Peat	NA	NA	NA	NA	8.21	NA	7	NA	NA	NA	<95	NA	0.009	NA	<1
TP02_3.25-3.35	28/04/2022	Peat	NA	NA	NA	NA	8.20	NA	30	NA	NA	NA	<96	NA	0.027	NA	3.5
TP02_2.75-2.85	28/04/2022	Peat	NA	NA	NA	NA	8.19	NA	130	NA	NA	NA	<97	NA	0.14	NA	16
QA05 (duplicate pair of TP02_2.25-2.35)	28/04/2022	Peat	NA	NA	NA	NA	8.18	NA	340	NA	NA	NA	<98	NA	0.12	NA	32
TP02_2.25-2.35	28/04/2022	Peat	NA	NA	NA	NA	8.17	NA	280	NA	NA	NA	<99	NA	0.13	NA	28
QA04 (duplicate pair of TP02_1.75-1.85)	28/04/2022	Peat	NA	NA	NA	NA	8.16	NA	970	NA	NA	NA	<100	NA	0.049	NA	76
TP02_1.75-1.85	28/04/2022	Peat	NA	NA	NA	NA	8.15	NA	250	NA	NA	NA	<101	NA	0.3	NA	33
TP01_3.4-3.5	28/04/2022	Sand	NA	NA	NA	NA	8.14	NA	5	NA	NA	NA	<102	NA	0.074	NA	3.9
TP01_3.25-3.35	28/04/2022	Sand	NA	NA	NA	NA	8.13	NA	6	NA	NA	NA	<103	NA	0.007	NA	<1
QA06 (duplicate pair of TP01_3.0-3.1)	28/04/2022	Peat	NA	NA	NA	NA	8.12	NA	19	NA	NA	NA	<104	NA	0.038	NA	3.2
TP01_3.0-3.1	28/04/2022	Peat	NA	NA	NA	NA	8.11	NA	52	NA	NA	NA	<105	NA	0.024	NA	5.2
TP01_2.75-2.85	28/04/2022	Peat	NA	NA	NA	NA	8.10	NA	300	NA	NA	NA	<106	NA	0.071	NA	26
TP01_2.25-2.35	28/04/2022	Peat	NA	NA	NA	NA	8.9	NA	23	NA	NA	NA	<107	NA	0.39	NA	20
TP01_1.75-1.85	28/04/2022	Peat	NA	NA	NA	NA	8.8	NA	6	NA	NA	NA	<108	NA	0.074	NA	3.9
TP01_1.5-1.6	28/04/2022	Peat	NA	NA	NA	NA	8.7	NA	18	NA	NA	NA	<109	NA	0.36	NA	18
QA08 (duplicate pair of TP01_1.25-1.35)	28/04/2022	Peat	NA	NA	NA	NA	8.6	NA	25	NA	NA	NA	<110	NA	0.39	NA	20
TP01_1.25-1.35	28/04/2022	Peat	NA	NA	NA	NA	8.5	NA	27	NA	NA	NA	<111	NA	0.45	NA	23
TP01_0.0-0.1	28/04/2022	Fill	NA	NA	NA	NA	8.4	NA	<2	NA	NA	NA	<112	NA	<0.005	NA	<1
QA02 (duplicate pair of BH06A_7.9-8)	26/04/2022	Sand	NA	NA	NA	NA	8.3	NA	<2	NA	NA	NA	<113	NA	<0.005	NA	<1
BH06A_7.9-8	26/04/2022	Sand	NA	NA	NA	NA	4.6	NA	35	NA	NA	NA	<114	NA	0.45	NA	24
BH06A_7.75-7.85	26/04/2022	Sand	NA	NA	NA	NA	6.5	NA	3	NA	NA	NA	<115	NA	0.11	NA	5.5
BH06A_7.25-7.35	26/04/2022	Sand	NA	NA	NA	NA	5.2	NA	9	NA	NA	NA	<116	NA	0.056	NA	3.3
BH06A_7-7.1	26/04/2022	Sand	NA	NA	NA	NA	5.1	NA	12	NA	NA	NA	<117	NA	0.007	NA	1.2
BH06A_6.75-6.85	26/04/2022	Sand	NA	NA	NA	NA	5.2	NA	9	NA	NA	NA	<118	NA	0.012	NA	1.3
BH06A_6.25-6.35	26/04/2022	Sand	6.2	5	1.2	NA	5.4	NA	7	NA	NA	NA	<119	NA	0.063	NA	3.5
BH06A_6-6.1	26/04/2022	Sand	NA	NA	NA	NA	5.1	NA	14	NA	NA	NA	<120	NA	0.017	NA	1.8
BH06A_5.5-5.6	26/04/2022	Sand	6.3	4.7	1.6	NA	5.1	NA	11	NA	NA	NA	<121	NA	0.026	NA	2.1
BH06A_5.25-5.35	26/04/2022	Sand	6.2	4.9	1.3	NA	5.4	NA	5	NA	NA	NA	<122	NA	0.013	NA	<1
BH06A_4.5-4.6	26/04/2022	Sand	6	5	1.0	NA	5.1	NA	13	NA	NA	NA	<123	NA	0.009	NA	1.4
BH06A_4-4.1	26/04/2022	Sand	6.2	4.8	1.4	NA	6.3	NA	<2	NA	NA	NA	<124	NA	<0.005	NA	<1
BH06A_3.75-3.85	26/04/2022	Sand	6.7	5.5	1.2	NA	5.9	NA	4	NA	NA	NA	<125	NA	<0.005	NA	<1
BH06A_3.25-3.35	26/04/2022	Sand	6.4	5.4	1.0	NA	5.9	NA	5	NA	NA	NA	<126	NA	<0.005	NA	<1
BH06A_2.75-2.85	26/04/2022	Peat	6	3.2	2.8	NA	4.5	NA	84	NA	NA	NA	<127	NA	0.008	NA	7.2
BH06A_2.5-2.6	26/04/2022	Peat	6.2	3.8	2.4	NA	4.3	NA	180	NA	NA	NA	<128	NA	0.046	NA	16
BH06A_2.25-2.35	26/04/2022	Peat	6.2	4.2	2.0	NA	4.1	NA	350	NA	NA	NA	<129	NA	0.071	NA	30
BH06A_2-2.1	26/04/2022	Peat	6.4	3.5	2.9	NA	4.1	NA	290	NA	NA	NA	<130	NA	0.062	NA	25
QA01 (duplicate pair of BH06A_0-0.1)	26/04/2022	Fill	NA	NA	NA	NA	6.9	NA	<2	NA	NA	NA	<131	NA	0.073	NA	<1
BH06A_0-0.1	26/04/2022	Fill	6.9	6.3	0.6	NA	8.2	NA	<2	NA	NA	NA	<132	NA	<0.005	NA	<1
BH05A_7.9-8	26/04/2022	Sand	6.6	4.5	2.1	NA	5	NA	11	NA	NA	NA	<133	NA	0.076	NA	4.4
BH05A_7.5-7.6	26/04/2022	Sand	6.8	5	1.8	NA	4.9	NA	17	NA	NA	NA	<134	NA	0.1	NA	6
Additional Site Investigation (EI, 2023)																	
TP402_1.9-2.0 ASSA	0602/2023	Natural - CLAY	6.2	2.3	3.9	2	5.3	1.9	79	4678	4599	1.4	980	0.13	0.28	0.4	73
TP406_1.9-2.0 ASSA		Natural - CLAY	5.6	2.3	3.3	3	4.1	1.8	225	5638	5414	1.5	1200	0.36	0.13	0.55	92
TP410_1.9-2.0 ASSA		Natural - CLAY	5.6	2.6	3.0	3	4.3	2.6	95	299	205	0.2	230	0.15	0.021	0.19	17
TP412_1.9-2.0 ASSA		Natural - CLAY	5.5	2.6	2.9	2	4.2	1.8	259	4353	4094	1.9	1500	0.42	0.15	0.63	110
TP413_1.9-2.0 ASSA		Natural - CLAY	5.8	3.1	2.6	2	4.5	2.9	52	125	72	0.15	150	0.08	0.008	0.1	12
TP414_1.9-2.0 ASSA		Natural - CLAY	5.9	3.5	2.3	2	5.3	2	67	4678	4610	1.6	1000	0.11	0.14	0.25	78
TP417_1.9-2.0 ASSA		Natural - CLAY	5.5	2.8	2.7	2	4.2	2.1	187	1188	1000	0.53	530	0.3	0.038	0.36	40
TP419_1.9-2.0 ASSA		Natural - CLAY	5.7	3.4	2.2	1	4.8	1.9	130	3692	3563	1.6	1100	0.21	0.11	0.39	85
Statistical Analysis																	
Minimum			5	2.1	0.1	1	3.7	1.5	2	98	72	0.02	12	0.028	0.006	0.1	1
Maximum			9	6.3	5.1	3	10.9	8.4	970	8040	7710	3.38	2410	0.701	0.53	0.63	181
SILs																	
DAWR (2018) Action Criteria	Indicator of AASS		< 4 actual ASS are present														
			> 4 but < 5.5 indicates acidic soil, but not confirmatory of actual ASS [1]														
	Indicator of PASS			< 3 and a strong reaction, indicates high probability of PASS. [1]													
				> 3 and ≤ 4, mild reaction requires lab analysis to confirm. [1]													
				> 4 and ≤ 5, and no reaction requires lab analysis to confirm. [1]													
				> 5 and little or no drop in pH, sulfur trail in SPOCAS applies.[1]													
					> 1 indicates PASS [1]											
										>18 *	>18 *	≥ 0.03 *					

Notes:

(grey shading) No reference criteria available in current regulatory tools

* Indicates PASS where volume of fine textured soil disturbance is > 1,000 tonnes

1 In the absence of DAWR 2018 criteria, the ASMAC 1998 criteria are applied

SPOCAS = Suspension Perroxide Oxidation Combined Activity and Sulfur

pH_{KCl} = Potassium chloride pH

pH_F = Field pH

pH_{FOX} = Peroxide oxidised pH

S_{Cr} = Chromium reducible sulfur

S_{POS} = Peroxide oxidisable sulfur

TAA = Titrable Actual Acidity

TPA = Titrable Peroxide Activity

TSA = Titrable Sulfidic Activity

Reaction Rate:

0 = No Reaction

1 = Slight Reaction

2 = Moderate Reaction

3 = Strong/High Reaction

4 = Extreme/Vigorous Reaction (gas evolution and heat generation)

TEST PIT: TP402

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Contamination | Remediation | Geotechnical

Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	-		0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP402_0.1-0.2			-	FILL: SAND; fine to medium grained, brown, with glass, brick, ceramic and metal fragments, no odour.			FILL
				0.40								
			0.5		TP402_0.5-0.6			-	FILL: SAND; medium grained, brown yellow, with sub-angular to angular gravels, with glass, brick, metal and concrete fragments, no odour.			
				0.80					From 0.80 m, colour change to brown grey.	D		
			1.0		TP402_1.0-1.1						-	
				1.20				Pt	PEAT; dark brown, with organic material, with a weak sulfur odour.			NATURAL
			1.5		TP402_1.5-1.6							
				1.70				CL	CLAY; low plasticity, dark brown, with a moderate sulfur odour.	W		
				2.00	TP402_1.9-2.0							
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP406

Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP406_0.1-0.2			-	FILL: SAND; fine grained, brown, with sub-angular to angular gravels, with glass, ceramic tiles, brick, metal and concrete fragments, no odour.			
				0.40								
			0.5		TP406_0.5-0.6 QD3/QT3			-	FILL: SAND; medium to coarse grained, brown/grey, with sub-angular to angular gravels, with glass, ceramic tiles, brick, metal and concrete fragments, no odour.			
				0.90								
E	-	GWNE	1.0		TP406_1.0-1.1				From 0.90 m, with peat and roots.	D	-	
				1.40								
			1.5		TP406_1.5-1.6			Pt	PEAT; dark brown, with organic material, with a trace of low plasticity clay, with a weak sulfur odour.			NATURAL
				1.80								
				2.00	TP406_1.9-2.0			CL	CLAY; low plasticity, dark brown, with a weak sulfur odour.			
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP410

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Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP410_0.1-0.2			-	FILL: SAND; fine grained, brown, with gravels, with ceramic tiles and brick fragments, no odour.			FILL
				0.40				-	FILL: SAND; medium to coarse grained, brown/yellow, with sub-angular to angular gravels, with glass and brick fragments, no odour.			
			0.5		TP410_0.5-0.6 QD4/QT4							
				0.90				-	FILL: SAND; medium grained, brown, with roots and peat, no odour.			
E	-	GWNE	1.0		TP410_1.0-1.1					D	-	
				1.40				Pt	PEAT; brown, with organic material, with a weak sulfur odour.			NATURAL
			1.5		TP410_1.5-1.6							
				1.80				CL	CLAY; low plasticity, dark brown, with a moderate sulfur odour.			
					TP410_1.9-2.0							
			2.0	2.00					Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP412

Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	-	GWNE	0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
				0.40	TP412_0.1-0.2			-	FILL: Gravelly SAND; fine to medium grained, brown, with sub-angular to angular gravels, with glass, ceramic tiles, brick fragments, no odour.			FILL
			0.5	0.90	TP412_0.5-0.6			-	FILL: SAND; medium to coarse grained, brown/yellow, with sub-angular to angular gravels, with glass, ceramic tiles, brick and concrete fragments, with slag, no odour.			
			1.0	1.40	TP412_1.0-1.1			-	FILL: SAND; medium grained, brown, with gravel and clay, with brick, concrete and wood fragments, no odour.	D	-	
			1.5	1.80	TP412_1.5-1.6			Pt	PEAT; dark brown, with a trace of fine grained sand, no odour.			NATURAL
				2.00	TP412_1.9-2.0			CL	CLAY; low plasticity, dark brown, with a weak sulfur odour.			
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP413

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Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	-	GWNE	0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP413_0.1-0.2			-	FILL: SAND; fine grained, brown, with roots, with glass, ceramic tiles, brick, concrete, wood and plastic fragments, no odour.			FILL
				0.40								
			0.5		TP413_0.5-0.6			-	FILL: SAND; medium grained, brown/yellow, with sub-angular to angular gravels, no odour.			
				0.90								
			1.0		TP413_1.0-1.1				From 0.90 m, colour change to brown/grey.	D	-	
				1.40								
			1.5		TP413_1.5-1.6			Pt	PEAT; dark brown, with organic material, with a weak sulfur odour.			NATURAL
				1.80								
				2.00	TP413_1.9-2.0			CL	CLAY; low plasticity, dark brown, with a moderate sulfur odour.			
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP414

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Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP414_0.1-0.2			-	FILL: Gravelly SAND; fine to medium grained, brown, with concrete fragments, no odour.			FILL
				0.40								
			0.5		TP414_0.5-0.6 QD1/QT1			-	FILL: SAND; medium to coarse grained, brown/yellow, with slag, no odour.			
				0.90								
E	-	GWNE	1.0		TP414_1.0-1.1			-	FILL: SAND; medium grained, brown, with gravel and clay, no odour.	D	-	
				1.40								
			1.5		TP414_1.5-1.6			Pt	PEAT; dark brown, with organic material, no odour.			NATURAL
				1.80								
				2.00	TP414_1.9-2.0			CL	CLAY; low plasticity, dark brown, with a weak sulfur odour.			
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP417

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Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*Strata Depth*	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	-	GWNE	0.0	*0.10*				-	TOPSOIL; 100 mm thickness.	D	-	TOPSOIL
					TP417_0.1-0.2			-	FILL: SAND; fine to medium grained, brown, with sub-angular to angular gravels, with glass, ceramic tiles and brick fragments, no odour.			FILL
				0.40				-	FILL: SAND; medium to coarse grained, brown/yellow, with sub-angular to angular gravels, with glass, ceramic tiles and brick fragments, no odour.			
			0.5		TP417_0.5-0.6							
				0.90				-	FILL: SAND; medium grained, brown mottled grey/yellow, with ceramic tiles and brick fragments, no odour.			
			1.0		TP417_1.0-1.1							
				1.40				Pt	PEAT; dark brown, with organic material, no odour.			NATURAL
			1.5		TP417_1.5-1.6							
				1.80				CL	CLAY; low plasticity, dark brown, with a moderate sulfur odour.			
					TP417_1.9-2.0							
			2.0	*2.00*					Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT: TP419

Project	Additional Site Investigation			Sheet	1 OF 1
Location	600-660 Elizabeth Street, Redfern NSW			Date	8/2/23
Position	Refer to Figure 2			Logged	GT
Job No.	E25947.E03	Contractor	-	Checked	NK
Client	Hickory Constructions Pty Ltd	Machine	Excavator		
		Bucket Size			

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	Strata Depth	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.10				-	TOPSOIL; 100 mm thickness.			TOPSOIL
					TP419_0.1-0.2			-	FILL: SAND; medium grained, brown, with sub-angular to angular gravels, with glass, ceramic tiles, brick and metal fragments, no odour.			FILL
				0.40								
			0.5		TP419_0.5-0.6			-	FILL: SAND; medium to coarse grained, brown grey, with sub-angular gravels, with glass, ceramic tiles, brick and metal fragments, no odour.	D		
				0.90								
E	-		1.0		TP419_1.0-1.1				From 0.90 m, colour change to yellow grey.		-	
				1.40								
			1.5		TP419_1.5-1.6			Pt	PEAT; dark brown, with organic matter, no odour.			NATURAL
				1.80						W		
				2.00	TP419_1.9-2.0			CL	CLAY; low plasticity, dark brown, with a weak sulfur odour.			
			2.0						Hole Terminated at 2.00 mBGL; Target Depth Reached.			
			2.5									
			3.0									

Sketch & Other Observations

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST PIT TP01

PROJECT NUMBER 59618	**DRILLING COMPANY** Ken Coles	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 28-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** Excavator	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**DRILLING METHOD** Bucket excavation	**COORD SOURCE**
	DIMENSIONS 600 mm	**LOGGED BY** MD

COMMENTS

Drilling Method	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
Test Pit	0.2		Fill	Fill - SAND, brown, heterogeneous, damp, fine sand loose, with inclusions of brick, tiles, sandstone, gravel, concrete, and plastic	DP	TP01_0.00-0.60	No odour, staining, or asbestos. 10 L AQ from 0.0-0.6 m
	0.4					TP01_0.25-0.35	
	0.6					TP01_0.50-0.60	
	0.8		Fill	Fill - SAND, grey/brown, heterogeneous, damp, fine sand loose, with inclusions of brick, tiles, sandstone, gravel, concrete, and plastic	DP	TP01_0.60-1.40	No odour, staining, or asbestos.10 L AQ from 0.6-1.4 m. QA/QC08 taken from 1.25-1.35 m.
	1					TP01_0.75-0.85	
	1.2					TP01_1.00-1.10	
	1.4					TP01_1.25-1.35	
	1.6		PT	Natural - PEAT, black, homogenous, moist, medium plasticity, firm, with inclusions of organic material	M	TP01_1.50-1.60	No staining or asbestos, sulfidic odours. QA/QC06 taken from 3.0-3.1 m
	1.8					TP01_1.75-1.85	
	2					TP01_2.00-2.10	
	2.2					TP01_2.25-2.35	
	2.4					TP01_2.50-2.60	
	2.6					TP01_2.75-2.85	
	2.8					TP01_3.00-3.10	
	3					TP01_3.25-3.35	
	3.2		SW	Natural - SAND, grey/brown, homogenous, wet, fine sand medium dense, water in hole to 2.0 m (no sheen, brown colour)	W	TP01_3.40-3.50	No odour, staining, or asbestos. QA/QC07 taken from 3.4-3.5 m
	3.4						
	3.6			Termination Depth at: 3.50 m.			End of hole @ 3.5 mbgs, programmed depth
	3.8						

GROUNDWATER WELL TP01

PROJECT NUMBER 59618	**DRILLING COMPANY** Ken Coles	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 28-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** Excavator	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Bucket excavation	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 3.5 m bgl	**COORD SOURCE**
	DIAMETER 600 mm	**LOGGED BY** MD

COMPLETION | **CASING** | **SCREEN INTERVAL** - m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
Test Pit			0.5		Fill	Fill - SAND, brown, heterogeneous, damp, fine sand loose, with inclusions of brick, tiles, sandstone, gravel, concrete, and plastic	DP	TP01_0.00-0.60 TP01_0.25-0.35 TP01_0.50-0.60	No odour, staining, or asbestos. 10 L AQ from 0.0-0.6 m
			1			Fill - SAND, grey/brown, heterogeneous, damp, fine sand loose, with inclusions of brick, tiles, sandstone, gravel, concrete, and plastic	DP	TP01_0.60-1.40 TP01_0.75-0.85 TP01_1.00-1.10 TP01_1.25-1.35	No odour, staining, or asbestos.10 L AQ from 0.6-1.4 m. QA/QC08 taken from 1.25-1.35 m.
Test Pit			1.5 2 2.5 3		PT	Natural - PEAT, black, homogenous, moist, medium plasticity, firm, with inclusions of organic material	M	TP01_1.50-1.60 TP01_1.75-1.85 TP01_2.00-2.10 TP01_2.25-2.35 TP01_2.50-2.60 TP01_2.75-2.85 TP01_3.00-3.10	No staining or asbestos, sulfidic odours. QA/QC06 taken from 3.0-3.1 m
Test Pit			3.5		SW	Natural - SAND, grey/brown, homogenous, wet, fine sand medium dense, water in hole to 2.0 m (no sheen, brown colour)	W	TP01_3.25-3.35 TP01_3.40-3.50	No odour, staining, or asbestos. QA/QC07 taken from 3.4-3.5 m
			4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5			Termination Depth at: 3.50 m.			End of hole @ 3.5 mbgs, programmed depth

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TEST PIT TP02

PROJECT NUMBER 59618	**DRILLING COMPANY** Ken Coles	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 28-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** Excavator	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**DRILLING METHOD** Bucket excavation	**COORD SOURCE**
	DIMENSIONS 600 mm	**LOGGED BY** JM

COMMENTS

Drilling Method	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
Test Pit	0.2		Fill	Fill - SAND, grey/brown, heterogeneous, damp, fine sand loose, with inclusions of brick, glass, metal, sandstone, concrete, and slag	DP	TP02_0.00-0.90	No odour, staining, or asbestos. 10 L AQ from 0.0-0.9 m
	0.4					TP02_0.25-0.35	
	0.6					TP02_0.50-0.60	
	0.8					TP02_0.75-0.85	
	1					TP02_0.90-1.60	No odour, staining, or asbestos. 10 L AQ from 0.9-1.6 m
	1.2					TP02_1.00-1.10	
	1.4					TP02_1.25-1.35	
	1.6					TP02_1.50-1.60	
	1.8		PT	Natural - PEAT, black, homogenous, moist, medium plasticity, stiff, with inclusions of organic material	M	TP02_1.75-1.85	No staining or asbestos, sulfidic odours. QA/QC04 taken from 1.75-1.85 m
	2					TP02_2.00-2.10	
	2.2					TP02_2.25-2.35	
	2.4						
	2.6		PT	Natural - PEAT, black, homogenous, saturated, high plasticity, very soft, with inclusions of organic material	S	TP02_2.50-2.60	No staining or asbestos, sulfidic odours. QA/QC05 taken from 2.5-2.6 m
	2.8					TP02_2.75-2.85	
	3					TP02_3.00-3.10	
	3.2					TP02_3.25-3.35	
	3.4		SW	Natural - SAND, light brown, homogenous, saturated, fine sand loose, with water in based of hole at ~3.0 m (no sheen, brown colour)	S	TP02_3.40-3.50	No odour, staining, or asbestos
	3.6			Termination Depth at: 3.50 m.			End of hole @ 3.5 mbgs, programmed depth
	3.8						

GROUNDWATER WELL TP02

PROJECT NUMBER 59618	**DRILLING COMPANY** Ken Coles	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 28-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** Excavator	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Bucket excavation	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 3.5 m bgl	**COORD SOURCE**
	DIAMETER 600 mm	**LOGGED BY** JM

COMPLETION | **CASING** | **SCREEN INTERVAL** - m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
Test Pit			0.5		Fill	Fill - SAND, grey/brown, heterogeneous, damp, fine sand loose, with inclusions of brick, glass, metal, sandstone, concrete, and slag	DP	TP02_0.00-0.90 TP02_0.25-0.35 TP02_0.50-0.60 TP02_0.75-0.85	No odour, staining, or asbestos. 10 L AQ from 0.0-0.9 m
			1					TP02_1.00-1.10 TP02_1.25-1.35 TP02_1.50-1.60	No odour, staining, or asbestos. 10 L AQ from 0.9-1.6 m
Test Pit			1.5		PT	Natural - PEAT, black, homogenous, moist, medium plasticity, stiff, with inclusions of organic material	M	TP02_1.75-1.85 TP02_2.00-2.10 TP02_2.25-2.35	No staining or asbestos, sulfidic odours. QA/QC04 taken from 1.75-1.85 m
Test Pit			2					TP02_2.50-2.60	
			2.5		PT	Natural - PEAT, black, homogenous, saturated, high plasticity, very soft, with inclusions of organic material	S	TP02_2.75-2.85 TP02_3.00-3.10 TP02_3.25-3.35	No staining or asbestos, sulfidic odours. QA/QC05 taken from 2.5-2.6 m
Test Pit			3						
			3.5		SW	Natural - SAND, light brown, homogenous, saturated, fine sand loose, with water in based of hole at ~3.0 m (no sheen, brown colour) Termination Depth at: 3.50 m.	S	TP02_3.40-3.50	No odour, staining, or asbestos End of hole @ 3.5 mbgs, programmed depth
			4						
			4.5						
			5						
			5.5						
			6						
			6.5						
			7						
			7.5						
			8						
			8.5						
			9						
			9.5						

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GROUNDWATER WELL BH01A

PROJECT NUMBER 59618	**DRILLING COMPANY** Terratest	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** LR
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 1.4 - 4.4 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT	▽		0.2		Fill	Fill - silty SAND, brown/orange, heterogeneous, moist, loose, inclusions of gravel	M	BH01A_0.00-0.60	No odour, staining, or asbestos
			0.4					BH01A_0.30-0.40	
			0.6		Fill	Fill - coarse SAND, red/orange, heterogeneous, dry, loose	DR	BH01A_0.50-0.60	No odour, staining, or asbestos
					Fill	Fill - fine SAND, brown/beige, heterogeneous, dry, loose	DR	BH01A_0.60-1.10	No odour, staining, or asbestos
			0.8					BH01A_0.70-0.80	
			1						
			1.2		PT	Natural - PEAT, black, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M	BH01A_1.10-1.20	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			1.4					BH01A_1.30-1.40	
			1.6					BH01A_1.60-1.70	
			1.8					BH01A_1.90-2.00	
			2					BH01A_2.10-2.20	
			2.2					BH01A_2.40-2.50	
			2.4						
			2.6		SP	Natural - fine SAND, beige, homogeneous, wet, medium dense	W	BH01A_2.70-2.80	No odour, staining, or asbestos
			2.8					BH01A_2.90-3.00	
			3					BH01A_3.10-3.20	
			3.2					BH01A_3.40-3.50	
			3.4					BH01A_3.70-3.80	
			3.6					BH01A_4.00-4.10	
			3.8						
			4						

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GROUNDWATER WELL BH01A

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT			4.2 4.4 4.6 4.8 5 5.2 5.4 5.6 5.8 6 6.2 6.4 6.6 6.8 7 7.2 7.4 7.6 7.8 8					BH01A_4.10-4.20 BH01A_4.40-4.50 BH01A_4.70-4.80 BH01A_5.00-5.10 BH01A_5.20-5.30 BH01A_5.50-5.60 BH01A_5.80-5.90 BH01A_6.10-6.20 BH01A_6.40-6.50 BH01A_6.70-6.80 BH01A_7.00-7.10 BH01A_7.20-7.30 BH01A_7.40-7.50 BH01A_7.70-7.80 BH01A_7.90-8.00	
			8.2 8.4 8.6 8.8 9			Termination Depth at: 8.00 m.			

GROUNDWATER WELL BH02A

PROJECT NUMBER 59618	**DRILLING COMPANY** Terratest	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** LR
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 1.4 - 4.4 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT			0.2		Fill	Fill - gravelly SAND, brown/grey, heterogeneous, moist, loose, inclusions of bricks and roots	M	BH02A_0.00-0.50	No odour, staining, or asbestos
			0.4					BH02A_0.30-0.40	
								BH02A_0.40-1.00	
			0.6		Fill	Fill - SAND, brown/beige, heterogeneous, moist, loose	M	BH02A_0.50-1.00	No odour, staining, or asbestos
								BH02A_0.60-0.70	
			0.8		Fill	Fill - coarse SAND, red/orange, heterogeneous, dry, loose	DR		No odour, staining, or asbestos
	▽		1		PT	Natural - PEAT, black, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M		No staining, asbestos, or hydrocarbon odours, sulfidic odours
			1.2					BH02A_1.20-1.30	
			1.4						
								BH02A_1.50-1.60	
			1.6						
								BH02A_1.70-1.80	
			1.8					BH02A_1.80-1.90	
			2						
			2.2					BH02A_2.20-2.30	
			2.4						
								BH02A_2.50-2.60	
			2.6		SP	Natural - fine SAND, beige, homogeneous, wet, medium dense	W		No odour, staining, or asbestos
			2.8					BH02A_2.70-2.80	
			3					BH02A_2.90-3.00	
			3.2					BH02A_3.20-3.30	
			3.4						
								BH02A_3.50-3.60	
			3.6						
			3.8					BH02A_3.80-3.90	
			4					BH02A_3.90-4.00	

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GROUNDWATER WELL BH02A

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
			4.2 4.4 4.6 4.8 5 5.2 5.4 5.6 5.8 6 6.2 6.4 6.6 6.8 7 7.2 7.4 7.6 7.8 8					BH02A_4.10-4.20 BH02A_4.30-4.40 BH02A_4.40-4.50 BH02A_4.70-4.80 BH02A_5.00-5.10 BH02A_5.30-5.40 BH02A_5.60-5.70 BH02A_5.90-6.00 BH02A_6.20-6.30 BH02A_6.30-6.40 BH02A_6.50-6.60 BH02A_6.80-6.90 BH02A_7.90-8.00	Push tube failure, no sample from 7.0-7.9 mbgs.
			8.2 8.4 8.6 8.8 9			Termination Depth at: 8.00 m.			

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GROUNDWATER WELL BH03A

PROJECT NUMBER 59618	**DRILLING COMPANY** Terratest	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** LR
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 1.4 - 5.4 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT			0.2		Fill	Fill - silty SAND, brown, heterogeneous, moist, loose, inclusions of gravel and roots	M	BH03A_0.00-0.50	No odour, staining, or asbestos
			0.4					BH03A_0.30-0.40	
					Fill	Fill - SAND, bright red, heterogeneous, dry, loose	DR	BH03A_0.50-1.00	No odour, staining, or asbestos
			0.6		Fill	Fill - SAND, grey/beige, heterogeneous, moist, loose	M	BH03A_0.60-0.70	No odour, staining, or asbestos
			0.8					BH03A_0.90-1.00	
			1		PT	Natural - PEAT, black, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M	BH03A_1.00-1.10	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			1.2						
			1.4					BH03A_1.30-1.40	
			1.6					BH03A_1.60-1.70	
			1.8		SP	Natural - SAND, grey/beige, heterogeneous, moist, loose	M		No odour, staining, or asbestos
	▽		2					BH03A_1.90-2.00	
			2.2						
			2.4		PT	Natural - PEAT, black, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M	BH03A_2.30-2.40	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2.6					BH03A_2.60-2.70	
			2.8						
			3					BH03A_2.90-3.00	
			3.2					BH03A_3.10-3.20	
	▽		3.4						
			3.6		SP	Natural - fine SAND, beige, homogeneous, wet, medium dense	W	BH03A_3.40-3.50	No odour, staining, or asbestos
			3.8					BH03A_3.70-3.80	
			4					BH03A_3.90-4.00	

GROUNDWATER WELL BH03A

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
			4.2					BH03A_4.20-4.30	
			4.4					BH03A_4.30-4.40	
			4.6					BH03A_4.60-4.70	
			4.8						
			5					BH03A_4.90-5.00	
			5.2					BH03A_5.00-5.10	
			5.4					BH03A_5.30-5.40	
			5.6					BH03A_5.60-5.70	
			5.8					BH03A_5.90-6.00	
			6					BH03A_6.00-6.10	
			6.2					BH03A_6.30-6.40	
			6.4						No staining, asbestos, or hydrocarbon odours, sulfidic odours
			6.6		PT	Natural - PEAT, black, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M	BH03A_6.60-6.70	
			6.8		SP	Natural - fine SAND, beige, homogeneous, moist, medium dense	M	BH03A_6.90-7.00	No odour, staining, or asbestos
			7					BH03A_7.00-7.10	
			7.2					BH03A_7.30-7.40	
			7.4						
			7.6						
			7.8						
			8			Termination Depth at: 8.00 m.			
			8.2						
			8.4						
			8.6						
			8.8						
			9						

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GROUNDWATER WELL BH04A

PROJECT NUMBER 59618	**DRILLING COMPANY** Numac	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** MD
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 1.5 - 4.5 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT			0.2		Fill	Fill - fine SAND, brown/beige, heterogeneous, damp, loose, inclusions of grass/roots, concrete, bricks, and scrap metal	DP	BH04A_0.00-1.00	No odour, staining, or asbestos
			0.4					BH04A_0.25-0.35	
			0.6					BH04A_0.50-5.60	
			0.8					BH04A_0.75-0.85	
	▽		1		Fill	Fill - fine SAND, brown, heterogeneous, damp, loose, inclusions of grass/roots, concrete, bricks, and scrap metal	DP	BH04A_1.00-1.70	No odour, staining, or asbestos
			1.2		Fill	Fill - fine SAND, dark brown, heterogeneous, damp, loose, root zone, inclusions of concrete, bricks, and scrap metal	DP	BH04A_1.25-1.35	No odour, staining, or asbestos
			1.4		Fill	Fill - fine SAND, brown, heterogeneous, damp, loose, inclusions of grass/roots, concrete, bricks, and scrap metal	DP	BH04A_1.50-1.60	No odour, staining, or asbestos
			1.6						
			1.8		PT	Natural - PEAT, dark brown, heterogeneous, moist, medium plasticity, very soft, inclusions of organic matter	M		No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2					BH04A_2.00-2.10	
			2.2						
			2.4					BH04A_2.25-2.35	
			2.6						
			2.8		PT	Natural - PEAT, dark brown, heterogeneous, wet, high plasticity, very soft, inclusions of organic matter	W	BH04A_2.75-2.85	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			3					BH04A_3.00-3.10	
			3.2					BH04A_3.25-3.35	
			3.4		SP	Natural - fine SAND, beige/light brown, homogeneous, wet, medium dense	W	BH04A_3.50-3.60	No odour, staining, or asbestos
			3.6						
			3.8					BH04A_3.75-3.85	
			4					BH04A_4.00-4.10	

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Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
			4.2						
			4.4					BH04A_4.25-4.35	
			4.6					BH04A_4.50-4.60	
			4.8					BH04A_4.75-4.85	
			5					BH04A_5.00-5.10	
			5.2		SP	Natural - fine SAND, grey/beige, homogeneous, wet, medium dense	W	BH04A_5.25-5.35	No odour, staining, or asbestos
			5.4					BH04A_5.50-5.60	
			5.6					BH04A_5.75-5.85	
			5.8					BH04A_6.00-6.10	
			6						
			6.2		SP	Natural - fine SAND, dark brown, homogeneous, saturated, medium dense	S	BH04A_6.25-6.35	No odour, staining, or asbestos
SFA			6.4					BH04A_6.50-6.60	
			6.6					BH04A_6.75-6.85	
			6.8					BH04A_7.00-7.10	
			7					BH04A_7.25-7.35	
			7.2					BH04A_7.50-7.60	
			7.4					BH04A_7.75-7.85	
			7.6					BH04A_7.90-8.00	
			7.8						
			8			Termination Depth at: 8.00 m.			
			8.2						
			8.4						
			8.6						
			8.8						
			9						

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GROUNDWATER WELL BH05A

PROJECT NUMBER 59618	**DRILLING COMPANY** Numac	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** MD
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 2 - 5 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT	▽		0.2		Fill	Fill - fine SAND, brown/beige, heterogeneous, damp, medium dense, inclusions of brick fragments, gravel and concrete	DP	BH05A_0.00-1.00	No odour, staining, or asbestos
			0.4					BH05A_0.25-0.35	
			0.6					BH05A_0.50-0.60	
			0.8					BH05A_0.75-0.85	
			1		Fill	Fill - fine SAND, brown, heterogeneous, damp, medium dense, inclusions of brick fragments, gravel, concrete, ash and slag	DP		No odour, staining, or asbestos
			1.2		Fill	Fill - fine SAND, brown, heterogeneous, damp, medium dense, inclusions of brick fragments, gravel and concrete	DP	BH05A_1.00-1.60	No odour, staining, or asbestos
			1.4		Fill	Fill - fine SAND, beige, heterogeneous, damp, medium dense, inclusions of brick fragments, gravel, concrete, ash and slag	DP	BH05A_1.25-1.35	No odour, staining, or asbestos
			1.6					BH05A_1.50-1.60	
			1.8		PT	Natural - PEAT, black/dark brown, heterogeneous, moist, medium plasticity, very soft, inclusions of organic matter	M	BH05A_1.75-1.85	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2					BH05A_2.00-2.10	
			2.2					BH05A_2.25-2.35	
			2.4						
			2.6		PT	Natural - PEAT, black/dark brown, heterogeneous, moist, medium plasticity, very soft, inclusions of organic matter and rocks	M	BH05A_2.50-2.60	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2.8					BH05A_2.75-2.85	
			3		PT	Natural - PEAT, black/dark brown, heterogeneous, wet, high plasticity, very soft, inclusions of organic matter	W	BH05A_3.00-3.10	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			3.2					BH05A_3.25-3.35	
			3.4					BH05A_3.50-3.60	
			3.6					BH05A_3.75-3.85	
			3.8		SP	Natural - fine SAND, beige/light brown, homogeneous, wet, medium dense	W		No odour, staining, or asbestos
			4					BH05A_4.00-4.10	

GROUNDWATER WELL BH05A

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
			4.2						
			4.4					BH05A_4.25-4.35	
			4.6						
			4.8					BH05A_4.50-4.60	
			5						
			5.2		SP	Natural - fine SAND, grey/brown, homogeneous, saturated, dense	S	BH05A_4.75-4.85	
			5.4						
			5.6					BH05A_5.00-5.10	No odour, staining, or asbestos
			5.8						
SFA			6					BH05A_5.25-5.35	
			6.2						
			6.4					BH05A_5.50-5.60	
			6.6						
			6.8					BH05A_5.75-5.85	
			7						
			7.2					BH05A_6.00-6.10	
			7.4						
			7.6					BH05A_6.25-6.35	
			7.8		SP	Natural - fine SAND, dark brown, homogeneous, wet, medium dense	W		No odour, staining, or asbestos
			8					BH05A_6.50-6.60	
			8.2						
			8.4					BH05A_6.75-6.85	
			8.6						
			8.8					BH05A_7.00-7.10	
			9						
								BH05A_7.25-7.35	
								BH05A_7.50-7.60	
								BH05A_7.75-7.85	
								BH05A_7.90-8.00	
						Termination Depth at: 8.00 m.			

GROUNDWATER WELL BH06A

PROJECT NUMBER 59618	**DRILLING COMPANY** Numac	**EASTING** N/A
PROJECT NAME Contamination Advice Redfern	**DRILLING DATE** 26-Apr-22	**NORTHING** N/A
CLIENT LAHC	**DRILL RIG** GeoProbe	**ELEVATION** N/A
PERMIT NO. N/A	**DRILLING METHOD** Push Tube	**COORD SYS** GDA94_MGA_zone_56
ADDRESS 600-660 Elizabeth Street, Redfern NSW	**TOTAL DEPTH** 8 m bgl	**COORD SOURCE**
	DIAMETER 100 mm	**LOGGED BY** MD
COMPLETION Roadbox	**CASING** Class 18 PVC - 50mm	**SCREEN INTERVAL** 1.4 - 4.9 m bgl

COMMENTS

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
PT	▽		0.2		Fill	Fill - fine SAND, brown/beige, heterogeneous, damp, loose, inclusions of brick, concrete and roots	DP	BH06A_0.00-1.00	No odour, staining, or asbestos
			0.4					BH06A_0.25-0.35	
			0.6					BH06A_0.50-0.60	
			0.8					BH06A_0.75-0.85	
			1		Fill	Fill - fine SAND, grey, heterogeneous, damp, loose, inclusions of brick, concrete, roots, and slag	DP	BH06A_1.00-1.60	No odour, staining, or asbestos
			1.2						
			1.4						
			1.6		PT	Natural - PEAT, black/dark brown, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter	M		No staining, asbestos, or hydrocarbon odours, sulfidic odours
			1.8					BH06A_1.75-1.85	
			2					BH06A_2.00-2.10	
			2.2		PT	Natural - PEAT, black/dark brown, heterogeneous, moist, medium plasticity, soft, inclusions of organic matter and roots	M	BH06A_2.25-2.35	No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2.4		PT	Natural - PEAT, black/dark brown, heterogeneous, wet, high plasticity, soft, inclusions of organic matter	W		No staining, asbestos, or hydrocarbon odours, sulfidic odours
			2.6						
			2.8						
			3		SP	Natural - fine SAND, brown/beige, homogeneous, wet, medium dense	W	BH06A_3.00-3.10	No odour, staining, or asbestos
			3.2					BH06A_3.25-3.35	
			3.4					BH06A_3.50-3.60	
			3.6					BH06A_3.75-3.85	
			3.8					BH06A_4.00-4.10	
			4						

GROUNDWATER WELL BH06A

Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	Additional Observations
			4.2						
			4.4					BH06A_4.25-4.35	
			4.6					BH06A_4.50-4.60	
			4.8					BH06A_4.75-4.85	
			5		SP	Natural - fine SAND, grey/brown, homogeneous, wet, medium dense	W	BH06A_5.00-5.10	No odour, staining, or asbestos
			5.2					BH06A_5.25-5.35	
			5.4						
			5.6		SP	Natural - fine SAND, brown, homogeneous, saturated, dense	S	BH06A_5.50-5.60	No odour, staining, or asbestos
			5.8					BH06A_5.75-5.85	
			6					BH06A_6.00-6.10	
SFA			6.2					BH06A_6.25-6.35	
			6.4					BH06A_6.50-6.60	
			6.6					BH06A_6.75-6.85	
			6.8					BH06A_7.00-7.10	
			7					BH06A_7.25-7.35	
			7.2					BH06A_7.50-7.60	
			7.4					BH06A_7.75-7.85	
			7.6					BH06A_7.90-8.00	
			7.8						
			8			Termination Depth at: 8.00 m.			
			8.2						
			8.4						
			8.6						
			8.8						
			9						

ENVIRONMENTAL BOREHOLE BH01

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334226.9 N6248047.6
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0	0.6	BH01_0.1	Y		SP	FILL: SAND; medium to course grain, light brown, minor organics, trace brick fragments, very loose, very dry, no odour or staining.
	0.5	0.2	BH01_0.5	Y			Colour change to light grey
	1	0.3	BH01_1.0			Pt	Sandy PEAT; medium to high plasticity, dark grey to black, with organics (20%), medium dense, dry to moist, no odour or staining.
Direct push tube	1.5						
	2	2.5	BH01_2.0				
	2.5	0.5	BH01_2.5	Y			
							End of investigation at 2.5 m (target depth).
	3						

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ENVIRONMENTAL BOREHOLE BH02

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334224.9 N6248059.4
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0	0	BH02_0.1	Y		SM	FILL: Silty SAND; Fine to course grain, brown, trace roots and mortar fragments, medium dense, dry, no odour or staining.
	0.5	0.2	BH02_0.5	Y			Sandstone fragments from 0.5 to 1.4m.
	1	0.2					
	1.5					SC	Clayey SAND; fine grain, dark brown, minor roots, dry, dense, no odour or staining.
Direct push tube		1.0	BH02_1.5			Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
	2						
	2.5	6.5	BH02_2.5, QC100	Y			End of investigation at 2.5 m (target depth).
	3						

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ENVIRONMENTAL BOREHOLE BH03

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334225.5 N6248029.3
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.0	BH03_0.1			SM	FILL: Silty SAND; grey to brown, fine to medium grain, minor organics, trace brick fragments, very loose, dry, no odour or staining.
		0.1	BH03_0.5	Y			
	1						
	1.5	1.1	BH03_1.5	Y		Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
Push tube	2						
	2.5	1.0	BH03_2.5	Y			
							End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH04

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334216.0 N6248017.4
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.2	BH04_0.1	Y		SP	FILL: SAND; medium grain, brown, minor brick fragments, loose, dry, no odour or staining.
		0.1	BH04_0.5	Y			
	1						
	1.5						Becoming clayey Colour change to dark grey
Push tube		0.3	BH04_1.5	Y		Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
	2						
	2.5	0.1	BH04_2.5				
							End of investigation at 2.5 m (target depth).
	3						

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ENVIRONMENTAL BOREHOLE BH05

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334223.0 N6248000.7
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0	0.4	BH05_0.1	Y		SP	FILL: SAND; medium grain, brown to grey, trace ceramic and brick fragments, loose, dry, no odour or staining.
	0.5	0.2	BH05_0.5				
	1	0.1	BH05_0.9	Y			Becoming dense to medium dense Colour change to dark grey to brown Trace shale fragments
		0.2	BH05_1.2	Y		Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
Push tube	1.5						
	2						
	2.5	0.2	BH05_2.5				
							End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH06

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334214.5 N6247980.2
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0	0.1	BH06_0.1	Y		SP	FILL: SAND; fine to medium grain, grey to brown, minor ceramic and stone fragments, very loose, dry, no odour or staining. Minor woodchips from 0-0.5m.
	0.5	0.0	BH06_0.5	Y			
	1						
		0.3	BH06_1.2			Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
Push tube	1.5						
	2	4.0	BH06_2.2	Y			
	2.5						End of investigation at 2.5 m (target depth).
	3						

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ENVIRONMENTAL BOREHOLE BH07

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334264.6 N6247970.7
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.0	0.0	BH07_0.1	Y		SP	FILL: SAND; medium grain, brown, minor gravel and brick fragments, loose, dry, no odour or staining.
	0.5	0.2	BH07_0.5				
Push tube							Becoming medium dense
	1	0.1	BH07_0.9	Y		CL	Sandy CLAY; low plasticity, dark grey and light grey, medium grain sand, stiff, dry, no odour or staining.
		0.1	BH07_1.1	Y		SP	SAND; medium grain, light brown to grey
	1.5					Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
	2	0.8	BH07_2.1				
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH08

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334274.2 N6248022.8
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.2	BH08_0.1			SP	FILL: SAND; medium grain, brown, minor gravel and brick fragments, loose, dry, no odour or staining.
		1.1	BH08_0.5	Y			
	1	0.8	BH08_0.9			CL	Sandy CLAY; low plasticity, dark grey and light grey, medium grain sand, stiff, dry, no dour or staining.
		0.5	BH08_1.1	Y		SP	SAND; medium grain, light brown to grey
Push tube	1.5					Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
	2	2.1	BH08_2.0, QC200	Y			Moist
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH09

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 27/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334279.1 N6248044.1
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	1.2	BH09_0.1, QC101	Y		SP	FILL: SAND; fine to medium grain, grey to brown, minor gravel, brick and ceramic fragments, very loose, dry, no odour or staining.
		0.0	BH09_0.5	Y			Loose to medium dense
	1	0.7	BH09_1.0	Y		SP	SAND; fine to medium grain, dark grey, very dense, no odour or staining.
							Light grey, loose
Push tube	1.5	1.0	BH09_1.5			Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.
	2	1.1	BH09_2.5			SP	SAND: fine to medium grain, brown, loose, moist, no staining, slight sulfur odour.
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH10

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334269.4 N6247994.4
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.4	BH10_0.1	Y		SP	FILL: SAND; fine to medium grain, dark brown, trace ceramic and brick fragments, trace organics, loose, dry, no odour or staining.
		0.4	BH10_0.5				Light brown
	1	0.9	BH10_1.0	Y		SC	FILL: Clayey SAND; fine to medium grain, dark grey to dark brown, medium to high plasticity clay, trace brick fragments, soft, dry, no odour or staining.
Push tube	1.5	1.0	BH10_1.5			Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist, no odour or staining.
	2	0.6	BH10_2.5	Y			
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH12

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334257.7 N6248034.9
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.2	BH12_0.1	Y		SP	FILL: SAND; fine to medium grain, dark brown, trace ceramic, brick and gravel fragments, trace organics, loose, dry, no odour or staining.
		0.6	BH12_0.5				
	1						
	1.5						
Push tube		0.9	BH12_1.5	Y		Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist, no odour or staining.
	2						
		0.9	BH12_2.5	Y		SP	SAND; medium grain, light brown, loose, moist, no odour or staining.
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH13

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334265.3 N6247948.8
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger							Asphalt
	0.5	0.5	BH13_0.3	Y		SP	FILL: Gravelly SAND; medium grain, grey brown, no odour or staining.
			BH13_0.5	Y			Concrete fragments
	1						
	1.5	1.8	BH13_1.5	Y		Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist, no odour or staining.
Push tube	2						
	2.5	4.1	BH13_2.5	Y			
	3						End of investigation at 3.0 m (target depth).

ENVIRONMENTAL BOREHOLE BH14

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334243.2 N6247951.8
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger							Asphalt
		0.1	BH14_0.3	Y		SP	FILL: Gravelly SAND; medium grain, dark grey, no odour or staining.
	0.5						
	1	0.3	BH14_1.0	Y			
	1.5						
Push tube						Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
	2	0.8	BH14_2.0				
	2.5						
		0.6	BH14_3.0	Y			
	3						End of investigation at 3.0 m (target depth).

ENVIRONMENTAL BOREHOLE BH15

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334241.3 N6247918.2
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger							Asphalt
						SP	FILL: Gravelly SAND; medium to course grain, grey-brown, no odour or staining.
		0.2	BH15_0.2	Y			
	0.5	0.7	BH15_0.5				
	1						Minor clay, medium plasticity, red to light grey.
							Moist to wet
Push tube	1.5	10.4	BH15_1.5, QC201	Y		Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
	2	9.6	BH15_2.5	Y			
	2.5						End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH16

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334241.8 N6247983.6
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.5	0.3	BH16_0.1	Y		SP	FILL: SAND; medium grain, grey-brown, very loose, dry, no odour or staining.
		0.3	BH16_0.5				
	1	1.1	BH16_0.9	Y		SP	FILL: Sandy GRAVEL; sub angular, grey, brick fragments, loose, dry, no odour or staining.
	1.5	0.5	BH16_1.2			SP	SAND; fine to course grain, brown, minor roots, very dense, dry, no odour or staining.
Push tube	2	1.2	BH16_1.7	Y		Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
							Moist
							Wet
	2.5	0.9	BH16_2.5				
	3						End of investigation at 2.5 m (target depth).

ENVIRONMENTAL BOREHOLE BH17

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS Unable to locate BH17 for survey.

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.0	0.0	BH17_0.1	Y		SP	FILL: SAND; medium grain, brown-grey, trace brick and glass fragments, medium dense, dry, no odour or staining.
	0.5	0.1	BH17_0.5	Y			
	1	0.1					Becoming very dense, minor roots, trace brick fragments
Push tube	1.5	0.9	BH17_1.5			Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
							Moist
	2						Wet
	2.5	1.0	BH17_2.5	Y			
							End of investigation at 2.5 m (target depth).
	3						

ENVIRONMENTAL BOREHOLE BH18

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334259.1 N6248019.4
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0	0.0	BH18_0.1	Y		SP	FILL: SAND; medium grain, brown-grey, trace brick and glass fragments, loose, dry, no odour or staining.
	0.5	0.0	BH18_0.5	Y			
	1						Medium dense with brick fragments
Push tube	1.5					Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
	2	0.0	BH18_1.8				Moist
	2.5	0.0	BH18_2.8	Y		SP	SAND: medium grain, dark brown, loose, medium dense, moist, no odour or staining.
	3						End of investigation at 2.8 m (target depth).

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ENVIRONMENTAL BOREHOLE BH19

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/2019
DRILLING CONTRACTOR Matrix Drilling
DRILLING METHOD Push tube

COORDINATES E334204.9 N6247957.7
LOGGED BY L Lewis
CHECKED BY A Tennant

COMMENTS

Method	Depth (m)	PID (ppm)	Samples	Analysed?	Graphic Log	USCS	Material Description
Hand auger	0.0	0.0	BH19_0.1			SP	FILL: Silty SAND; dark brown, trace roots, trace brick fragments, medium dense, loose, dry, no odour or staining.
	0.5	0.0	BH19_0.5, QC102	Y			Large brick fragments (70mm)
	1		BH19_1.0				Glass fragments Dense
Push tube	1.5	2.5	BH19_1.5	Y		Pt	PEAT; medium plasticity, black, organics (50%), minor sand (grey, medium grain), firm, moist to wet, no odour or staining.
	2	0.5	BH19_2.5	Y			Moist
	2.5						End of investigation at 2.5 m (target depth).
	3						

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MONITORING WELL MW11

PROJECT NUMBER J190730	**DRILLING DATE** 28/11/19-29/11/19	**COORDINATES** E334259.6 N6248055.4
PROJECT NAME DSI	**DRILLING METHOD** Hollow-stem auger	**LOGGED BY** L Lewis
CLIENT Land and Housing Corporation	**DRILLING CONTRACTOR** Matrix Drilling	**CHECKED BY** A Tennant
ADDRESS 600-660 Elizabeth Street, Redfern	**DIAMETER** 50 mm	**SCREEN** uPVC Factory Slotted, 1.5 to 4.5 m bgs
	CASING uPVC	**SURFACE LEVEL** 30.38 mAHD

COMMENTS Top of Pipe - 30.30 mAHD, flush well head

PID (ppm)	Samples	Analysed	Depth (m)	Graphic Log	USCS	Material Description	Well Diagram
0.2	MW11_0.1		0.2		SP	FILL: SAND; fine to medium grain, dark brown, trace ceramic and brick fragments, trace organics, loose, dry, no odour or staining.	concrete cement grout
0.4	MW11_0.5	Y	0.4				
			0.6				bentonite
			0.8				
			1				
			1.2			FILL: Clayey SAND; fine to medium grain, dark brown and grey, trace ceramic fragments, medium dense, dry, no odour or staining.	
0.4	MW11_1.2		1.4		SC	▽ 2 Stabilised water level	
			1.6				
			1.8				
			2				
0.5	MW11_2.1		2.2		CL	Sandy CLAY; medium plasticity, black, fine to medium grain sand, soft, dry, no odour or staining.	
			2.4			▽ 1 Waterstrike	
			2.6				filter pack (1-2 mm)
			2.8				
			3				
			3.2				
			3.4				
0.7	MW11_3.5	Y	3.6		SC	Clayey SAND; fine to medium grain, black, no odour or staining.	
			3.8				
			4				
			4.2				
			4.4				
			4.6				
			4.8				bore collapse
1.1	MW11_5.0	Y	5				
			5.2			End of investigation at 5.0 m (target depth).	

produced by ESlog.ESdat.net on 03 Feb 2020

MONITORING WELL MW20

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 28/11/19
DRILLING METHOD Hollow stem auger
DRILLING CONTRACTOR Matrix drilling
DIAMETER 50 mm
CASING uPVC

COORDINATES E334205.2 N6247944.6
LOGGED BY L Lewis
CHECKED BY A Tennant
SCREEN uPVC Factory Slotted, 1.5 to 4.5 m bgs
SURFACE LEVEL 30.64 mAHD

COMMENTS Location at PCYC entrance. Top of pipe - 30.555 mAHD, flush well head.

PID (ppm)	Samples	Analysed	Depth (m)	Graphic Log	USCS	Material Description	Well Diagram
0.5	MW20_0.1		0.2, 0.4		SP	FILL: SAND; fine to medium grain, grey to brown, with ceramic pipe fragments and glass fragments, very loose, dry, no odour or staining.	concrete cement grout
0.5	MW20_0.5	Y	0.6, 0.8				bentonite
0.6	MW20_1.0		1, 1.2, 1.4			Dense	
1.0	MW20_1.8	Y	1.6, 1.8		Pt	PEAT; medium plasticity, black, organics (50%), firm, moist, no odour or staining.	
			2			▽2 Stabilised water level	
			2.2, 2.4			Moist	
			2.6			▽1 Waterstrike, wet	filter pack (1-2 mm)
1.6	MW20_2.8		2.8, 3, 3.2, 3.4, 3.6, 3.8			Saturated, sticky	
1.5	MW20_4.0	Y	4, 4.2, 4.4				
			4.6, 4.8			End of investigation at 4.5 m (target depth).	

MONITORING WELL MW21

PROJECT NUMBER J190730
PROJECT NAME DSI
CLIENT Land and Housing Corporation
ADDRESS 600-660 Elizabeth Street, Redfern

DRILLING DATE 29/11/19
DRILLING METHOD Hollow stem auger
DRILLING CONTRACTOR Matrix drilling
DIAMETER 50 mm
CASING uPVC

COORDINATES E334265.8 N6247929.7
LOGGED BY L Lewis
CHECKED BY A Tennant
SCREEN uPVC Factory Slotted, 1.5 to 4.5 m bgs
SURFACE LEVEL 30.215 mAHD

COMMENTS Location at basketball court. Top of pipe - 30.135 m AHD, flush well head.

PID (ppm)	Samples	Analysed	Depth (m)	Graphic Log	USCS	Material Description	Well Diagram
			0.2			Asphalt	concrete cement grout
12.7	MW21_0.3, QC202	Y	0.4		SP	FILL: Gravelly SAND; medium grain, brown, brick and mortar inclusions (30%), angular gravel, dry, loose to medium dense, no odour or staining.	bentonite
			1			▽1 Stabilised water level	
13.7	MW21_1.3. QC103, QC203	Y	1.4		Pt	PEAT; medium plasticity, black, organics (50%), firm, dry to moist, no odour or staining.	
			2.4			▽2 Waterstrike	
1.8	MW21_2.5		2.6				filter pack (1-2 mm)
1.9	MW21_4.4	Y	4.4			End of investigation at 4.4 m (target depth).	
			4.6				
			4.8				

E-MAILED
13/2/23 @ 1.24pm

heet 1 of 2

te: 600-660 ELIZABETH ST, REDFERN

Project No: ES9147

aboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM [A] /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	[illegible]	TCLP HM [B] / PAH
PH02_1.9-2.0ASS	1	ZLB	6/2/23	AM/PM	X															X	X	X						
PH05_1.9-2.0ASS																												
PH06_1.9-2.0ASS	2																			X	X	X						
PH07_1.9-2.0ASS																												
PH08_1.9-2.0ASS																												
PH10_1.9-2.0ASS	3																			X	X	X						
PH12_1.9-2.0ASS	4																			X	X	X						
PH13_1.9-2.0ASS	5																			X	X	X						
PH14_1.9-2.0ASS	6																			X	X	X						
PH15_1.9-2.0ASS																												
PH16_1.9-2.0ASS																												
PH17_1.9-2.0ASS	7																			X	X	X						

SGS EHS Sydney COC
SE243073

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

ontainer Type:
= solvent washed, acid rinsed, Tefton sealed glass jar
= solvent washed, acid rinsed glass bottle
= natural HDPE plastic bottle
C = glass vial, Tefton Septum
LB = Zip-Lock Bag BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [X]

Sampler's Name (EI): GT	Received by (SGS):
Print GEISIANE TORRES	Print
Signature	Signature
Date 13/2/23	Date 09/02/23 @ 2.05

Sampler's Comments:
CC. SHARON LI
SERGIO RAPISARDA

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 2 of 2

Site: 600-660 ELIZABETH ST, REDFERN

Project No: E25947

Laboratory: **SGS Australia**
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	SOIL	WATER	0.45 µm field filtered	OTHER	HM A /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM A /TRH/BTEX/PAHs	HM A /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	Excavated Natural Material (ENM) Suite	ENM Suite - Stockpile discrete (TRH/BTEX/PAHs)	ENM Suite - Stockpile composite (HM A /pH / EC / Foreign Materials)	Dewatering Suite	pH / pH peroxide	sPOCAS	Chromium Reducible Sulfur (CrS)	PFAS	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Sulphate / Chloride	Lead	TCLP HM B / PAH
TP419 BH19_1.9-20ASA	8	ZLB	↓	AM/AM	X															X	X	X						

Comments

HM A: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc

HM B: Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel

Dewatering Suite: pH & EC, TDS / TDU, Hardness, Total Cyanide, Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), TRH (F1, F2, F3, F4), BTEX, PAH, Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other______

Container Type:
J = solvent washed, acid rinsed, Teflon sealed glass jar
B = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Teflon Septum
ZLB = Zip-Lock Bag   BB = Bulk Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table [x]

Sampler's Name (EI): GT	Received by (SGS):
Print GEISIANE TORRES	Print
Signature [signature]	Signature [signature] S. Subarray
Date 13/2/23	Date 09/02/23 @ 2:05

Sampler's Comments: CC: SHARON LI, SERGIO RABEIRO

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC June 2021 FORM v.5 - SGS

SAMPLE RECEIPT ADVICE

SE243073

CLIENT DETAILS

Contact	Geisiane Torres
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Geisiane.Torres @eiaustralia.com.au
Project	**E25947 600-660 Elizabeth St Redfern**
Order Number	**E25947**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 9/2/2023
Report Due	Tue 21/2/2023
SGS Reference	**SE243073**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Thursday 9/2/2023. Results are expected to be ready by COB Tuesday 21/2/2023. Please quote SGS reference SE243073 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	8 Soil	Type of documentation received	COC
Date documentation received	13/2/2023@5:24pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	10.3°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SPOCAS and CrS subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146.
5 samples have been placed on hold as no tests have been assigned for it. These samples will not be processed.

SAMPLE RECEIPT ADVICE

SE243073

CLIENT DETAILS

Client EI AUSTRALIA

Project E25947 600-660 Elizabeth St Redfern

SUMMARY OF ANALYSIS

No.	Sample ID	Chromium Reducible Sulfur (CRS)	Field pH for Acid Sulphate Soil	Moisture Content	SPOCAS Net Acidity Calculations	TAA (Titratable Actual Acidity)	TPA (Titratable Peroxide Acidity)
001	TP402_1.9-2.0 ASSA	2	4	1	6	7	21
002	TP406_1.9-2.0 ASSA	2	4	1	6	7	21
003	TP410_1.9-2.0 ASSA	2	4	1	6	7	21
004	TP412_1.9-2.0 ASSA	2	4	1	6	7	21
005	TP413_1.9-2.0 ASSA	2	4	1	6	7	21
006	TP414_1.9-2.0 ASSA	2	4	1	6	7	21
007	TP417_1.9-2.0 ASSA	2	4	1	6	7	21
008	TP419_1.9-2.0 ASSA	2	4	1	6	7	21

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Yin, Emily (Sydney)

From: Geisiane Torres - ElAustralia <geisiane.torres@eiaustralia.com.au>
Sent: Friday, 24 February 2023 6:10 PM
To: AU.Environmental.Sydney, AU (Sydney); AU.SampleReceipt.Sydney, AU (Sydney)
Cc: Sharon Li - ElAustralia
Subject: [EXTERNAL] E25947_Redfern

Hi SGS team,

Can you please book Chromium suite for samples below:

	Sample ID	TPA (moles H^+/tonne)	TSA (moles H^+/tonne)	S_{POS} (as %S)
1	TP402_1.9-2.0 ASSA	4678	4599	1.4
2	TP406_1.9-2.0 ASSA	5638	5414	1.5
3	TP410_1.9-2.0 ASSA			0.2
4	TP412_1.9-2.0 ASSA	4353	4094	1.9
5	TP413_1.9-2.0 ASSA			0.15
6	TP414_1.9-2.0 ASSA	4678	4610	1.6
7	TP417_1.9-2.0 ASSA	1188		0.53
8	TP419_1.9-2.0 ASSA	3692	3563	1.6

SGS EHS Alexandria Laboratory
SE243073A COC
Received: 24 – Feb – 2023

TAT: Standard. Thank you.

Best regards,

Geisiane Torres
Environmental Engineer

T (02) 9516 0722 M 0478 965 237
E geisiane.torres@eiaustralia.com.au

Suite 6.01, 55 Miller Street
Pyrmont, NSW 2009

www.eiaustralia.com.au

Yin, Emily (Sydney)

From: Sharon Li - EIAustralia <sharon.li@eiaustralia.com.au>
Sent: Monday, 27 February 2023 3:22 PM
To: AU.SampleReceipt.Sydney, AU (Sydney); Geisiane Torres - EIAustralia
Subject: RE: [EXTERNAL] E25947_Redfern

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Yes please

Thanks for confirming

From: AU.SampleReceipt.Sydney, AU (Sydney) [mailto:AU.SampleReceipt.Sydney@sgs.com]
Sent: Monday, 27 February 2023 11:43 AM
To: Geisiane Torres - EIAustralia
Cc: Sharon Li - EIAustralia
Subject: RE: [EXTERNAL] E25947_Redfern

Caution: This email originated from outside your organization and might have suspicious subject or content. PLEASE DO NOT CLICK ANY LINKS AND\OR OPEN ANY ATTACHEMENTS UNLESS YOU CAN CONFIRM THE SENDER.

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Dear All,

Do you want them all analysed for Chromium Suite?
Please advise as soon as possible.
Thank You.

Regards,

Emily Yin
Environment, Health & Safety
Sample Receipt

SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015

Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499
E-mail: au.samplereceipt.sydney@sgs.com

From: Geisiane Torres - EIAustralia <geisiane.torres@eiaustralia.com.au>
Sent: Friday, 24 February 2023 6:10 PM
To: AU.Environmental.Sydney, AU (Sydney) <AU.Environmental.Sydney@sgs.com>; AU.SampleReceipt.Sydney, AU (Sydney) <AU.SampleReceipt.Sydney@sgs.com>

SAMPLE RECEIPT ADVICE

SE243073A

CLIENT DETAILS

Contact	Geisiane Torres
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Geisiane.Torres @eiaustralia.com.au
Project	**E25947 600-660 Elizabeth St Redfern-Add**
Order Number	**E25947**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 24/2/2023
Report Due	Mon 6/3/2023
SGS Reference	**SE243073A**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Friday 24/2/2023. Results are expected to be ready by COB Monday 6/3/2023. Please quote SGS reference SE243073A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	8 Soil	Type of documentation received	Email
Date documentation received	24/2/2023@6:29pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	10.3°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

Chromium Suite subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146. Report No. CE164709A.

SAMPLE RECEIPT ADVICE

SE243073A

CLIENT DETAILS

Client EI AUSTRALIA

Project E25947 600-660 Elizabeth St Redfern-Add

SUMMARY OF ANALYSIS

No.	Sample ID	Acid Neutralising Capacity (ANC)	Chromium Reducible Sulfur (CRS)	Chromium Suite Net Acidity Calculations	HCl Extractable S, Ca and Mg in Soil/Solids ICP OES	Moisture Content	TAA (Titratable Actual Acidity)
001	TP402_1.9-2.0 ASSA	6	2	7	1	1	5
002	TP406_1.9-2.0 ASSA	6	2	7	1	1	5
003	TP410_1.9-2.0 ASSA	6	2	7	1	1	5
004	TP412_1.9-2.0 ASSA	6	2	7	1	1	5
005	TP413_1.9-2.0 ASSA	6	2	7	1	1	5
006	TP414_1.9-2.0 ASSA	6	2	7	1	1	5
007	TP417 1.9-2.0 ASSA	6	2	7	1	1	5
008	TP419_1.9-2.0 ASSA	6	2	7	1	1	5

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Geisiane Torres
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Geisiane.Torres @eiaustralia.com.au
Project	**E25947 600-660 Elizabeth St Redfern**
Order Number	**E25947**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE243073 R0**
Date Received	9/2/2023
Date Reported	21/2/2023

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SPOCAS and CrS subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146. Report No. CE164709.

SIGNATORIES

Huong CRAWFORD
Production Manager

Shane MCDERMOTT
Inorganic/Metals Chemist

Field pH for Acid Sulphate Soil [AN104] Tested: 14/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
pHf	pH Units	-	6.2	5.6	5.6	5.5	5.8
pHfox	pH Units	-	2.3	2.3	2.6	2.6	3.1
Reaction Rate (pHfox)*	No unit	-	2	3	3	2	2
pH Difference*	pH Units	-10	3.9	3.3	3.0	2.9	2.6

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
pHf	pH Units	-	5.9	5.5	5.7
pHfox	pH Units	-	3.5	2.8	3.4
Reaction Rate (pHfox)*	No unit	-	2	2	1
pH Difference*	pH Units	-10	2.3	2.7	2.2

Moisture Content [AN002] Tested: 21/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
% Moisture	%w/w	0.5	81	83	40	83	33

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
% Moisture	%w/w	0.5	83	70	85

TAA (Titratable Actual Acidity) [AN219] Tested: 21/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
pH KCl*	pH Units	-	5.3	4.1	4.3	4.2	4.5
Titratable Actual Acidity	kg H2SO4/T	0.25	3.9	11	4.7	13	2.6
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	79	225	95	259	52
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	0.13	0.36	0.15	0.42	0.08
Sulphur (SKCl)	%w/w	0.005	0.017	0.017	<0.005	0.019	<0.005
Calcium (CaKCl)	%w/w	0.005	0.72	0.080	0.048	0.20	0.048
Magnesium (MgKCl)	%w/w	0.005	0.10	0.10	0.079	0.27	0.085

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
pH KCl*	pH Units	-	5.3	4.2	4.8
Titratable Actual Acidity	kg H2SO4/T	0.25	3.3	9.2	6.4
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	67	187	130
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	0.11	0.30	0.21
Sulphur (SKCl)	%w/w	0.005	0.027	0.006	0.012
Calcium (CaKCl)	%w/w	0.005	0.68	0.068	0.57
Magnesium (MgKCl)	%w/w	0.005	0.27	0.095	0.17

TPA (Titratable Peroxide Acidity) [AN218] Tested: 21/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
Peroxide pH (pH Ox)	pH Units	-	1.9	1.8	2.6	1.8	2.9
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	230	280	15	210	6.1
TPA as moles H+/tonne	moles H+/T	5	4678	5638	299	4353	125
TPA as S % W/W	%w/w S	0.01	7.50	9.04	0.48	6.98	0.20
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	4599	5414	205	4094	72
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	230	270	10	200	3.6
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	7.37	8.68	0.33	6.56	0.12
ANCE as % $CaCO_3$	% CaCO3	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5	<5	<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	1.4	1.5	0.20	1.9	0.15
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	900	965	128	1167	95
Sulphur (Sp)	%w/w	0.005	1.5	1.6	0.21	1.9	0.15
Calcium (Cap)	%w/w	0.005	0.22	0.084	0.046	0.20	0.050
Reacted Calcium (CaA)*	%w/w	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)*	moles H+/T	5	<5	<5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005	0.13	0.094	0.079	0.25	0.090
Reacted Magnesium (MgA)*	%w/w	0.005	0.033	<0.005	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)*	moles H+/T	5	27	<5	<5	<5	<5
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-	0.071	0.019	0.082	0.014
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-	45	12	51	9

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
Peroxide pH (pH Ox)	pH Units	-	2.0	2.1	1.9
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	230	58	180
TPA as moles H+/tonne	moles H+/T	5	4678	1188	3692
TPA as S % W/W	%w/w S	0.01	7.50	1.90	5.92
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	4610	1000	3563
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	230	49	170
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	7.39	1.60	5.71
ANCE as % $CaCO_3$	% CaCO3	0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	1.6	0.53	1.6
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	967	328	968
Sulphur (Sp)	%w/w	0.005	1.6	0.53	1.6
Calcium (Cap)	%w/w	0.005	0.46	0.060	0.13
Reacted Calcium (CaA)*	%w/w	0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)*	moles H+/T	5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005	0.28	0.10	0.16
Reacted Magnesium (MgA)*	%w/w	0.005	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)*	moles H+/T	5	<5	<5	<5
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-	0.027	0.086
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-	17	54

SPOCAS Net Acidity Calculations [AN220] Tested: 21/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
s-Net Acidity	%w/w S	0.005	1.6	2.0	0.37	2.3	0.25
a-Net Acidity	moles H+/T	5	980	1200	230	1500	150
Liming Rate*	kg CaCO3/T	0.1	73	92	17	110	12
Verification s-Net Acidity*	%w/w S	-20	0.48	0.52	0.07	0.62	0.05
a-Net Acidity without ANCE*	moles H+/T	5	980	1200	230	1500	150
Liming Rate without ANCE*	kg CaCO3/T	0.1	73	92	17	110	12

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
s-Net Acidity	%w/w S	0.005	1.7	0.85	1.8
a-Net Acidity	moles H+/T	5	1000	530	1100
Liming Rate*	kg CaCO3/T	0.1	78	40	85
Verification s-Net Acidity*	%w/w S	-20	0.52	0.18	0.52
a-Net Acidity without ANCE*	moles H+/T	5	1000	530	1100
Liming Rate without ANCE*	kg CaCO3/T	0.1	78	40	85

Chromium Reducible Sulfur (CRS) [AN217] Tested: 21/2/2023

PARAMETER	UOM	LOR	TP402_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.001	TP406_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.002	TP410_1.9-2.0 ASSA SOIL - 6/2/2023 SE243073.003	TP412_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.004	TP413_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.005
Chromium Reducible Sulfur (Scr)	%	0.005	**0.28**	**0.13**	**0.021**	**0.15**	**0.008**
Chromium Reducible Sulfur (Scr)	moles H+/T	5	**173**	**82**	**13**	**94**	<5

PARAMETER	UOM	LOR	TP414_1.9-2.0 ASSA SOIL - 7/2/2023 SE243073.006	TP417_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.007	TP419_1.9-2.0 ASSA SOIL - 8/2/2023 SE243073.008
Chromium Reducible Sulfur (Scr)	%	0.005	**0.14**	**0.038**	**0.11**
Chromium Reducible Sulfur (Scr)	moles H+/T	5	**87**	**24**	**72**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN104	pHF is determined on an extract of approximately 2g of as received sample in approximately 10 mL of deionised water with pH determined after standing 30 minutes.
AN104	pHFox is determined on an extract of approximately 2g of as received sample with a few mLs of 30% hydrogen peroxide (adjusted to pH 4.5 to 5.5) with the extract reaction being rated from slight to extreme, with pH determined after reaction is complete and extract has cooled. Referenced to ASS Laboratory Methods Guidelines , method 23Af-Bf, 2004. 0 No Reaction 1 Slight Reaction 2 Moderate Reaction 3 Strong/High Reaction 4 Extreme/Vigorous Reaction (gas evolution and heat generation)
AN217	Dried pulped sample is mixed with acid and chromium metal in a rapid distillation unit to produce hydrogen sulfide (H2S) which is collected and titrated with iodine (I2(aq)) to measure SCR.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulfide is converted to sulfuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulfur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulfur are determined by ICP-AES.
AN220	SPOCAS Suite: Scheme for the calculation of net acidities and liming rates using a Fineness Factor of 1.5.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		
***	Indicates that both * and ** apply.				

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

STATEMENT OF QA/QC PERFORMANCE

SE243073 R0

CLIENT DETAILS

Contact	Geisiane Torres
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Geisiane.Torres @eiaustralia.com.au
Project	**E25947 600-660 Elizabeth St Redfern**
Order Number	**E25947**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE243073 R0**
Date Received	09 Feb 2023
Date Reported	21 Feb 2023

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Sample counts by matrix	8 Soil	Type of documentation received	COC
Date documentation received	13/2/2023@5:24pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	10.3°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE243073 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Field pH for Acid Sulphate Soil — **Method: ME-(AU)-[ENV]AN104**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP402_1.9-2.0 ASSA	SE243073.001	LB271413	06 Feb 2023	09 Feb 2023	06 Mar 2023	14 Feb 2023	06 Mar 2023	16 Feb 2023
TP406_1.9-2.0 ASSA	SE243073.002	LB271413	06 Feb 2023	09 Feb 2023	06 Mar 2023	14 Feb 2023	06 Mar 2023	16 Feb 2023
TP410_1.9-2.0 ASSA	SE243073.003	LB271413	06 Feb 2023	09 Feb 2023	06 Mar 2023	14 Feb 2023	06 Mar 2023	16 Feb 2023
TP412_1.9-2.0 ASSA	SE243073.004	LB271413	07 Feb 2023	09 Feb 2023	07 Mar 2023	14 Feb 2023	07 Mar 2023	16 Feb 2023
TP413_1.9-2.0 ASSA	SE243073.005	LB271413	07 Feb 2023	09 Feb 2023	07 Mar 2023	14 Feb 2023	07 Mar 2023	16 Feb 2023
TP414_1.9-2.0 ASSA	SE243073.006	LB271413	07 Feb 2023	09 Feb 2023	07 Mar 2023	14 Feb 2023	07 Mar 2023	16 Feb 2023
TP417_1.9-2.0 ASSA	SE243073.007	LB271413	08 Feb 2023	09 Feb 2023	08 Mar 2023	14 Feb 2023	08 Mar 2023	16 Feb 2023
TP419_1.9-2.0 ASSA	SE243073.008	LB271413	08 Feb 2023	09 Feb 2023	08 Mar 2023	14 Feb 2023	08 Mar 2023	16 Feb 2023

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

No method blanks were required for this job.

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Field pH for Acid Sulphate Soil — **Method: ME-(AU)-[ENV]AN104**

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE242987.018	LB271413.012	pHf	pH Units	-	6.3	6.2	30	1
		pHfox	pH Units	-	2.2	2.1	30	3
SE243073.008	LB271413.023	pHf	pH Units	-	5.7	5.8	30	3
		pHfox	pH Units	-	3.4	3.5	30	2

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE243073 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Admin
Client	SGS I&E SYDNEY
Address	5058 201 I&E HSE SYDNEY (EX 5258) UNIT 16 33 MADDOX STREET ALEXANDRIA NSW 2015
Telephone	0285940400
Facsimile	0285940499
Email	au.environmental.sydney@sgs.com
Project	**E25947 600-660 Elizabeth St Redfern**
Order Number	**SE243073**
Samples	8

LABORATORY DETAILS

Manager	Anthony Nilsson
Laboratory	SGS Cairns Environmental
Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	+61 07 4035 5111
Facsimile	+61 07 4035 5122
Email	AU.Environmental.Cairns@sgs.com
SGS Reference	**CE164709 R1**
Date Received	14 Feb 2023
Date Reported	28 Feb 2023

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(3146/19038)

This report cancels and supersedes the report No.CE164709 R0. dated 21/02/2023 issued by SGS Environment, Health and Safety due to addition of extra results on Chromium suite.

SIGNATORIES

Anthony NILSSON
Operations Manager

Jon DICKER
Manager Northern QLD

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE164709.001 Soil 02 Jun 2023 SE243073.001	CE164709.002 Soil 02 Jun 2023 SE243073.002	CE164709.003 Soil 02 Jun 2023 SE243073.003	CE164709.004 Soil 02 Jul 2023 SE243073.004
Moisture Content Method: AN002 Tested: 15/2/2023							
% Moisture	%w/w	0.5		81	83	40	83
TAA (Titratable Actual Acidity) Method: AN219 Tested: 16/2/2023							
pH KCl	pH Units	-		5.3	4.1	4.3	4.2
Titratable Actual Acidity	kg H2SO4/T	0.25		3.9	11	4.7	13
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		79	225	95	259
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		0.13	0.36	0.15	0.42
Sulphur (SKCl)	%w/w	0.005		0.017	0.017	<0.005	0.019
Calcium (CaKCl)	%w/w	0.005		0.72	0.080	0.048	0.20
Magnesium (MgKCl)	%w/w	0.005		0.10	0.10	0.079	0.27
TPA (Titratable Peroxide Acidity) Method: AN218 Tested: 16/2/2023							
Peroxide pH (pH Ox)	pH Units	-		1.9	1.8	2.6	1.8
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25		230	280	15	210
TPA as moles H+/tonne	moles H+/T	5		4678	5638	299	4353
TPA as S % W/W	%w/w S	0.01		7.50	9.04	0.48	6.98
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5		4599	5414	205	4094
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25		230	270	10	200
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01		7.37	8.68	0.33	6.56
ANCE as % $CaCO_3$	% CaCO3	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)	%w/w	0.005		1.4	1.5	0.20	1.9
Peroxide Oxidisable Sulphur as moles H+/tonne	moles H+/T	5		900	965	128	1167
Sulphur (Sp)	%w/w	0.005		1.5	1.6	0.21	1.9
Calcium (Cap)	%w/w	0.005		0.22	0.084	0.046	0.20
Reacted Calcium (CaA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)	moles H+/T	5		<5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005		0.13	0.094	0.079	0.25
Reacted Magnesium (MgA)	%w/w	0.005		0.033	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)	moles H+/T	5		27	<5	<5	<5
Net Acid Soluble Sulphur as % w/w	%w/w	0.005		-	0.071	0.019	0.082
Net Acid Soluble Sulphur as moles H+/tonne	moles H+/T	5		-	45	12	51
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 21/2/2023							
Acid Soluble Sulfate, SO4 as S	%w/w	0.005		-	0.089	0.021	0.10
Acid Soluble Sulfur (SHCl)	%w/w	0.005		-	0.089	0.021	0.10
SPOCAS Net Acidity Calculations Method: AN220 Tested: 21/2/2023							
s-Net Acidity	%w/w S	0.005		1.6	2.0	0.37	2.3
a-Net Acidity	moles H+/T	5		980	1200	230	1500
Liming Rate	kg CaCO3/T	0.1		73	92	17	110
Verification s-Net Acidity	%w/w S	-20		0.48	0.52	0.07	0.62
a-Net Acidity without ANCE	moles H+/T	5		980	1200	230	1500
Liming Rate without ANCE	kg CaCO3/T	0.1		73	92	17	110
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 16/2/2023							
Chromium Reducible Sulfur (Scr)	%	0.005		0.28	0.13	0.021	0.15
Chromium Reducible Sulfur (Scr)	moles H+/T	5		173	82	13	94

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE164709.001 Soil 02 Jun 2023 SE243073.001	CE164709.002 Soil 02 Jun 2023 SE243073.002	CE164709.003 Soil 02 Jun 2023 SE243073.003	CE164709.004 Soil 02 Jul 2023 SE243073.004
Chromium Suite Net Acidity Calculations	**Method: AN220**	**Tested: 28/2/2023**					
s-Net Acidity	%w/w S	0.01		**0.40**	**0.55**	**0.19**	**0.63**
s-Net Acidity without ANC	%w/w S	0.01		**0.40**	**0.55**	**0.19**	**0.63**
a-Net Acidity	moles H+/T	3		**250**	**340**	**120**	**390**
Liming Rate	kg CaCO3/T	0.1		**19**	**26**	**8.8**	**29**
Verification s-Net Acidity	%w/w S	-20		**0.28**	**0.13**	**0.02**	**0.15**
a-Net Acidity without ANCBT	moles H+/T	3		**250**	**340**	**120**	**390**
Liming Rate without ANCBT	kg CaCO3/T	0.1		**19**	**26**	**8.8**	**29**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE164709.005 Soil 02 Jul 2023 SE243073.005	CE164709.006 Soil 02 Jul 2023 SE243073.006	CE164709.007 Soil 02 Aug 2023 SE243073.007	CE164709.008 Soil 02 Aug 2023 SE243073.008
Moisture Content Method: AN002 Tested: 15/2/2023							
% Moisture	%w/w	0.5		33	83	70	85
TAA (Titratable Actual Acidity) Method: AN219 Tested: 16/2/2023							
pH KCl	pH Units	-		4.5	5.3	4.2	4.8
Titratable Actual Acidity	kg H2SO4/T	0.25		2.6	3.3	9.2	6.4
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		52	67	187	130
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		0.08	0.11	0.30	0.21
Sulphur (SKCl)	%w/w	0.005		<0.005	0.027	0.006	0.012
Calcium (CaKCl)	%w/w	0.005		0.048	0.68	0.068	0.57
Magnesium (MgKCl)	%w/w	0.005		0.085	0.27	0.095	0.17
TPA (Titratable Peroxide Acidity) Method: AN218 Tested: 16/2/2023							
Peroxide pH (pH Ox)	pH Units	-		2.9	2.0	2.1	1.9
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25		6.1	230	58	180
TPA as moles H+/tonne	moles H+/T	5		125	4678	1188	3692
TPA as S % W/W	%w/w S	0.01		0.20	7.50	1.90	5.92
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5		72	4610	1000	3563
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25		3.6	230	49	170
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01		0.12	7.39	1.60	5.71
ANCE as % $CaCO_3$	% CaCO3	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)	%w/w	0.005		0.15	1.6	0.53	1.6
Peroxide Oxidisable Sulphur as moles H+/tonne	moles H+/T	5		95	967	328	968
Sulphur (Sp)	%w/w	0.005		0.15	1.6	0.53	1.6
Calcium (Cap)	%w/w	0.005		0.050	0.46	0.060	0.13
Reacted Calcium (CaA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)	moles H+/T	5		<5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005		0.090	0.28	0.10	0.16
Reacted Magnesium (MgA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)	moles H+/T	5		<5	<5	<5	<5
Net Acid Soluble Sulphur as % w/w	%w/w	0.005		0.014	-	0.027	0.086
Net Acid Soluble Sulphur as moles H+/tonne	moles H+/T	5		9	-	17	54
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 21/2/2023							
Acid Soluble Sulfate, SO4 as S	%w/w	0.005		0.015	-	0.033	0.098
Acid Soluble Sulfur (SHCl)	%w/w	0.005		0.015	-	0.033	0.098
SPOCAS Net Acidity Calculations Method: AN220 Tested: 21/2/2023							
s-Net Acidity	%w/w S	0.005		0.25	1.7	0.85	1.8
a-Net Acidity	moles H+/T	5		150	1000	530	1100
Liming Rate	kg CaCO3/T	0.1		12	78	40	85
Verification s-Net Acidity	%w/w S	-20		0.05	0.52	0.18	0.52
a-Net Acidity without ANCE	moles H+/T	5		150	1000	530	1100
Liming Rate without ANCE	kg CaCO3/T	0.1		12	78	40	85
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 16/2/2023							
Chromium Reducible Sulfur (Scr)	%	0.005		0.008	0.14	0.038	0.11
Chromium Reducible Sulfur (Scr)	moles H+/T	5		<5	87	24	72

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name CE164709.005 Soil 02 Jul 2023 SE243073.005	CE164709.006 Soil 02 Jul 2023 SE243073.006	CE164709.007 Soil 02 Aug 2023 SE243073.007	CE164709.008 Soil 02 Aug 2023 SE243073.008
Chromium Suite Net Acidity Calculations **Method: AN220** **Tested: 28/2/2023**						
s-Net Acidity	%w/w S	0.01	**0.10**	**0.25**	**0.36**	**0.39**
s-Net Acidity without ANC	%w/w S	0.01	**0.10**	**0.25**	**0.36**	**0.39**
a-Net Acidity	moles H+/T	3	**64**	**150**	**220**	**240**
Liming Rate	kg CaCO3/T	0.1	**4.8**	**12**	**17**	**18**
Verification s-Net Acidity	%w/w S	-20	**0.01**	**0.14**	**0.04**	**0.11**
a-Net Acidity without ANCBT	moles H+/T	3	**64**	**150**	**220**	**240**
Liming Rate without ANCBT	kg CaCO3/T	0.1	**4.8**	**12**	**17**	**18**

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Chromium Reducible Sulfur (CRS) **Method: ME-(AU)-[ENV]AN217**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Chromium Reducible Sulfur (Scr)	LB112813	%	0.005	<0.005	0%
Chromium Reducible Sulfur (Scr)	LB112813	moles H+/T	5	<5	

TAA (Titratable Actual Acidity) **Method: ME-(AU)-[ENV]AN219**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl	LB112822	pH Units	-	6.4	0%	103%
Titratable Actual Acidity	LB112822	kg H2SO4/T	0.25	<0.25	0%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB112822	moles H+/T	5	<5	0%	96%
Titratable Actual Acidity (TAA) S%w/w	LB112822	%w/w S	0.01	<0.01	0%	97%
Sulphur (SKCl)	LB112822	%w/w	0.005	<0.005	13%	90%
Calcium (CaKCl)	LB112822	%w/w	0.005	<0.005	7%	116%
Magnesium (MgKCl)	LB112822	%w/w	0.005	<0.005	7%	102%

TPA (Titratable Peroxide Acidity) **Method: ME-(AU)-[ENV]AN218**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Peroxide pH (pH Ox)	LB112812	pH Units	-	6.2	9%	100%
TPA as kg H_2SO_4/tonne	LB112812	kg H2SO4/T	0.25	0.37	10%	104%
TPA as moles H+/tonne	LB112812	moles H+/T	5	7	10%	104%
TPA as S % W/W	LB112812	%w/w S	0.01	0.01	10%	104%
ANCE as % $CaCO_3$	LB112812	% CaCO3	0.01	<0.01	0%	
ANCE as moles H+/tonne	LB112812	moles H+/T	5	<5	0%	
ANCE as S % W/W	LB112812	%w/w S	0.01	<0.01	0%	
Sulphur (Sp)	LB112812	%w/w	0.005	<0.005	3%	97%
Calcium (Cap)	LB112812	%w/w	0.005	<0.005	3%	114%
Magnesium (Mgp)	LB112812	%w/w	0.005	<0.005	2%	108%

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN014	This method is for the determination of soluble sulfate (SO4-S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulfate as Sulfur is determined by ICP.
AN217	Dried pulped sample is mixed with acid and chromium metal in a rapid distillation unit to produce hydrogen sulfide (H2S) which is collected and titrated with iodine (I2(aq)) to measure SCR.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulfide is converted to sulfuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulfur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulfur are determined by ICP-AES.
AN220	Chromium Suite: Scheme for the calculation of net acidities and liming rates using a Fineness Factor of 1.5.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Admin
Client	SGS I&E SYDNEY
Address	5058 201 I&E HSE SYDNEY (EX 5258) UNIT 16 33 MADDOX STREET ALEXANDRIA NSW 2015
Telephone	0285940400
Facsimile	0285940499
Email	au.environmental.sydney@sgs.com
Project	**E25947 600-660 Elizabeth St Redfern**
Order Number	**SE243073**
Samples	8

LABORATORY DETAILS

Manager	Anthony Nilsson
Laboratory	SGS Cairns Environmental
Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	+61 07 4035 5111
Facsimile	+61 07 4035 5122
Email	AU.Environmental.Cairns@sgs.com
SGS Reference	**CE164709 R0**
Date Received	14 Feb 2023
Date Reported	21 Feb 2023

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(3146/19038)

SIGNATORIES

Anthony NILSSON
Operations Manager

Jon DICKER
Manager Northern QLD

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE164709.001 Soil 02 Jun 2023 SE243073.001	CE164709.002 Soil 02 Jun 2023 SE243073.002	CE164709.003 Soil 02 Jun 2023 SE243073.003	CE164709.004 Soil 02 Jul 2023 SE243073.004
Moisture Content Method: AN002 Tested: 15/2/2023							
% Moisture	%w/w	0.5		81	83	40	83
TAA (Titratable Actual Acidity) Method: AN219 Tested: 16/2/2023							
pH KCl	pH Units	-		5.3	4.1	4.3	4.2
Titratable Actual Acidity	kg H2SO4/T	0.25		3.9	11	4.7	13
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		79	225	95	259
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		0.13	0.36	0.15	0.42
Sulphur (SKCl)	%w/w	0.005		0.017	0.017	<0.005	0.019
Calcium (CaKCl)	%w/w	0.005		0.72	0.080	0.048	0.20
Magnesium (MgKCl)	%w/w	0.005		0.10	0.10	0.079	0.27
TPA (Titratable Peroxide Acidity) Method: AN218 Tested: 16/2/2023							
Peroxide pH (pH Ox)	pH Units	-		1.9	1.8	2.6	1.8
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25		230	280	15	210
TPA as moles H+/tonne	moles H+/T	5		4678	5638	299	4353
TPA as S % W/W	%w/w S	0.01		7.50	9.04	0.48	6.98
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5		4599	5414	205	4094
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25		230	270	10	200
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01		7.37	8.68	0.33	6.56
ANCE as % $CaCO_3$	% CaCO3	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)	%w/w	0.005		1.4	1.5	0.20	1.9
Peroxide Oxidisable Sulphur as moles H+/tonne	moles H+/T	5		900	965	128	1167
Sulphur (Sp)	%w/w	0.005		1.5	1.6	0.21	1.9
Calcium (Cap)	%w/w	0.005		0.22	0.084	0.046	0.20
Reacted Calcium (CaA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)	moles H+/T	5		<5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005		0.13	0.094	0.079	0.25
Reacted Magnesium (MgA)	%w/w	0.005		0.033	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)	moles H+/T	5		27	<5	<5	<5
Net Acid Soluble Sulphur as % w/w	%w/w	0.005		-	0.071	0.019	0.082
Net Acid Soluble Sulphur as moles H+/tonne	moles H+/T	5		-	45	12	51
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 21/2/2023							
Acid Soluble Sulfate, SO4 as S	%w/w	0.005		-	0.089	0.021	0.10
Acid Soluble Sulfur (SHCl)	%w/w	0.005		-	0.089	0.021	0.10
SPOCAS Net Acidity Calculations Method: AN220 Tested: 21/2/2023							
s-Net Acidity	%w/w S	0.005		1.6	2.0	0.37	2.3
a-Net Acidity	moles H+/T	5		980	1200	230	1500
Liming Rate	kg CaCO3/T	0.1		73	92	17	110
Verification s-Net Acidity	%w/w S	-20		0.48	0.52	0.07	0.62
a-Net Acidity without ANCE	moles H+/T	5		980	1200	230	1500
Liming Rate without ANCE	kg CaCO3/T	0.1		73	92	17	110
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 16/2/2023							
Chromium Reducible Sulfur (Scr)	%	0.005		0.28	0.13	0.021	0.15
Chromium Reducible Sulfur (Scr)	moles H+/T	5		173	82	13	94

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE164709.005 Soil 02 Jul 2023 SE243073.005	CE164709.006 Soil 02 Jul 2023 SE243073.006	CE164709.007 Soil 02 Aug 2023 SE243073.007	CE164709.008 Soil 02 Aug 2023 SE243073.008
Moisture Content Method: AN002 Tested: 15/2/2023							
% Moisture	%w/w	0.5		33	83	70	85
TAA (Titratable Actual Acidity) Method: AN219 Tested: 16/2/2023							
pH KCl	pH Units	-		4.5	5.3	4.2	4.8
Titratable Actual Acidity	kg H2SO4/T	0.25		2.6	3.3	9.2	6.4
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		52	67	187	130
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		0.08	0.11	0.30	0.21
Sulphur (SKCl)	%w/w	0.005		<0.005	0.027	0.006	0.012
Calcium (CaKCl)	%w/w	0.005		0.048	0.68	0.068	0.57
Magnesium (MgKCl)	%w/w	0.005		0.085	0.27	0.095	0.17
TPA (Titratable Peroxide Acidity) Method: AN218 Tested: 16/2/2023							
Peroxide pH (pH Ox)	pH Units	-		2.9	2.0	2.1	1.9
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25		6.1	230	58	180
TPA as moles H+/tonne	moles H+/T	5		125	4678	1188	3692
TPA as S % W/W	%w/w S	0.01		0.20	7.50	1.90	5.92
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5		72	4610	1000	3563
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25		3.6	230	49	170
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01		0.12	7.39	1.60	5.71
ANCE as % $CaCO_3$	% CaCO3	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)	%w/w	0.005		0.15	1.6	0.53	1.6
Peroxide Oxidisable Sulphur as moles H+/tonne	moles H+/T	5		95	967	328	968
Sulphur (Sp)	%w/w	0.005		0.15	1.6	0.53	1.6
Calcium (Cap)	%w/w	0.005		0.050	0.46	0.060	0.13
Reacted Calcium (CaA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Calcium (CaA)	moles H+/T	5		<5	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005		0.090	0.28	0.10	0.16
Reacted Magnesium (MgA)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)	moles H+/T	5		<5	<5	<5	<5
Net Acid Soluble Sulphur as % w/w	%w/w	0.005		0.014	-	0.027	0.086
Net Acid Soluble Sulphur as moles H+/tonne	moles H+/T	5		9	-	17	54
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 21/2/2023							
Acid Soluble Sulfate, SO4 as S	%w/w	0.005		0.015	-	0.033	0.098
Acid Soluble Sulfur (SHCl)	%w/w	0.005		0.015	-	0.033	0.098
SPOCAS Net Acidity Calculations Method: AN220 Tested: 21/2/2023							
s-Net Acidity	%w/w S	0.005		0.25	1.7	0.85	1.8
a-Net Acidity	moles H+/T	5		150	1000	530	1100
Liming Rate	kg CaCO3/T	0.1		12	78	40	85
Verification s-Net Acidity	%w/w S	-20		0.05	0.52	0.18	0.52
a-Net Acidity without ANCE	moles H+/T	5		150	1000	530	1100
Liming Rate without ANCE	kg CaCO3/T	0.1		12	78	40	85
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 16/2/2023							
Chromium Reducible Sulfur (Scr)	%	0.005		0.008	0.14	0.038	0.11
Chromium Reducible Sulfur (Scr)	moles H+/T	5		<5	87	24	72

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Chromium Reducible Sulfur (CRS) **Method: ME-(AU)-[ENV]AN217**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Chromium Reducible Sulfur (Scr)	LB112813	%	0.005	<0.005	0%
Chromium Reducible Sulfur (Scr)	LB112813	moles H+/T	5	<5	

TAA (Titratable Actual Acidity) **Method: ME-(AU)-[ENV]AN219**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl	LB112822	pH Units	-	6.4	0%	103%
Titratable Actual Acidity	LB112822	kg H2SO4/T	0.25	<0.25	0%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB112822	moles H+/T	5	<5	0%	96%
Titratable Actual Acidity (TAA) S%w/w	LB112822	%w/w S	0.01	<0.01	0%	97%
Sulphur (SKCl)	LB112822	%w/w	0.005	<0.005	13%	90%
Calcium (CaKCl)	LB112822	%w/w	0.005	<0.005	7%	116%
Magnesium (MgKCl)	LB112822	%w/w	0.005	<0.005	7%	102%

TPA (Titratable Peroxide Acidity) **Method: ME-(AU)-[ENV]AN218**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Peroxide pH (pH Ox)	LB112812	pH Units	-	6.2	9%	100%
TPA as kg H_2SO_4/tonne	LB112812	kg H2SO4/T	0.25	0.37	10%	104%
TPA as moles H+/tonne	LB112812	moles H+/T	5	7	10%	104%
TPA as S % W/W	LB112812	%w/w S	0.01	0.01	10%	104%
ANCE as % $CaCO_3$	LB112812	% CaCO3	0.01	<0.01	0%	
ANCE as moles H+/tonne	LB112812	moles H+/T	5	<5	0%	
ANCE as S % W/W	LB112812	%w/w S	0.01	<0.01	0%	
Sulphur (Sp)	LB112812	%w/w	0.005	<0.005	3%	97%
Calcium (Cap)	LB112812	%w/w	0.005	<0.005	3%	114%
Magnesium (Mgp)	LB112812	%w/w	0.005	<0.005	2%	108%

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN014	This method is for the determination of soluble sulfate (SO4-S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulfate as Sulfur is determined by ICP.
AN217	Dried pulped sample is mixed with acid and chromium metal in a rapid distillation unit to produce hydrogen sulfide (H2S) which is collected and titrated with iodine (I2(aq)) to measure SCR.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulfide is converted to sulfuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulfur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulfur are determined by ICP-AES.
AN220	SPOCAS Suite: Scheme for the calculation of net acidities and liming rates using a Fineness Factor of 1.5.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.