Detailed Salinity Assessment Report

421 The Northern Road, Cobbitty NSW 2570
Lot 2005 in DP 1162239

Report Ref. **P33603.1_R01**
Report Date: 2nd February 2022

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2nd February 2022

Mirvac Homes (NSW) Pty Limited

Re: Detailed Salinity Assessment Report; 421 The Northern Road, Cobbitty NSW 2570.

Please find enclosed the Detailed Salinity Assessment Report prepared by Geotest Services for the Site 421 The Northern Road, Cobbitty NSW 2570. Should you have any queries regarding the report and its contents, please do not hesitate to be in contact with Geotest.

We look forward to assisting you in future development and project works.

Document Control:

Reference	Version	Date	Prepared	Checked	Approved
P33603.1_R01	Draft	21/01/2022	D.Spasojevic J. Barnes A. Halpin	D.Spasojevic	
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1 INTRODUCTION

This report presents the results of a Detailed Salinity Assessment (DSA) for a single parcel of land located at 421 The Northern Road, Cobbitty NSW 2570 (legally identified as lot 2005 in Deposited Plan (DP) 1162239) and herein referred to as 'The Site'. This report was commissioned to address development and planning requirements for the proposed master-planned community incorporating various urban land use settings, local urban facilities, infrastructure, and open spaces. It is expected that an experienced earthworks contractor with knowledge of the soils in Western Sydney will be engaged to undertake civil earthworks that may be required at the Site.

1.1 Objectives

The objectives of this DSA are to:

- Expand on the existing DP 2020 PSA[1].
- Characterise Site soils to identify the nature and degree of salinity; and
- Provide a salinity management plan to assist in future Site works.

1.2 Scope of Works

To achieve the objectives, Geotest undertook the following scope of works:

- Review of existing PSA pertaining to the Site.
- Undertake a supplementary desktop review of the Site setting addressing any data gaps.
- Derive and present assessment criteria and discussion on appropriateness with respect to the proposed development.
- Preparation of a field works program and Site soil sampling plan.
- Establishment on-site and intrusive field works with mechanical equipment for excavation of investigation locations across the Site.
- Undertake excavation of 25 test pit investigation locations penetrating through multiple soil horizons to target depth of 1.5m and a maximum depth of 3.0m below ground surface level.
- Logging of bore hole investigation locations and record any presence of groundwater presence/seepage.
- Collection of samples from each horizon for laboratory analysis of Electrical Conductivity (EC) and Potential Hydrogen (pH).
- Analysis of representative samples from target horizons and soil landscape groupings for the analysis of Dispersion through Emmerson aggregate analysis, analysis for Cation Exchange Capacity (CEC), Exchangeable Sodium Potential (ESP), Sulphates, and Chlorides to assess soil physiochemical characteristics and potential stresses on the built environment (ie. concrete and steel).
- Assessment of laboratory results.
- Discussion on results, and
- Reporting including an updated Salinity Management Plan for the development.

1.3 Regulatory Setting

The preparation of this salinity assessment was carried out with reference to the following Department of Infrastructure Planning and Natural Resources (DIPNR) publications.

[1] Preliminary Salinity Assessment, Lot 2005 in DP 1162239, Douglas Partners Report Ref. 92323.01, dated February 2020

- Map of Salinity Potential in Western Sydney – 2002.
- Site Investigations for Urban Salinity – 2002.
- Building in a Saline Environment – 2003.
- Indicators of Urban Salinity – 2002; and
- AS 2159 2009 Piling – Design and Installation.

1.4 Site Description

Item	Description
Address[2]	421 The Northern Road, Cobbitty NSW 2570
Legal Identity[2]	Lot 2005 in DP 1162239
Site area[2]	Approximately 79.80 ha
LGA[2]	Camden City Council
Location Description	The Site is situated to the north of Cobbitty Road and to the east of Charles Mcintosh Parkway
Current Land Zoning[3]	• Zone R1 – General Residential • Zone B1 – Neighbourhood Centre • Zone C2 – Environmental Conservation • Zone C4 – Environmental Living
Current use of Site	Agricultural land, primarily for cattle grazing.
Proposed use of Site	Various urban land use settings, local urban facilities, infrastructure, and open spaces
Elevation[2]	The Site lies between approximately 68-92 metres Australian Height Datum (AHD)
Geographic Coordinates[2]	-34.010014 S, 150.7107913 E.

[2] https://maps.six.nsw.gov.au/

[3] https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

2 PREVIOUS ASSESSMENTS

Geotest is aware of the following PSA relating to the Site as listed below. Geotest has carried out a review of the report as part of this DSA.

- ***Douglas Partners 2020 PSA[4]***

Douglas Partners Pty Ltd (DP) were commissioned to complete a Desktop Preliminary Salinity Investigation and Management Plan (SMP) for Lot 2005 in DP 1162239, Cobbitty NSW. DP stated that the Site was proposed for residential subdivision and that an assessment of soil salinity was required for submission to Camden Council with the subdivision application, and to assist in conceptual planning of the development.

DP undertook the following scope of work:

- Review of available mapping and the Land Capability Assessment (LCA), with respect to potential for salinity effects on the development.
- Review of the regulatory and industry guidelines detailing Council requirements; and
- Preparation of a SMP providing management strategies to reduce the impact of saline material on the proposed development.

A previous investigation within the subject site and its immediate surroundings was undertaken by DP in 2006 as part of the LCA. A review of this report by DP indicated the relevant site was located within the southwestern corner of the larger project. Site observations made during the site walkovers completed for the LCA, identified the following salinity concerns within the site:

- Salt efflorescence were present within the banks and bases of erosion gullies along Cobbitty Creek and its tributary and also around the margins of the dam.
- Salt tolerant vegetation was also present along the course of Cobbitty Creek and the tributary erosion gullies.
- Bare soil patches which were associated with the salt efflorescence.
- Areas of possible surface ponding, seepage and waterlogging, with consequent salinity risks, were noted in the vicinity of the farm dam.

A review of the of the LCA indicated that nine test pits were excavated within the Site boundary and four test pits were excavated in close proximity to the site. Based on a review of the limited selected laboratory analysis, soils within the site were identified to range from non-saline to very saline, and non-aggressive to mildly aggressive towards steel and concrete.

Based on the desktop review and limited testing completed as part of the prior LCA, DP considered that the site had a moderate to high salinity potential and would have salinity constraints. Furthermore, DP considered that an intrusive salinity investigation will be required prior to development so that an appropriate salinity management plan can be prepared. The salinity management plan will need to include appropriate management strategies to address the site-specific salinity constraints.

DP made the following recommendations regarding management strategies for the assumed salinity at the Site

- Management should focus on capping of the upper surface of the sodic soils, both exposed by excavation and placed as filling, with a more permeable material to prevent ponding, to reduce capillary rise, to act as a drainage layer and to reduce the potential for erosion.

[4] Preliminary Salinity Assessment, Lot 2005 in DP 1162239, Douglas Partners Report Ref. 92323.01, dated February 2020

- When possible, placement of excavated soils in fill areas with similar salinity characteristics. (ie. to place material on to in-situ soils with a similar or higher aggressivity or salinity classification).
- Sodic soils can also be managed by maintaining vegetation where possible and planting new salt tolerant species. The addition of organic matter, gypsum and lime can also be considered where appropriate.
- Avoiding water collecting in low lying areas, in depressions or behind fill. This can lead to water logging of the soils, evaporative concentration of salts, and eventual breakdown in soil structure resulting in accelerated erosion
- Any pavements should be designed to be well drained of surface water. There should not be excessive concentrations of runoff or ponding that would lead to waterlogging of the pavement or additional recharge to the groundwater through any more permeable zones in the underlying filling material.
- Surface drains should generally be provided along the top of batter slopes to reduce the potential for concentrated flows of water down slopes possibly causing scour.
- Salt tolerant grasses and trees should be considered for landscaping, to reduce soil erosion as in Strategy A above and to maintain the existing evapotranspiration and groundwater levels. Reference should be made to an experienced landscape planner or agronomist.

In addition to the above, DP also provided the following management strategies for the installation of services or construction of pavements and structures/buildings, tailored by Geotest for relevance to the subject site:

- For soils which are classified as mildly aggressive to concrete, piles should have a minimum strength of 32 MPa and a minimum cover to reinforcement of 60 mm (as per AS 2159) to limit the corrosive effects of the surrounding soils (in accordance with AS 2159).
- Wet cast concrete pipes and currently manufactured spun concrete pipes are understood to have estimated compressive strengths of 50 MPa and 60 - 70 MPa, respectively, in excess of the requirements for mass concrete in F above. It is recommended that any concrete pipes installed within the site should employ AS 4058 - compliant steel reinforced pipes of general-purpose Portland cement, with minimum cover to reinforcement of 20 mm, or should be fibre reinforced.

3 HISTORICAL AERIAL REVIEW

Geotest reviewed a selection of available historical aerial photographs for the Site from 2009 to 2021, in order to ascertain any potential changes from the time of the DP 2006 LCA as referenced within the DP 2020 PSA. Images were sourced via NearMap online imagery. Geotest makes the following comments regarding land use at the Site and surrounding the Site:

2009 (Nearmap)	In the 2009 image, the Site is described as primarily vacant paddocks with a large dam occupying the central portion of the Site. Small bare patches of surface vegetation with exposed soils are visible in eastern portion of the Site. Cobbitty Creek is observed in the southern portion of the Site, aligned generally from south to north-west. The land use surrounding the Site is described as vacant pastoral lands, rural residency, and areas of dense woodland. Cobbitty Road is visible to the south of the Site.
2011 (Nearmap)	In the 2011 image, civil works occur for the installation of sewer main alignments, a sewage pumping station and upgraded access way are observed in the centre, southern and western portion of the Site. The civil works are observed to include the excavation and potential trenching of large alignments and the stockpiling of materials on-site. The remainder of the Site appears to remain generally unchanged since previous image. The land surrounding the Site appears to remain generally unchanged since previous image with the exception to the increased presence of low density styled residency to east.
2013 (Nearmap)	In the 2013 image, a small structure (present today) was observed in the eastern portion along the eastern boundary. An access way is observed connecting the Site to Cobbitty Road transecting the Site from the southern to northern boundary. The remainder of the Site appears to remain generally unchanged since previous image. The land surrounding the Site appears to remain generally unchanged since previous image with the exception to the increased presence of low density styled residency to east.
2015 (Nearmap)	In the 2015 image, the Site appears generally unchanged since the previous image. The land surrounding the Site shows an increase low-density styled residency and civil works to east.
2017 (Nearmap)	In the 2017 image, the Site appears generally unchanged since the previous image. The land surrounding the Site shows an increase low-density styled residency and civil works to east.
2019 (Nearmap)	In the 2019 image, the Site appears generally unchanged since the previous image. The land surrounding the Site shows an increase low-density styled residency and civil works to east.
2021 (Nearmap)	In the 2021 image, the Site appears generally unchanged since the previous image. The land surrounding the Site shows an increase low density styled residency and civil works to east.

4 REGIONAL GEOLOGY, SOIL LANDSCAPES AND HYDROGEOLOGY

4.1 Regional geology and soil landscapes

The 1:100,000 Wollongong - Port Hacking Geological Series Sheet 9030 (Geological Survey of New South Wales, Edition 1, 1991) indicates that the Site locality is likely to be underlain by Middle Triassic Bringelly Shale.

The 1:100,000 Penrith Soil Landscape Series Sheet 9030 (Soil Conservation Service of NSW, 1989) indicates that the Site is situated at or near the boundary of two mapping categories. The Site can be described as situated predominantly on Richmond Group soils with Blacktown Group soils present in the south-western and south-eastern portion of the Site.

The Richmond soil groups are described as poorly structured orange to red clay loams, clays and sands. Plastic clays (U46.12) in drainage lines. Deep acid non-calcic brown soils (Gn3.14, Gn4.34), red earths (Gn2.11) and red podzolic soils (Dr2.41), occur on terrace surfaces with earthy sands (Uc5.21, Uc1.23) on terrace edges. The limitations associated with this soil landscape are localised flood hazard, localised seasonal waterlogging, localised water erosion hazard on terrace edges.

The Blacktown soil groups are described as shallow to moderately deep (<100cm) hard setting mottled texture contrast soils, *red and brown podzolic soils (Dr3.21, Dr3.31, Db2.11, Db2.21)* on crests grading to yellow podzolic soils on lower slopes and in drainage lines. The limitations associated with this soil landscape are moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage (low hydraulic permeability).

4.2 Salinity Potential

The 1:100000 Salinity Potential in Western Sydney Sheet indicates the Site appears to be situated near to the boundary of two mapping categories. The Site is observed situated within a zone of moderate salinity potential and high salinity potential.

4.3 Sub-surface Conditions

Reference should be made to the engineering logs (Appendix A) for detailed sub surface conditions. A summary of the generalised profile is as follows -

Topsoil	Sandy Silty Clay, brown to dark brown
Residual	Silty Clay, brown, red and grey
Bedrock	Extremely Weathered Shale, grey

Groundwater was not observed in the test pits during the short time that they remained open. It must be noted however, that fluctuations in the level of ground water may occur due to variations in rainfall, temperature and/or other factors.

4.4 Regional Hydrogeology

The NSW Department of Lands Spatial Information Exchange (http://imagery.maps.nsw.gov.au) indicates that the sites topography ranges from 92m relative to Australia height datum (AHD) in the north east of the site, to 68m AHD along the central/western and north-western Site boundaries.

A review of nearby surface water bodies and the surrounding topography indicates Cobbitty Creek transects the Site, flowing from east to west through the approximate center. A large dam (approximately 8.20 ha) is located within the central/eastern portion of the Site.

The Site slopes from the south and from the north toward the dam, while further generally draining to the west. It is expected that Site surface waters would either percolate into sub-surface soils (where permeability allows), accumulate within the on-site dam, or become surface run-off and drain off-site to the west.

A search for registered groundwater monitoring bores within a 500m radius of the Site was undertaken using the NSW Office of Water Groundwater Bore map data (http://allwaterdata.water.nsw.gov.au/water.stm) on the 16th of

December 2021. Information presented in the individual groundwater bore work summary reports has been summarised and presented within the table below:

Table 4.3 Groundwater Bore Summary Information

Groundwater Bore I.D.	**Completion date** (ie. installed)	**Distance / Direction**	**Intended purpose**	**Drilled depth** (m, bgl)	**Standing water level** (m, bgl)
GW106394	01/06/2004	10m East	Stock, domestic	279.0	63.00 w/ yield of 2.0 L/s
GW027135	01/01/1941	350m North	Stock, domestic	47.5	N/A

Geotest further searched the Office of Environment & Heritage eSPADE hydrogeological landscapes mapping tool[5] on the 16th of December 2021 which indicates that the Site is situated within the Cawdor Hydrogeological Landscape (USCHGL). The CHGL report identifies the following hydrogeological characteristics:

Characteristic:	• **Information (CHGL):**
Aquifer Type	• Unconfined in unconsolidated alluvial sediments. • Unconfined to semi-confined in fractured rock along structures • Vertical and lateral flow components • Local perching above clay-rich layers (seasonal)
Hydraulic Conductivity	Moderate, range: >10^{-2}-10 metres/day
Aquifer Transmissivity	Lot to moderate, range: <2-100 metres^2/day
Specific Yield	Moderate, range: 5-15%
Hydraulic Gradient	Gentle to moderate, range: <10-30%
Groundwater Salinity	Saline, range: >4.8 dS/m
Depth to Water Table	Shallow to Intermediate, range 0-8m
Typical Catchment Size	Medium (<1000 ha)
Scale (flow length)	Local, Flow Length: <5km (short)
Recharge Estimate	Moderate
Residence Time	Medium (years)
Responsiveness to Change	Fast to medium (months to years)

4.5 Acid Sulfate Soils

Geotest searched the National Acid Sulfate Soils Atlas develop by the Australian government (in conjunction with Commonwealth Scientific and Industrial Research Organisation CSIRO - http://www.asris.csiro.au/). The Site is situated in an area where there is a low probability of ASS and no known occurrence. Land management activities at the Site are not likely to be affected by ASS.

The Site is situated at an approximate elevation of 68-92 meters AHD, while the presence of acid sulphate soils is generally limited to elevations less than 10m AHD. It is considered that ASS or potential ASS are unlikely to be present at the Site.

[5] https://www.environment.nsw.gov.au/eSpade2WebApp#

5 SITE WORKS

Field works for the assessment were carried out on the 17th of December 2021 by members of our engineering and environmental staff. The field work consisted of a walk over inspections of the Site to assess whether any salinity effects and impacts could be observed and the excavation of twenty-five (25) test pits for sample recovery.

During the walkover of the Site and the adjacent properties, areas of salt tolerant vegetation (e.g. Casuarina and Melaleuca) were observed surrounding the Site dam and sparsely scattered across the western portion of the Site. There were no other salinity indicators observed to be present at the Site such as salt-affected infrastructure, bare patches of soil with scalding nor salt effervescence. Vegetation appeared normal for this part of Sydney with no indications of salinity affected trees.

The locations of the test pits, which are indicated on Figure 2, were obtained by taking measurements relative to on Site in-situ Site features. A summary of the field data obtained is presented in Appendix A.

6 LABORATORY ANALYSIS

During the course of the investigations, a total of one hundred and fifteen (115) samples were collected from 25 investigation locations at appropriate depths to assess salinity at the Site which were subsequently sent to Eurofins MGT Lane Cove Soils Laboratory. Of the 115 samples collected:

- Ninety-nine (99) samples were recovered for the testing of; pH and Electrical Conductivity (EC).
- Twenty-five (25) samples were recovered to determine the soils aggressivity towards concrete and steel through sulfate and chloride analysis; and
- Seventeen (17) samples were recovered to determine the soils exchangeable sodium percentage (ESP) and cation exchange capacity (CEC).

Additionally, forty-nine (49) samples were retained at the NATA Accredited Geotest Laboratory for Emerson class testing.

Tabled results of the pH, EC and Emerson class number may be found in Appendix B. The Tabled ESP and CEC results may be found in Appendix C. The laboratory certificates of analysis have been presented as Appendix D.

7 SALINITY ASSESSMENT

7.1 Salinity Results & Discussion

The fundamental criteria for assessing soil salinity are based on electrical conductivity. The following measures of soil salinity are based on Site Investigations for Urban Salinity (2002), Table 6.2 which has been reproduced below:

Class	EC_e (dS/m)	Comments
Non Saline	<2	Salinity effects mostly negligible
Slightly Saline	2-4	Yields of very sensitive crops may be affected
Moderately Saline	4-8	Yields of many crops affected
Very Saline	8-16	Only tolerant crops yield satisfactorily
Highly Saline	>16	Only a few very tolerant crops yield satisfactorily

The EC results reported from all samples tested were calculated using a select soil texture conversion factor for the interpreted soil textures observed at the Site.

The results of the salinity test results and calculation incorporating soil texture results ranged from 0.14 dS/m to 7.70 dS/m.

According to Site Investigations for Urban Salinity (2002); salinity class for the soils on this Site were found to be **Non-Saline, Slightly Saline** and **Moderately Saline.**

Soil stability is a function of soil salinity. Other parameters may be used to assess for saline soils. The Emerson crumb test measures a soils dispersibility in water. The following measures of soil dispersion are based on the "Australian standard Emerson aggregate test" –

Emerson Class Number	Dispersibility
1	Very High
2	High
3	Moderate
4&5	Slight
6,7,8	Negligible

- **Emerson class test results ranged from 1 – 8.**

According to the "Australian Standard Emerson aggregate test"; the Emerson class indicates that results across the Site are considered to be **highly dispersive** to **negligible** (non-dispersive) absent of any strong delineation between result categories. Generally, the Site is considered to have moderately sodic soils throughout. Sodic soils are normal for this part of Sydney.

Importantly on a construction Site, soils may show aggressivity towards steel and concrete, particularly if the soils are in direct contact with the concrete and/or steel. The following is a measure of soil aggressivity based on AS 2159 2009 "Piling – Design and Installation":

Concrete Foundation*	
pH	**Classification**
>5	Non-aggressive
4.5-5	Mild
4.0-4.5	Moderate
<4.0	Severe

Steel Structures	
pH	**Classification**
>4	Non-aggressive
3-4	Mild
<3	Moderate

**Where there is running water the rating should be moved at least one level due to the increased risk of erosion.*

- **pH test result results ranged from 4.4 – 9.3**

According to AS2159-2009, the pH is considered to be **moderately-aggressive** towards concrete, and **non-aggressive** towards steel from all samples tested. Refer to Australian Standard AS2159-2009 "Piling – Design and Installation" and for guidelines on protection of buried steel and concrete structures.

Selected samples were assessed for their Sulphate and Chloride levels. The following is a measure of soil aggressivity based on AS 2159 2009 "Piling – Design and Installation".

Concrete Foundation*	
Sulfate ($mgS0_4/kg$)	**Classification**
<5,000	Non-aggressive
5000-10,000	Mild
10,000 –20,000	Moderate
>20,000	Severe

Steel Structures	
Chloride (mgCl/kg)	**Classification**
<20,000	Non-aggressive
20,000-50,000	Mild
>50,000	Moderate

* Where there is running water the rating should be moved at least one level due to the increased risk of erosion

- **Sulphate ranged from 13 – 640 mg/kg and Chloride ranged from 14 – 1500 mg/kg.**

According to AS2159-2009, the chloride and sulphate levels are considered **non-aggressive** to concrete and **non-aggressive** towards steel from all samples tested.

Selected samples were assessed for their CEC and ESP. The following is a measure of ESP and CEC based on "Site Investigations for Urban Salinity (2002)".

ESP (%)	Classification
<5	Non-sodic
5-15	Sodic
>15	Highly-sodic
CEC (cmol+/Kg)	**Classification**
<6	Very Low
6-12	Low
13-25	Moderate
26-40	High
>40	Very High

- **ESP ranged from 7.9 – 43% and CEC ranged from 10 – 85 cmol+/kg**

According to "Site Investigations for Urban Salinity" Exchangeable Sodium Percentage (ESP) analysis ranged from **sodic** to **highly-sodic**. Fifteen samples were highly sodic and the remaining two samples fell within the sodic threshold. The results of the CEC analysis ranged from **low** to **very high**. One sample was recorded as having very high CEC whilst the remaining samples ranged from low to moderate CEC.

When wet, sodic soils lose their structure and disperse into very small particles, the small particles fill the pore spaces in the soil effectively blocking them. This impermeable layer can severely impede water movement. However, this does not pose any construction and environmental risk to residential redevelopment.

CEC is the total capacity of a soil to hold exchangeable cations. CEC is an inherent soil characteristic and is difficult to alter significantly. It influences the soil's ability to hold onto essential nutrients through ionic bonding and provides a buffer against soil acidification.

8 SALINITY AND MANGEMENT PLAN

Salinity management on the Site during construction will depend on the final earthworks design and the volume of cut and fill works required on the Site. In conjunction with the recommendations of the DP 2020 PSA, options for managing moderately saline soils on this Site further include the following –

- Develop the best use of existing topography to minimise cut and fill operations where possible.
  - Noting the necessity for cut and fill as part of the inferred earthworks plan, use of robust sediment control measures may be implemented to mitigate the impacts of erosion and sediment transport.
- Maintenance and improvement of native vegetation along drainage courses.
- Management to limit excessive water discharges across landscaped areas.
- Utilise native and deep-rooted plants in order to minimise soil erosion.
- Minimise any prolonged exposure of any moderately saline soils in temporary excavation faces.
- Minimise any prolonged exposure of any moderately saline soils in stockpiles during Site works.
- Minimise potential for ponding or water logging areas on the Site.
- Provision of lining in temporary ponds with non-saline clays to minimise groundwater recharge through the soils.
- Placement of any excavated moderately saline soils to locations where salts cannot be leached to the environment.
- Natural drainage patterns to be maintained where possible.
- Drainage infrastructure in vulnerable areas to be installed as soon as practical to avoid excessive water infiltration, ponding of water on Site and salt leaching.
- Imported material should be tested for salinity to avoid importing large quantities of soil considered moderately saline, while soils considered very saline or highly saline should not be imported to the Site.
- Roads should have well designed sub soil drainage.
- In fill areas. place the soils with highest salinity at the deepest levels.
- Application of gypsum to areas of exposed moderately saline soils where applicable.
- Concrete of suitable strength and reinforcement cover is to be used for drainage structures and wherever contact with water and increased soil moisture is expected.
- Pipes used for stormwater drainage should be sealed to minimise the risk of leakage.
- Soils that are excavated from either roads or service trenches throughout areas or the Site found to be moderately saline should be re-instated at the same horizontal level or lower where possible; and
- <u>Conduct a comprehensive post-earthworks Site exposure classification assessment to determine the final exposure classification of each individual lot.</u>
  - Should any near-surface soil material be identified to be saline or aggressive toward concrete and/or steel, the impacts of these soil conditions can be mitigated through relatively simple construction techniques such as the use of concrete of appropriate strength (ie. MPa), correct concrete thickness/cover over metal reinforcements and correct installation of appropriately designed damp-course barrier.

These and other techniques may be used by construction management team to minimise the effects of salinity on this Site.

Constructors and house builders should follow all relevant Australian Standards and should also be made aware of the Cement Concrete & Aggregates Australia publication “Guide to Residential Slabs and Footings in Saline Environments”.

Providing the management practices outlined in this report are followed during the construction period the proposed development of this Site is unlikely to have any significant impact on the existing salinity on this Site or on any downstream sites.

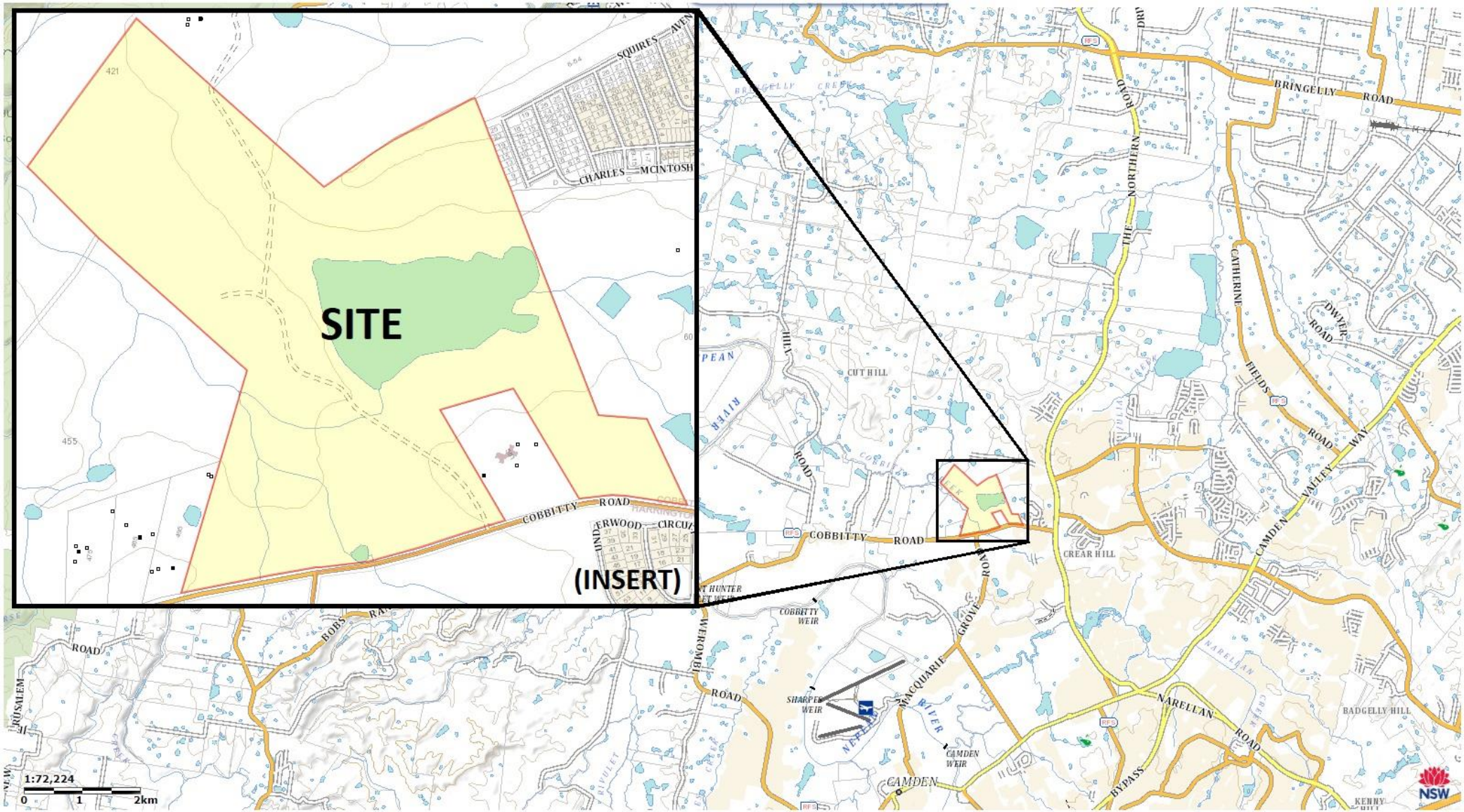
9 CLOSING

If you have any further questions regarding this matter, please don't hesitate to contact me.

Yours Faithfully

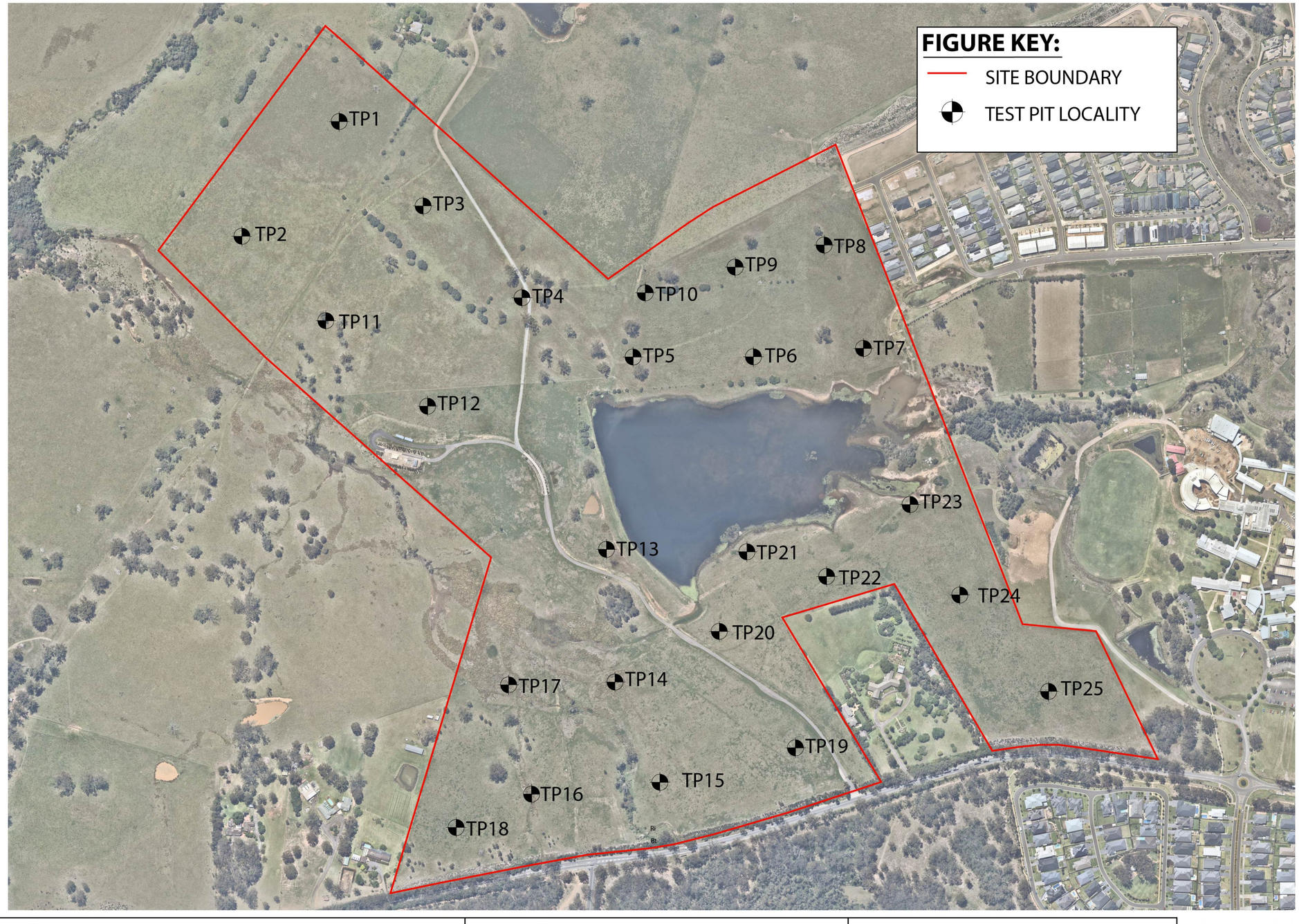
D. Spasojevic

Geotest Services Pty Ltd



Title: **Site Locality**		Figure: **Figure 1**	Project No: **P33603.1_R01**
Project: Detailed Salinity Assessment	Scale: Not to Scale	Geotest Services	
Location: 421 The Northern Road, Cobbitty NSW 2570	Date: 20/01/2022		
Client: Mirvac Homes (NSW) Pty Limited	Drawn: D.R.S		

Image source: SIXMap accessed 2022



Title: **Site Sampling Plan**		Figure: **Figure 2**	Project No: **P33603.1_R01**
Project: Detailed Salinity Assessment	Scale: Not to Scale	Geotest Services	
Location: 421 The Northern Road, Cobbitty NSW 2570	Date: 20/01/2022		
Client: Mirvac Homes (NSW) Pty Limited	Drawn: D.R.S		

Image source: Nearmap, accessed 2021.

APPENDIX A

Engineering Logs

P33603.1_R01
Mirvac Homes (NSW) Pty Ltd
421 The Northern Road
COBBITTY, NSW.
Date of Field Works: **17/12/2021**

TP1			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-2.0	0.5, 1.0, 1.5	Silty CLAY, brown, red moist, stiff	
2.0-2.6	2.0, 2.5	Silty CLAY, grey, mottled red moist, stiff	
2.6-2.9		Sandy Silty CLAY, grey, moist, stiff	
2.9-3.0	3.0	Extremely weathered sandy SHALE, red ironstone, grey, moist, stiff	
Test Pit Terminated @ **3.0m *bgl***			

TP2			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.5	0.5,1.0, 1.5	Silty CLAY, brown, red moist, stiff	
Test Pit Terminated @ **1.5m *bgl***			

TP3			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.0	0.5,1.0,	Silty CLAY, brown, grey moist, stiff	
1.0-1.2		Silty CLAY, grey, moist, stiff	
1.2-1.5	1.5	Extremely weathered SHALE, grey, yellow, moist, stiff	
Test Pit Terminated @ **1.5m *bgl***			

TP4			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.8	0.5	Silty CLAY, red, moist, stiff	
0.8-1.2	1.0	Silty CLAY, pale brown, moist, stiff	
1.2-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
Test Pit Terminated @ **1.5m *bgl***			

TP5			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.7	0.5	Silty CLAY, red, brown, moist, stiff	
0.7-1.1	1.0	Silty CLAY, grey, moist, stiff	
1.1-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP6			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.5	0.5,1.0, 1.5	Silty CLAY, brown, red, becoming grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP7			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-2.2	0.5,1.0, 1.5,2.0	Silty CLAY, red, moist, stiff	
2.2-3.0	2.5, 3.0	Silty CLAY, grey, mottled red, moist, stiff	
Test Pit Terminated @ ***3.0m bgl***			

TP8			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.7	0.5	Silty CLAY, red, moist, stiff	
0.7-1.3	1.0	Silty CLAY, pale brown, moist, stiff	
1.3-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP9			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-1.2	0.5,1.0	Silty CLAY, brown, red, moist, stiff	
1.2-1.5	1.5	Silty CLAY, grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP10			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.1	0.5,1.0	Silty CLAY, red, brown, moist, stiff	
1.1-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP11			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.5	0.5,1.0 1.5	Silty CLAY, red, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP12			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.5	0.5,1.0, 1.5	Silty CLAY, red, brown, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP13			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.5	0.5, 1.0, 1.5	Silty CLAY, pale brown becoming brown, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP14			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-1.5	0.5,1.0, 1.5	Silty CLAY, red, becoming red and grey, moist, stiff	
*Test Pit Terminated @ **1.5m bgl***			

TP15			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.4	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.4-1.3	0.5,1.0	Silty CLAY, pale brown, moist, stiff	
1.3-1.6	1.5	Silty CLAY, red, moist, stiff	
1.6-2.6	2.0, 2.5	Silty CLAY, yellow, grey, moist, stiff	
2.6-3.0	3.0	Extremely weathered SHALE, grey, moist, stiff	
*Test Pit Terminated @ **3.0m bgl***			

TP16			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.4	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.4-1.3	0.5,1.0	Silty CLAY, pale brown, moist, stiff	
1.3-1.5	1.5	Silty CLAY, grey, red, moist, stiff	
*Test Pit Terminated @ **1.5m bgl***			

TP17			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-1.5	0.5,1.0, 1.5	Silty CLAY, brown, grey, becoming red, , moist, stiff	
*Test Pit Terminated @ **1.5m bgl***			

TP18			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.4	0.5,1.0	Silty CLAY, brown, red, moist, stiff	
1.4-2.3	1.5,2.0	Silty CLAY, grey, mottled brown and red, moist, stiff	
2.3-2.6	2.5	Sandy SHALE , grey, brown, moist, stiff	
2.6-3.0	3.0	SHALE, grey, moist, stiff	
*Test Pit Terminated @ **3.0m bgl***			

TP19			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.6	0.5	Silty CLAY, red, moist, stiff	
0.6-1.2	1.0	Shaley CLAY, brown, moist, stiff	
1.2-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
*Test Pit Terminated @ **1.5m bgl***			

TP20			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-0.6	0.5	Silty CLAY, red, brown, moist, stiff	
0.6-1.3	1.0	Silty CLAY, grey, moist, stiff	
1.3-1.5	1.5	Extremely weathered SHALE, grey, moist, stiff	
*Test Pit Terminated @ **1.5m bgl***			

TP21			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy, Silty, CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.6	0.5	Silty CLAY, red, moist, stiff	
0.6-3.0	1.0,1.5, 2.0,2.5, 3.0	Silty CLAY, grey, mottled yellow, moist, stiff	
Test Pit Terminated @ ***3.0 m bgl***			

TP22			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy, Silty, CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.3	0.5,1.0	Silty CLAY, red, moist, stiff	
1.3-1.5	1.5	Silty CLAY, grey, mottled red, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP23			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy, Silty, CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-1.0	0.5	Silty CLAY, red, brown, moist, stiff	
1.0-1.5	1.0, 1.5	Silty CLAY, brown, yellow, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP24			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.3	0.2	Topsoil: Sandy, Silty, CLAY; low plasticity, brown to dark brown, moist, firm	
0.3-0.6	0.5	Silty CLAY, brown, moist, stiff	
0.6-1.5	1.0, 1.5	Silty CLAY, brown becoming red, grey, moist, stiff	
Test Pit Terminated @ ***1.5m bgl***			

TP25			
Depth (m)	**Sample**	**Description**	**Additional Observations**
0.0-0.2	0.2	Topsoil: Sandy Silty CLAY; low plasticity, brown to dark brown, moist, firm	
0.2-1.0	0.5	Silty CLAY, red, grey, moist, stiff	
1.0-1.3	1.0	Silty CLAY, pale brown, moist, stiff	
1.3-1.7	1.5	Shaley CLAY, grey, moist, stiff	
1.7-Refusal		SHALE, grey, moist, stiff	
Refusal @ ***1.7m bgl***			

APPENDIX B

Emerson, pH, EC Details

Geotest Services Pty Ltd

APPENDIX B
Table Emerson, pH, EC Details

33603.1; 421 The Northern Road, Cobbitty NSW 2570

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP1	0.2	Sandy Silty Clay, brown to dark brown	6.4	50.0	9.0	0.45	7	Non Saline
TP1	0.5	Silty Clay, brown,red	5.3	230.0	7.0	1.61		Non Saline
TP1	1.0	Silty Clay, brown,red	5.0	320.0	7.0	2.24		Slightly Saline
TP1	1.5	Silty Clay, brown,red	4.8	350.0	7.0	2.45	2	Slightly Saline
TP1	2.0	Silty Clay, brown,red	4.5	920.0	7.0	6.44		Moderately Saline
TP1	2.5	Silty Clay, grey, mottled red	5.0	600.0	7.0	4.20		Moderately Saline
TP1	3.0	Extremely weathered Sandy Shale, grey	4.4	490.0	7.0	3.43		Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP2	0.2	Sandy Silty Clay, brown to dark brown	6.5	39.0	9.0	0.35	7	Non Saline
TP2	0.5	Silty Clay, brown,red	7.5	990.0	7.0	6.93		Moderately Saline
TP2	1.5	Silty Clay, brown,red	7.9	1100.0	7.0	7.70		Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP3	0.2	Sandy Silty Clay, brown to dark brown	6.1	59.0	9.0	0.53	6	Non Saline
TP3	0.5	Silty Clay, brown, grey	5.4	160.0	7.0	1.12		Non Saline
TP3	1.0	Silty Clay, grey	5.3	350.0	7.0	2.45	2	Slightly Saline
TP3	1.5	Extremely weathered Shale, grey	7.6	480.0	7.0	3.36		Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP4	0.2	Sandy Silty Clay, brown to dark brown	6.2	38.0	9.0	0.34	6	Non Saline
TP4	0.5	Silty Clay, red	5.9	210.0	7.0	1.47		Non Saline
TP4	1.0	Silty Clay, pale brown	5.7	420.0	7.0	2.94	2	Slightly Saline
TP4	1.5	Extremely weathered Shale, grey	8.7	460.0	7.0	3.22		Slightly Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

Geotest Services Pty Ltd

APPENDIX B
Table Emerson, pH, EC Details

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Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP5	0.2	Sandy Silty Clay, brown to dark brown	6.4	32.0	9.0	0.29	7	Non Saline
TP5	0.5	Silty Clay, red, brown	5.7	140.0	7.0	0.98		Non Saline
TP5	1.0	Silty Clay, grey	5.5	300.0	7.0	2.10	2	Slightly Saline
TP5	1.5	Extremely weathered Shale, grey	6.8	270.0	7.0	1.89		Non Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP6	0.2	Sandy Silty Clay, brown to dark brown	6.1	26.0	9.0	0.23	8	Non Saline
TP6	0.5	Silty Clay, brown, red	6.6	35.0	7.0	0.25		Non Saline
TP6	1.5	Silty Clay, brown, red becoming grey	5.5	190.0	7.0	1.33	2	Non Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP7	0.2	Sandy Silty Clay, brown to dark brown	6.4	29.0	9.0	0.26	6	Non Saline
TP7	0.5	Silty Clay, red	5.4	490.0	7.0	3.43		Slightly Saline
TP7	1.5	Silty Clay, red	5.7	690.0	7.0	4.83	3	Moderately Saline
TP7	3.0	Silty Clay, grey, mottled red	5.4	620.0	7.0	4.34		Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP8	0.2	Sandy Silty Clay, brown to dark brown	5.9	41.0	9.0	0.37	7	Non Saline
TP8	0.5	Silty Clay, red	6.0	38.0	7.0	0.27		Non Saline
TP8	1.0	Silty Clay, pale brown	5.3	92.0	7.0	0.64	2	Non Saline
TP8	1.5	Extremely weathered Shale, grey	5.4	420.0	7.0	2.94		Slightly Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

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APPENDIX B
Table Emerson, pH, EC Details

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Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP9	0.2	Sandy Silty Clay, brown to dark brown	5.5	63.0	9.0	0.57	6	Non Saline
TP9	0.5	Silty Clay, brown, red	6.3	130.0	7.0	0.91		Non Saline
TP9	1.5	Silty Clay, grey	9.3	290.0	7.0	2.03	2	Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP10	0.2	Sandy Silty Clay, brown to dark brown	6.1	51.0	9.0	0.46	6	Non Saline
TP10	0.5	Silty Clay, red, brown	5.5	260.0	7.0	1.82		Non Saline
TP10	1.5	Extremely weathered Shale, grey	7.6	320.0	7.0	2.24	2	Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP11	0.2	Sandy Silty Clay, brown to dark brown	6.3	130.0	9.0	1.17	6	Non Saline
TP11	0.5	Silty Clay, red	5.7	120.0	7.0	0.84		Non Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP12	0.2	Sandy Silty Clay, brown to dark brown	6.4	67.0	9.0	0.60	6	Non Saline
TP12	0.5	Silty Clay, red, brown	5.5	510.0	7.0	3.57		Slightly Saline
TP12	1.0	Silty Clay, red, brown	5.4	220.0	7.0	1.54	2	Non Saline
TP12	1.5	Silty Clay, red, brown	5.5	170.0	7.0	1.19		Non Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP13	0.2	Sandy Silty Clay, brown to dark brown	6.8	170.0	9.0	1.53	8	Non Saline
TP13	0.5	Silty Clay, pale brown	8.5	390.0	7.0	2.73		Slightly Saline
TP13	1.0	Silty Clay, pale brown	7.7	590.0	7.0	4.13	2	Moderately Saline
TP13	1.5	Silty Clay, pale brown becoming brown	8.6	370.0	7.0	2.59		Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP14	0.2	Sandy Silty Clay, brown to dark brown	6.3	99.0	9.0	0.89	7	Non Saline
TP14	0.5	Silty Clay, red	5.2	330.0	7.0	2.31		Slightly Saline
TP14	1.5	Silty Clay, red becoming red, grey	5.3	520.0	7.0	3.64	2	Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP15	0.2	Sandy Silty Clay, brown to dark brown	6.3	61.0	9.0	0.55	8	Non Saline
TP15	0.5	Silty Clay, pale brown	7.8	570.0	7.0	3.99		Slightly Saline
TP15	1.0	Silty Clay, pale brown	7.8	840.0	7.0	5.88		Moderately Saline
TP15	1.5	Silty Clay, red	7.9	900.0	7.0	6.30		Moderately Saline
TP15	2.0	Silty Clay, yellow, grey	7.7	1000.0	7.0	7.00	2	Moderately Saline
TP15	2.5	Silty Clay, yellow, grey	7.7	1000.0	7.0	7.00		Moderately Saline
TP15	3.0	Extremely weathered Shale, grey	7.5	910.0	7.0	6.37		Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP16	0.2	Sandy Silty Clay, brown to dark brown	6.2	170.0	9.0	1.53	6	Non Saline
TP16	1.0	Silty Clay, red	8.0	750.0	7.0	5.25		Moderately Saline
TP16	1.5	Silty Clay, red	8.0	820.0	7.0	5.74	2	Moderately Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

Geotest Services Pty Ltd

APPENDIX B
Table Emerson, pH, EC Details

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Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP17	0.2	Sandy Silty Clay, brown to dark brown	6.3	130.0	9.0	1.17	7	Non Saline
TP17	0.5	Silty Clay, red	5.2	300.0	7.0	2.10		Slightly Saline
TP17	1.5	Silty Clay, red becoming red, grey	5.2	460.0	7.0	3.22	2	Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP18	0.2	Sandy Silty Clay, brown to dark brown	6.3	160.0	9.0	1.44	8	Non Saline
TP18	0.5	Silty Clay, brown, red	5.7	29.0	7.0	0.20		Non Saline
TP18	1.5	Silty Clay, grey, mottled brown and red	4.9	520.0	7.0	3.64	4	Slightly Saline
TP18	2.0	Silty Clay, grey, mottled brown and red	4.7	770.0	7.0	5.39		Moderately Saline
TP18	3.0	Shale grey	4.6	1100.0	7.0	7.70		Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP19	0.2	Sandy Silty Clay, brown to dark brown	6.6	120.0	9.0	1.08	6	Non Saline
TP19	0.5	Silty Clay, red	6.5	60.0	7.0	0.42		Non Saline
TP19	1.0	Shaley Clay, brown	6.2	160.0	7.0	1.12	3	Non Saline
TP19	1.5	Extremely weathered Shale, grey	7.0	160.0	7.0	1.12		Non Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP20	0.2	Sandy Silty Clay, brown to dark brown	5.7	61.0	9.0	0.55	7	Non Saline
TP20	0.5	Silty Clay, red, brown	5.5	89.0	7.0	0.62		Non Saline
TP20	1.0	Silty Clay, grey	4.8	520.0	7.0	3.64	2	Slightly Saline
TP20	1.5	Extremely weathered Shale, grey	5.1	570.0	7.0	3.99		Slightly Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP21	0.2	Sandy Silty Clay, brown to dark brown	5.9	15.0	9.5	0.14	8	Non Saline
TP21	0.5	Silty Clay, red	5.8	26.0	7.0	0.18		Non Saline
TP21	1.0	Silty Clay, grey, mottled yellow	6.1	230.0	7.0	1.61		Non Saline
TP21	1.5	Silty Clay, grey, mottled yellow	5.6	170.0	7.0	1.19	4	Non Saline
TP21	2.0	Silty Clay, grey, mottled yellow	5.3	700.0	7.0	4.90		Moderately Saline
TP21	2.5	Silty Clay, grey, mottled yellow	5.4	790.0	7.0	5.53	4	Moderately Saline
TP21	3.0	Silty Clay, grey, mottled yellow	5.6	360.0	7.0	2.52		Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP22	0.2	Sandy Silty Clay, brown to dark brown	6.3	65.0	9.0	0.59	7	Non Saline
TP22	0.5	Silty Clay, red	7.4	99.0	7.0	0.69		Non Saline
TP22	1.5	Silty Clay, grey, mottled red	5.0	750.0	7.0	5.25	2	Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP23	0.2	Sandy Silty Clay, brown to dark brown	6.0	25.0	9.0	0.23	8	Non Saline
TP23	0.5	Silty Clay, red, brown	5.6	880.0	7.0	6.16		Moderately Saline
TP23	1.0	Silty Clay, brown, yellow	5.7	990.0	7.0	6.93	2	Moderately Saline
TP23	1.5	Silty Clay, brown, yellow	5.6	970.0	7.0	6.79		Moderately Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP24	0.2	Sandy Silty Clay, brown to dark brown	6.1	49.0	9.0	0.44	6	Non Saline
TP24	0.5	Silty Clay, brown	5.3	110.0	7.0	0.77		Non Saline
TP24	1.5	Silty Clay, brown becoming red, grey	5.0	520.0	7.0	3.64	2	Slightly Saline

Sample I.D	Depth (m)	Laboratory Description	pH	EC (µS/cm)	EC (Factor)	Ece (dS/m)	Emerson Number	Salinity Class
TP25	0.2	Sandy Silty Clay, brown to dark brown	6.0	40.0	9.0	0.36	6	Non Saline
TP25	0.5	Silty Clay, red, grey	5.6	37.0	7.0	0.26		Non Saline
TP25	1.0	Silty Clay, pale brown	5.2	510.0	7.0	3.57		Slightly Saline
TP25	1.5	Shaley Clay, grey	5.2	240.0	7.0	1.68	2	Non Saline

Blue highlight indicates Non Saline & Slightly Saline soils
Green highlight indicates Moderately Saline soils

APPENDIX C

ESP and CEC Analytical Data

Geotest Services Pty Ltd

APPENDIX C
Table ESP and CEC
33603.1; 421 The Northern Road, Cobbitty NSW 2570

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP1	0.5	Silty Clay, brown,red	18.0	Highly-Sodic	14	Moderate
TP1	1.5	Silty Clay, brown,red	26.0	Highly-Sodic	15	Moderate
TP1	2.5	Silty Clay, grey, mottled red	30.0	Highly-Sodic	10	Low
TP1	3.0	Extremely weathered Sandy Shale, grey	30.0	Highly-Sodic	13	Moderate

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP7	0.5	Silty Clay, brown,red	27.0	Highly-Sodic	13	Moderate
TP7	3.0	Extremely weathered Sandy Shale, grey	43.0	Highly-Sodic	18	Moderate

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP12	0.5	Silty Clay, red, brown	24.0	Highly-Sodic	13	Moderate

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP15	0.5	Silty Clay, brown,red	17.0	Highly-Sodic	19	Moderate
TP15	3.0	Extremely weathered Sandy Shale, grey	18.0	Highly-Sodic	12	Low

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP18	0.5	Silty Clay, brown, red	7.9	Sodic	22	Moderate
TP18	2.0	Silty Clay, grey, mottled brown and red	29.0	Highly-Sodic	16	Moderate
TP18	3.0	Shale grey	32.0	Highly-Sodic	15	Moderate

Geotest Services Pty Ltd

APPENDIX C
Table ESP and CEC
33603.1; 421 The Northern Road, Cobbitty NSW 2570

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP21	0.5	Silty Clay, red	9.5	Sodic	13	Moderate
TP21	3.0	Silty Clay, grey, mottled yellow	25.0	Highly-Sodic	11	Low

Location*	Depth (m)	Laboratory Description	ESP (%)	Classification	CEC (cmol+/Kg)	Classification
TP25	0.5	Silty Clay, red, grey	21.0	Highly-Sodic	85	Very High
TP25	1.0	Silty Clay, pale brown	33.0	Highly-Sodic	13	Moderate
TP25	1.5	Shaley Clay, grey	36.0	Highly-Sodic	19	Moderate

APPENDIX D

Laboratory Certificates of Analysis

eurofins | Environment Testing

Certificate of Analysis

Geotest Services
Unit 18/24 Garling Rd
Kings Park
NSW 2148

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Jacob Barnes**

Report **852446-S**
Project name 531 COBBITTY ROAD
Project ID P33603.2
Received Date Dec 20, 2021

Client Sample ID			**TP1 0.2**	**TP1 0.5**	**TP1 1.0**	**TP1 1.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52277**	**S21-De52278**	**S21-De52279**	**S21-De52280**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	50	230	320	350
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.4	5.3	5.0	4.8
% Moisture	1	%	16	15	14	14
Chloride	10	mg/kg	-	70	-	700
Sulphate (as SO4)	10	mg/kg	-	330	-	640
Exchangeable Sodium Percentage (ESP)	0.1	%	-	18	-	26
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	14	-	15

Client Sample ID			**TP1 2.0**	**TP1 2.5**	**TP1 3.0**	**TP2 0.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52281**	**S21-De52282**	**S21-De52283**	**S21-De52284**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	920	600	490	39
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.5	5.0	4.4	6.5
% Moisture	1	%	16	13	14	17
Chloride	10	mg/kg	-	930	870	-
Sulphate (as SO4)	10	mg/kg	-	220	260	-
Exchangeable Sodium Percentage (ESP)	0.1	%	-	30	30	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	10.0	13	-

Client Sample ID			TP2 0.5	TP2 1.5	TP3 0.2	TP3 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52285	S21-De52286	S21-De52287	S21-De52288
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	990	1100	59	160
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	7.5	7.9	6.1	5.4
% Moisture	1	%	16	15	14	20

Client Sample ID			TP3 1.0	TP3 1.5	TP4 0.2	TP4 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52289	S21-De52290	S21-De52291	S21-De52475
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	350	480	38	210
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.3	7.6	6.2	5.9
% Moisture	1	%	19	9.0	18	21

Client Sample ID			TP4 1.0	TP4 1.5	TP5 0.2	TP5 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52476	S21-De52477	S21-De52478	S21-De52479
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	420	460	32	140
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	8.7	6.4	5.7
% Moisture	1	%	15	9.5	20	23

Client Sample ID			TP5 1.0	TP5 1.5	TP6 0.2	TP6 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52480	S21-De52481	S21-De52482	S21-De52483
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	300	270	26	35
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	6.8	6.1	6.6
% Moisture	1	%	17	7.3	17	18

Client Sample ID			TP6 1.5	TP7 0.2	TP7 0.5	TP7 1.5
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52484**	**S21-De52485**	**S21-De52486**	**S21-De52487**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	190	29	490	690
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	6.4	5.4	5.7
% Moisture	1	%	20	18	15	14
Chloride	10	mg/kg	-	< 10	1200	890
Sulphate (as SO4)	10	mg/kg	-	13	380	170
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	27	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	13	-

Client Sample ID			TP7 3.0	TP8 0.2	TP8 0.5	TP8 1.0
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52488**	**S21-De52489**	**S21-De52490**	**S21-De52491**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	620	41	38	92
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	5.9	6.0	5.3
% Moisture	1	%	14	21	19	16
Chloride	10	mg/kg	1000	-	-	-
Sulphate (as SO4)	10	mg/kg	200	-	-	-
Exchangeable Sodium Percentage (ESP)	0.1	%	43	-	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	18	-	-	-

Client Sample ID			TP8 1.5	TP9 0.2	TP9 0.5	TP9 1.5
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52492**	**S21-De52493**	**S21-De52494**	**S21-De52495**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	420	63	130	290
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	5.5	6.3	9.3
% Moisture	1	%	8.1	18	15	14

Client Sample ID			TP10 0.2	TP10 0.5	TP10 1.5	TP11 0.2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52496**	**S21-De52497**	**S21-De52498**	**S21-De52499**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	51	260	320	130
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.1	5.5	7.6	6.3
% Moisture	1	%	17	20	9.5	17

Client Sample ID			TP11 0.5	TP12 0.2	TP12 0.5	TP12 1.0
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52500**	**S21-De52501**	**S21-De52502**	**S21-De52503**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	120	67	510	220
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	6.4	5.5	5.4
% Moisture	1	%	16	14	15	16
Chloride	10	mg/kg	-	-	540	-
Sulphate (as SO4)	10	mg/kg	-	-	250	-
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	24	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	14	-

Client Sample ID			TP12 1.5	TP13 0.2	TP13 0.5	TP13 1.0
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52504**	**S21-De52505**	**S21-De52506**	**S21-De52507**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	170	170	390	590
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	6.8	8.5	7.7
% Moisture	1	%	16	17	18	19
Chloride	10	mg/kg	380	-	-	-
Sulphate (as SO4)	10	mg/kg	290	-	-	-

Client Sample ID			TP13 1.5	TP14 0.2	TP14 0.5	TP14 1.5
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52508**	**S21-De52509**	**S21-De52510**	**S21-De52511**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	370	99	330	520
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.6	6.3	5.2	5.3
% Moisture	1	%	20	18	16	18

Client Sample ID			TP15 0.2	TP15 0.5	TP15 1.0	TP15 1.5
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-De52512**	**S21-De52513**	**S21-De52514**	**S21-De52515**
Date Sampled			**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**	**Dec 17, 2021**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	61	570	840	900
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.3	7.8	7.8	7.9
% Moisture	1	%	19	18	15	14
Chloride	10	mg/kg	-	890	-	980
Sulphate (as SO4)	10	mg/kg	-	280	-	55
Exchangeable Sodium Percentage (ESP)	0.1	%	-	17	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	19	-	-

Client Sample ID			TP15 2.0	TP15 2.5	TP15 3.0	TP16 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52516	S21-De52517	S21-De52518	S21-De52519
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	1000	1000	910	170
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	7.7	7.7	7.5	6.2
% Moisture	1	%	16	16	18	20
Chloride	10	mg/kg	1300	1400	1500	-
Sulphate (as SO4)	10	mg/kg	170	120	79	-
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	18	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	12	-

Client Sample ID			TP16 1.0	TP16 1.5	TP17 0.2	TP17 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52520	S21-De52521	S21-De52522	S21-De52523
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	750	820	130	300
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.0	8.0	6.3	5.2
% Moisture	1	%	16	15	20	17

Client Sample ID			TP17 1.5	TP18 0.2	TP18 0.5	TP18 1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52524	S21-De52525	S21-De52526	S21-De52527
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	460	160	29	520
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2	6.3	5.7	4.9
% Moisture	1	%	17	22	22	18
Chloride	10	mg/kg	-	-	14	-
Sulphate (as SO4)	10	mg/kg	-	-	85	-
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	7.9	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	22	-

Client Sample ID			TP18 2.0	TP18 3.0	TP19 0.2	TP19 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52528	S21-De52529	S21-De52530	S21-De52531
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	770	1100	120	60
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.7	4.6	6.6	6.5
% Moisture	1	%	18	19	20	16
Chloride	10	mg/kg	1000	1500	-	-
Sulphate (as SO4)	10	mg/kg	230	190	-	-
Exchangeable Sodium Percentage (ESP)	0.1	%	29	32	-	-

Client Sample ID			TP18 2.0	TP18 3.0	TP19 0.2	TP19 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52528	S21-De52529	S21-De52530	S21-De52531
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	16	15	-	-

Client Sample ID			TP19 1.0	TP19 1.5	TP20 0.2	TP20 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52532	S21-De52533	S21-De52534	S21-De52535
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	160	160	61	89
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.2	7.0	5.7	5.5
% Moisture	1	%	9.5	9.6	18	18

Client Sample ID			TP20 1.0	TP20 1.5	TP21 0.2	TP21 0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52536	S21-De52537	S21-De52538	S21-De52539
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	520	570	15	26
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.8	5.1	5.9	5.8
% Moisture	1	%	13	14	17	18
Chloride	10	mg/kg	-	-	< 10	< 10
Sulphate (as SO4)	10	mg/kg	-	-	< 10	27
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	-	9.5
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	13

Client Sample ID			TP21 1.0	TP21 1.5	TP21 2.0	TP21 2.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52540	S21-De52541	S21-De52542	S21-De52543
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	230	170	700	790
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.1	5.6	5.3	5.4
% Moisture	1	%	15	15	18	16
Chloride	10	mg/kg	140	-	-	-
Sulphate (as SO4)	10	mg/kg	190	-	-	-

Client Sample ID			TP21 3.0	TP22 0.2	TP22 0.5	TP22 1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52544	S21-De52545	S21-De52546	S21-De52547
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	360	65	99	750
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	6.3	7.4	5.0
% Moisture	1	%	16	18	18	19
Chloride	10	mg/kg	1100	-	-	-
Sulphate (as SO4)	10	mg/kg	160	-	-	-
Exchangeable Sodium Percentage (ESP)	0.1	%	25	-	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	11	-	-	-

Client Sample ID			TP23 0.2	TP23 0.5	TP23 1.0	TP23 1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52548	S21-De52549	S21-De52550	S21-De52551
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	25	880	990	970
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.0	5.6	5.7	5.6
% Moisture	1	%	17	17	16	17

Client Sample ID			TP24 0.2	TP24 0.5	TP24 1.5	TP25 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-De52552	S21-De52553	S21-De52554	S21-De52555
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	49	110	520	40
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.1	5.3	5.0	6.0
% Moisture	1	%	19	19	22	15

Client Sample ID			TP25 0.5	TP25 1.0	TP25 1.5
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S21-De52723	S21-De52724	S21-De52725
Date Sampled			Dec 17, 2021	Dec 17, 2021	Dec 17, 2021
Test/Reference	LOR	Unit			
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	37	510	240
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	5.2	5.2
% Moisture	1	%	21	15	16
Chloride	10	mg/kg	20	460	390
Sulphate (as SO4)	10	mg/kg	120	230	160
Exchangeable Sodium Percentage (ESP)	0.1	%	21	33	36
Cation Exchange Capacity					
Cation Exchange Capacity	0.05	meq/100g	85	13	19

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Conductivity (1:5 aqueous extract at 25°C as rec.)	Melbourne	Jan 11, 2022	7 Days
- Method: LTM-INO-4030 Conductivity			
Exchangeable Sodium Percentage (ESP)	Melbourne	Jan 18, 2022	28 Days
- Method: LTM-MET-3060 - Cation Exchange Capacity (CEC) & Exchangeable Sodium Percentage (ESP)			
Eurofins Suite B18			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Dec 30, 2021	7 Days
- Method: LTM-GEN-7090 pH by ISE			
Chloride	Sydney	Dec 30, 2021	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Sulphate (as SO4)	Sydney	Dec 30, 2021	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
% Moisture	Sydney	Dec 22, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			
Cation Exchange Capacity	Melbourne	Jan 18, 2022	28 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			

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Company Name: Geotest Services
Address: Unit 18/24 Garling Rd
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Project Name: 531 COBBITTY ROAD
Project ID: P33603.2

Order No.:
Report #: 852446
Phone: 02 9671 4443
Fax: 02 9671 4343

Received: Dec 20, 2021 1:19 PM
Due: Jan 5, 2022
Priority: 10 Day
Contact Name: Jacob Barnes

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Conductivity (1:5 aqueous extract at 25°C as rec.)	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Eurofins Suite B18	Moisture Set	Cation Exchange Capacity	Exchangeable Sodium Percentage (ESP)
Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP1 0.2	Dec 17, 2021		Soil	S21-De52277	X		X		X		
2	TP1 0.5	Dec 17, 2021		Soil	S21-De52278				X	X	X	X
3	TP1 1.0	Dec 17, 2021		Soil	S21-De52279	X		X		X		
4	TP1 1.5	Dec 17, 2021		Soil	S21-De52280				X	X	X	X
5	TP1 2.0	Dec 17, 2021		Soil	S21-De52281	X		X		X		
6	TP1 2.5	Dec 17, 2021		Soil	S21-De52282				X	X	X	X
7	TP1 3.0	Dec 17, 2021		Soil	S21-De52283				X	X	X	X
8	TP2 0.2	Dec 17, 2021		Soil	S21-De52284	X		X		X		
9	TP2 0.5	Dec 17, 2021		Soil	S21-De52285	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
10	TP2 1.5	Dec 17, 2021		Soil	S21-De52286	X		X		X		
11	TP3 0.2	Dec 17, 2021		Soil	S21-De52287	X		X		X		
12	TP3 0.5	Dec 17, 2021		Soil	S21-De52288	X		X		X		
13	TP3 1.0	Dec 17, 2021		Soil	S21-De52289	X		X		X		
14	TP3 1.5	Dec 17, 2021		Soil	S21-De52290	X		X		X		
15	TP4 0.2	Dec 17, 2021		Soil	S21-De52291	X		X		X		
16	TP2 1.0	Dec 17, 2021		Soil	S21-De52292		X					
17	TP4 0.5	Dec 17, 2021		Soil	S21-De52475	X		X		X		
18	TP4 1.0	Dec 17, 2021		Soil	S21-De52476	X		X		X		
19	TP4 1.5	Dec 17, 2021		Soil	S21-De52477	X		X		X		
20	TP5 0.2	Dec 17, 2021		Soil	S21-De52478	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
21	TP5 0.5	Dec 17, 2021		Soil	S21-De52479	X		X		X		
22	TP5 1.0	Dec 17, 2021		Soil	S21-De52480	X		X		X		
23	TP5 1.5	Dec 17, 2021		Soil	S21-De52481	X		X		X		
24	TP6 0.2	Dec 17, 2021		Soil	S21-De52482	X		X		X		
25	TP6 0.5	Dec 17, 2021		Soil	S21-De52483	X		X		X		
26	TP6 1.5	Dec 17, 2021		Soil	S21-De52484	X		X		X		
27	TP7 0.2	Dec 17, 2021		Soil	S21-De52485	X			X	X		
28	TP7 0.5	Dec 17, 2021		Soil	S21-De52486				X	X	X	X
29	TP7 1.5	Dec 17, 2021		Soil	S21-De52487	X			X	X		
30	TP7 3.0	Dec 17, 2021		Soil	S21-De52488				X	X	X	X
31	TP8 0.2	Dec 17, 2021		Soil	S21-De52489	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
32	TP8 0.5	Dec 17, 2021		Soil	S21-De52490	X		X		X		
33	TP8 1.0	Dec 17, 2021		Soil	S21-De52491	X		X		X		
34	TP8 1.5	Dec 17, 2021		Soil	S21-De52492	X		X		X		
35	TP9 0.2	Dec 17, 2021		Soil	S21-De52493	X		X		X		
36	TP9 0.5	Dec 17, 2021		Soil	S21-De52494	X		X		X		
37	TP9 1.5	Dec 17, 2021		Soil	S21-De52495	X		X		X		
38	TP10 0.2	Dec 17, 2021		Soil	S21-De52496	X		X		X		
39	TP10 0.5	Dec 17, 2021		Soil	S21-De52497	X		X		X		
40	TP10 1.5	Dec 17, 2021		Soil	S21-De52498	X		X		X		
41	TP11 0.2	Dec 17, 2021		Soil	S21-De52499	X		X		X		
42	TP11 0.5	Dec 17, 2021		Soil	S21-De52500	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
43	TP12 0.2	Dec 17, 2021		Soil	S21-De52501	X		X		X		
44	TP12 0.5	Dec 17, 2021		Soil	S21-De52502				X	X	X	X
45	TP12 1.0	Dec 17, 2021		Soil	S21-De52503	X		X		X		
46	TP12 1.5	Dec 17, 2021		Soil	S21-De52504	X			X	X		
47	TP13 0.2	Dec 17, 2021		Soil	S21-De52505	X		X		X		
48	TP13 0.5	Dec 17, 2021		Soil	S21-De52506	X		X		X		
49	TP13 1.0	Dec 17, 2021		Soil	S21-De52507	X		X		X		
50	TP13 1.5	Dec 17, 2021		Soil	S21-De52508	X		X		X		
51	TP14 0.2	Dec 17, 2021		Soil	S21-De52509	X		X		X		
52	TP14 0.5	Dec 17, 2021		Soil	S21-De52510	X		X		X		
53	TP14 1.5	Dec 17, 2021		Soil	S21-De52511	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
54	TP15 0.2	Dec 17, 2021		Soil	S21-De52512	X		X		X		
55	TP15 0.5	Dec 17, 2021		Soil	S21-De52513				X	X	X	X
56	TP15 1.0	Dec 17, 2021		Soil	S21-De52514	X		X		X		
57	TP15 1.5	Dec 17, 2021		Soil	S21-De52515	X			X	X		
58	TP15 2.0	Dec 17, 2021		Soil	S21-De52516	X			X	X		
59	TP15 2.5	Dec 17, 2021		Soil	S21-De52517	X			X	X		
60	TP15 3.0	Dec 17, 2021		Soil	S21-De52518				X	X	X	X
61	TP16 0.2	Dec 17, 2021		Soil	S21-De52519	X		X		X		
62	TP16 1.0	Dec 17, 2021		Soil	S21-De52520	X		X		X		
63	TP16 1.5	Dec 17, 2021		Soil	S21-De52521	X		X		X		
64	TP17 0.2	Dec 17, 2021		Soil	S21-De52522	X		X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
65	TP17 0.5	Dec 17, 2021		Soil	S21-De52523	X		X		X		
66	TP17 1.5	Dec 17, 2021		Soil	S21-De52524	X		X		X		
67	TP18 0.2	Dec 17, 2021		Soil	S21-De52525	X		X		X		
68	TP18 0.5	Dec 17, 2021		Soil	S21-De52526				X	X	X	X
69	TP18 1.5	Dec 17, 2021		Soil	S21-De52527	X		X		X		
70	TP18 2.0	Dec 17, 2021		Soil	S21-De52528				X	X	X	X
71	TP18 3.0	Dec 17, 2021		Soil	S21-De52529				X	X	X	X
72	TP19 0.2	Dec 17, 2021		Soil	S21-De52530	X		X		X		
73	TP19 0.5	Dec 17, 2021		Soil	S21-De52531	X		X		X		
74	TP19 1.0	Dec 17, 2021		Soil	S21-De52532	X		X		X		
75	TP19 1.5	Dec 17, 2021		Soil	S21-De52533	X		X		X		

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Company Name: Geotest Services
Address: Unit 18/24 Garling Rd
Kings Park
NSW 2148

Project Name: 531 COBBITTY ROAD
Project ID: P33603.2

Order No.:
Report #: 852446
Phone: 02 9671 4443
Fax: 02 9671 4343

Received: Dec 20, 2021 1:19 PM
Due: Jan 5, 2022
Priority: 10 Day
Contact Name: Jacob Barnes

Eurofins Analytical Services Manager : Andrew Black

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Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
76	TP20 0.2	Dec 17, 2021		Soil	S21-De52534	X		X		X		
77	TP20 0.5	Dec 17, 2021		Soil	S21-De52535	X		X		X		
78	TP20 1.0	Dec 17, 2021		Soil	S21-De52536	X		X		X		
79	TP20 1.5	Dec 17, 2021		Soil	S21-De52537	X		X		X		
80	TP21 0.2	Dec 17, 2021		Soil	S21-De52538	X			X	X		
81	TP21 0.5	Dec 17, 2021		Soil	S21-De52539				X	X	X	X
82	TP21 1.0	Dec 17, 2021		Soil	S21-De52540	X			X	X		
83	TP21 1.5	Dec 17, 2021		Soil	S21-De52541	X		X		X		
84	TP21 2.0	Dec 17, 2021		Soil	S21-De52542	X		X		X		
85	TP21 2.5	Dec 17, 2021		Soil	S21-De52543	X		X		X		
86	TP21 3.0	Dec 17, 2021		Soil	S21-De52544				X	X	X	X

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Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
87	TP22 0.2	Dec 17, 2021		Soil	S21-De52545	X		X		X		
88	TP22 0.5	Dec 17, 2021		Soil	S21-De52546	X		X		X		
89	TP22 1.5	Dec 17, 2021		Soil	S21-De52547	X		X		X		
90	TP23 0.2	Dec 17, 2021		Soil	S21-De52548	X		X		X		
91	TP23 0.5	Dec 17, 2021		Soil	S21-De52549	X		X		X		
92	TP23 1.0	Dec 17, 2021		Soil	S21-De52550	X		X		X		
93	TP23 1.5	Dec 17, 2021		Soil	S21-De52551	X		X		X		
94	TP24 0.2	Dec 17, 2021		Soil	S21-De52552	X		X		X		
95	TP24 0.5	Dec 17, 2021		Soil	S21-De52553	X		X		X		
96	TP24 1.5	Dec 17, 2021		Soil	S21-De52554	X		X		X		
97	TP25 0.2	Dec 17, 2021		Soil	S21-De52555	X		X		X		

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Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
98	TP6 1.0	Dec 17, 2021		Soil	S21-De52556		X					
99	TP7 1.0	Dec 17, 2021		Soil	S21-De52557		X					
100	TP7 2.0	Dec 17, 2021		Soil	S21-De52558		X					
101	TP7 2.5	Dec 17, 2021		Soil	S21-De52559		X					
102	TP9 1.0	Dec 17, 2021		Soil	S21-De52560		X					
103	TP10 1.0	Dec 17, 2021		Soil	S21-De52561		X					
104	TP11 1.0	Dec 17, 2021		Soil	S21-De52562		X					
105	TP11 1.5	Dec 17, 2021		Soil	S21-De52563		X					
106	TP14 1.0	Dec 17, 2021		Soil	S21-De52564		X					
107	TP16 0.5	Dec 17, 2021		Soil	S21-De52565		X					
108	TP17 1.0	Dec 17, 2021		Soil	S21-De52566		X					

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Melbourne Laboratory - NATA # 1261 Site # 1254									X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794												
Mayfield Laboratory - NATA # 1261 Site # 25079												
Perth Laboratory - NATA # 2377 Site # 2370												
External Laboratory												
109	TP18 1.0	Dec 17, 2021		Soil	S21-De52567		X					
110	TP18 2.5	Dec 17, 2021		Soil	S21-De52568		X					
111	TP22 1.0	Dec 17, 2021		Soil	S21-De52569		X					
112	TP24 1.0	Dec 17, 2021		Soil	S21-De52570		X					
113	TP25 0.5	Dec 17, 2021		Soil	S21-De52723				X	X	X	X
114	TP25 1.0	Dec 17, 2021		Soil	S21-De52724				X	X	X	X
115	TP25 1.5	Dec 17, 2021		Soil	S21-De52725				X	X	X	X
Test Counts						82	16	74	25	99	17	17

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	< 10			10	Pass	
Chloride			mg/kg	< 10			10	Pass	
Sulphate (as SO4)			mg/kg	< 10			10	Pass	
LCS - % Recovery									
Conductivity (1:5 aqueous extract at 25°C as rec.)			%	114			70-130	Pass	
Chloride			%	103			70-130	Pass	
Sulphate (as SO4)			%	106			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
				Result 1					
Chloride	S22-Ja03692	NCP	%	112			70-130	Pass	
Sulphate (as SO4)	S22-Ja03692	NCP	%	111			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52278	CP	uS/cm	230	230	1.3	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52278	CP	pH Units	5.3	5.4	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-De52286	CP	%	15	15	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52288	CP	uS/cm	160	180	7.7	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52288	CP	pH Units	5.4	5.3	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52482	CP	uS/cm	26	32	19	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52482	CP	pH Units	6.1	6.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52489	CP	uS/cm	41	81	66	30%	Fail	Q15
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52489	CP	pH Units	5.9	5.8	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52499	CP	uS/cm	130	94	35	30%	Fail	Q15
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52499	CP	pH Units	6.3	6.2	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S21-De52504	CP	mg/kg	380	380	1.0	30%	Pass	
Sulphate (as SO4)	S21-De52504	CP	mg/kg	290	280	1.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52510	CP	uS/cm	330	230	35	30%	Fail	Q02
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52510	CP	pH Units	5.2	5.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S21-De52513	CP	mg/kg	890	890	<1	30%	Pass	
Sulphate (as SO4)	S21-De52513	CP	mg/kg	280	280	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52522	CP	uS/cm	130	51	89	30%	Fail	Q02
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52522	CP	pH Units	6.3	6.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52552	CP	uS/cm	49	47	5.4	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52552	CP	pH Units	6.1	6.0	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-De52555	CP	uS/cm	40	49	19	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-De52555	CP	pH Units	6.0	6.0	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GEOTEST SERVICES PTY LTD	Contact Name : DAVID SPASOJEVIC	Purchase Order :	COC Number :
Office Address : 18/24 GARLING ROAD	Project Manager : Jacob Barnes	PROJECT Number : P33603.2	Eurofins | mgt quote ID :
KINGS PARK, N.S.W. 2148	Email for results : admin@geotestservices.com.au	PROJECT Name : 531 Cobbitty Road	Data output format:
PH: 9671 4443 FAX: 9671 4343			

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
1	TP1 0.2	17/12/2021	SOIL	X	X				
2	TP1 0.5	17/12/2021	SOIL	X		X	X	X	
3	TP1 1.0	17/12/2021	SOIL	X	X				
4	TP1 1.5	17/12/2021	SOIL	X		X	X	X	
5	TP1 2.0	17/12/2021	SOIL	X	X				
6	TP1 2.5	17/12/2021	SOIL	X		X	X	X	
7	TP1 3.0	17/12/2021	SOIL	X		X	X	X	
8	TP2 0.2	17/12/2021	SOIL	X	X				
9	TP2 0.5	17/12/2021	SOIL	X	X				
10	TP2 1.0	17/12/2021	SOIL						X
11	TP2 1.5	17/12/2021	SOIL	X	X				
12	TP3 0.2	17/12/2021	SOIL	X	X				
13	TP3 0.5	17/12/2021	SOIL	X	X				
14	TP3 1.0	17/12/2021	SOIL	X	X				
15	TP3 1.5	17/12/2021	SOIL	X	X				
16	TP4 0.2	17/12/2021	SOIL	X	X				

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

	500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG	Sample comments:
1								X	
2								X	
3								X	
4								X	
5								X	
6								X	
7								X	
8								X	
9								X	
10								X	
11								X	
12								X	
13								X	
14								X	
15								X	
16								X	

	Laboratory Staff	Turn around time	Method Of Shipment	Temperature on arrival:
Relinquished By: Jacob Barnes	Received By:	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier ☑ Hand Delivered ☐ Postal	11.8
Date & Time : 20/12/2021	Date & Time :	5 DAY ☑ 10 DAY ☐ Other:	M.H	Report number:
Signature:	Signature:		Courier Consignment # : 20/12/21	# 852446

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GEOTEST SERVICES PTY LTD	Contact Name : DAVID SPASOJEVIC	Purchase Order :	COC Number :
Office Address : 18/24 GARLING ROAD	Project Manager : Jacob Barnes	PROJECT Number : P33603.2	Eurofins | mgt quote ID :
KINGS PARK, N.S.W. 2148	Email for results : admin@geotestservices.com.au	PROJECT Name : 531 Cobbitty Road	Data output format:
PH: 9671 4443 FAX: 9671 4343			

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
17	TP4 0.5	17/12/2021	SOIL	X	X				
18	TP4 1.0	17/12/2021	SOIL	X	X				
19	TP4 1.5	17/12/2021	SOIL	X	X				
20	TP5 0.2	17/12/2021	SOIL	X	X				
21	TP5 0.5	17/12/2021	SOIL	X	X				
22	TP5 1.0	17/12/2021	SOIL	X	X				
23	TP5 1.5	17/12/2021	SOIL	X	X				
24	TP6 0.2	17/12/2021	SOIL	X	X				
25	TP6 0.5	17/12/2021	SOIL	X	X				
26	TP6 1.0	17/12/2021	SOIL						X
27	TP6 1.5	17/12/2021	SOIL	X	X				
28	TP7 0.2	17/12/2021	SOIL	X		X			
29	TP7 0.5	17/12/2021	SOIL	X		X	X	X	
30	TP7 1.0	17/12/2021	SOIL						X
31	TP7 1.5	17/12/2021	SOIL	X		X			
32	TP7 2.0	17/12/2021	SOIL						X

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

	500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG	Sample comments:
17								X	
18								X	
19								X	
20								X	
21								X	
22								X	
23								X	
24								X	
25								X	
26								X	
27								X	
28								X	
29								X	
30								X	
31								X	
32								X	

Laboratory Staff		Turn around time	Method Of Shipment	Temperature on arrival:
Relinquished By: Jacob Barnes	Received By:	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier M.H	11.8
Date & Time : 20/12/2021	Date & Time :	5 DAY ☑ 10 DAY ☐ Other.	☑ Hand Delivered	Report number:
Signature:	Signature:		☐ Postal	#852446
			Courier Consignment # : 20,12,21	

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page 3 of 8

Company Name : GEOTEST SERVICES PTY LTD	Contact Name : DAVID SPASOJEVIC	Purchase Order :	COC Number :
Office Address : 18/24 GARLING ROAD	Project Manager : Jacob Barnes	PROJECT Number : P33603.2	Eurofins | mgt quote ID :
KINGS PARK, N.S.W. 2148	Email for results : admin@geotestservices.com.au	PROJECT Name : 531 Cobbitty Road	Data output format:
PH: 9671 4443 FAX: 9671 4343			

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
33	TP7 2.5	17/12/2021	SOIL						X
34	TP7 3.0	17/12/2021	SOIL	X		X	X	X	
35	TP8 0.2	17/12/2021	SOIL	X	X				
36	TP8 0.5	17/12/2021	SOIL	X	X				
37	TP8 1.0	17/12/2021	SOIL	X	X				
38	TP8 1.5	17/12/2021	SOIL	X	X				
39	TP9 0.2	17/12/2021	SOIL	X	X				
40	TP9 0.5	17/12/2021	SOIL	X	X				
41	TP9 1.0	17/12/2021	SOIL						X
42	TP9 1.5	17/12/2021	SOIL	X	X				
43	TP10 0.2	17/12/2021	SOIL	X	X				
44	TP10 0.5	17/12/2021	SOIL	X	X				
45	TP10 1.0	17/12/2021	SOIL						X
46	TP10 1.5	17/12/2021	SOIL	X	X				
47	TP11 0.2	17/12/2021	SOIL	X	X				
48	TP11 0.5	17/12/2021	SOIL	X	X				

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

	500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG	Sample comments:
33								X	
34								X	
35								X	
36								X	
37								X	
38								X	
39								X	
40								X	
41								X	
42								X	
43								X	
44								X	
45								X	
46								X	
47								X	
48								X	

Relinquished By: Jacob Barnes	Received By:	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time : 20/12/2021	Date & Time :	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier ☑ Hand Delivered ☐ Postal	4.8
Signature:	Signature:	5 DAY ☑ 10 DAY ☐ Other:	Courier Consignment # : 20,12,21	Report number: # 852446

M.H

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GEOTEST SERVICES PTY LTD	Contact Name : DAVID SPASOJEVIC	Purchase Order :	COC Number :
Office Address : 18/24 GARLING ROAD	Project Manager : Jacob Barnes	PROJECT Number : P33603.2	Eurofins | mgt quote ID :
KINGS PARK, N.S.W. 2148	Email for results : admin@geotestservices.com.au	PROJECT Name : 531 Cobbitty Road	Data output format:
PH: 9671 4443 FAX: 9671 4343			

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
49	TP11 1.0	17/12/2021	SOIL						X
50	TP11 1.5	17/12/2021	SOIL						X
51	TP12 0.2	17/12/2021	SOIL	X	X				
52	TP12 0.5	17/12/2021	SOIL	X		X	X	X	
53	TP12 1.0	17/12/2021	SOIL	X	X				
54	TP12 1.5	17/12/2021	SOIL	X		X			
55	TP13 0.2	17/12/2021	SOIL	X	X				
56	TP13 0.5	17/12/2021	SOIL	X	X				
57	TP13 1.0	17/12/2021	SOIL	X	X				
58	TP13 1.5	17/12/2021	SOIL	X	X				
59	TP14 0.2	17/12/2021	SOIL	X	X				
60	TP14 0.5	17/12/2021	SOIL	X	X				
61	TP14 1.0	17/12/2021	SOIL						X
62	TP14 1.5	17/12/2021	SOIL	X	X				
63	TP15 0.2	17/12/2021	SOIL	X	X				
64	TP15 0.5	17/12/2021	SOIL	X		X	X	X	

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

	500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP BAG	Sample comments:
49								X	
50								X	
51								X	
52								X	
53								X	
54								X	
55								X	
56								X	
57								X	
58								X	
59								X	
60								X	
61								X	
62								X	
63								X	
64								X	

Laboratory Staff		Turn around time	Method Of Shipment	Temperature on arrival:
Relinquished By: Jacob Barnes	Received By:	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier	11.8
Date & Time : 20/12/2021	Date & Time :	5 DAY ☑ 10 DAY ☐ Other:	☑ Hand Delivered M.H	Report number:
Signature:	Signature:		☐ Postal	
			Courier Consignment # : 20/12/21	# 852446

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GEOTEST SERVICES PTY LTD	Contact Name : DAVID SPASOJEVIC	Purchase Order :	COC Number :
Office Address : 18/24 GARLING ROAD	Project Manager : Jacob Barnes	PROJECT Number : P33603.2	Eurofins | mgt quote ID :
KINGS PARK, N.S.W. 2148	Email for results : admin@geotestservices.com.au	PROJECT Name : 531 Cobbitty Road	Data output format:
PH: 9671 4443 FAX: 9671 4343			

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Some common holding times (with correct preservation). For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD	Containers: 500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG	Sample comments:
65	TP15 1.0	17/12/2021	SOIL	X	X												X	
66	TP15 1.5	17/12/2021	SOIL	X		X											X	
67	TP15 2.0	17/12/2021	SOIL	X		X											X	
68	TP15 2.5	17/12/2021	SOIL	X		X											X	
69	TP15 3.0	17/12/2021	SOIL	X		X	X	X									X	
70	TP16 0.2	17/12/2021	SOIL	X	X												X	
71	TP16 0.5	17/12/2021	SOIL						X								X	
72	TP16 1.0	17/12/2021	SOIL	X	X												X	
73	TP16 1.5	17/12/2021	SOIL	X	X												X	
74	TP17 0.2	17/12/2021	SOIL	X	X												X	
75	TP17 0.5	17/12/2021	SOIL	X	X												X	
76	TP17 1.0	17/12/2021	SOIL						X								X	
77	TP17 1.5	17/12/2021	SOIL	X	X												X	
78	TP18 0.2	17/12/2021	SOIL	X	X												X	
79	TP18 0.5	17/12/2021	SOIL	X		X	X	X									X	
80	TP18 1.0	17/12/2021	SOIL						X								X	

Laboratory Staff

Relinquished By: Jacob Barnes	Received By:
Date & Time : 20/12/2021	Date & Time :
Signature:	Signature:

Turn around time

1 DAY ☐ 2 DAY ☐ 3 DAY ☐
5 DAY ☑ 10 DAY ☐ Other:

Method Of Shipment

☐ Courier
☑ Hand Delivered
☐ Postal
Courier Consignment # :

M·H
20,12,21

Temperature on arrival: 11·8

Report number: # 852446

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GEOTEST SERVICES PTY LTD
Office Address : 18/24 GARLING ROAD
KINGS PARK, N.S.W. 2148
PH: 9671 4443 FAX: 9671 4343

Contact Name : DAVID SPASOJEVIC
Project Manager : Jacob Barnes
Email for results : admin@geotestservices.com.au

Purchase Order :
PROJECT Number : P33603.2
PROJECT Name : 531 Cobbitty Road

COC Number :
Eurofins | mgt quote ID :
Data output format:

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
81	TP18 1.5	17/12/2021	SOIL	X	X				
82	TP18 2.0	17/12/2021	SOIL	X		X	X	X	
83	TP18 2.5	17/12/2021	SOIL						X
84	TP18 3.0	17/12/2021	SOIL	X		X	X	X	
85	TP19 0.2	17/12/2021	SOIL	X	X				
86	TP19 0.5	17/12/2021	SOIL	X	X				
87	TP19 1.0	17/12/2021	SOIL	X	X				
88	TP19 1.5	17/12/2021	SOIL	X	X				
89	TP20 0.2	17/12/2021	SOIL	X	X				
90	TP20 0.5	17/12/2021	SOIL	X	X				
91	TP20 1.0	17/12/2021	SOIL	X	X				
92	TP20 1.5	17/12/2021	SOIL	X	X				
93	TP21 0.2	17/12/2021	SOIL	X		X			
94	TP21 0.5	17/12/2021	SOIL	X		X	X	X	
95	TP21 1.0	17/12/2021	SOIL	X		X			
96	TP21 1.5	17/12/2021	SOIL	X	X				

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

	500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG	Sample comments:
81								X	
82								X	
83								X	
84								X	
85								X	
86								X	
87								X	
88								X	
89								X	
90								X	
91								X	
92								X	
93								X	
94								X	
95								X	
96								X	

Laboratory Staff

Relinquished By: Jacob Barnes
Date & Time : 20/12/2021
Signature:

Received By:
Date & Time :
Signature:

Turn around time

1 DAY ☐ 2 DAY ☐ 3 DAY ☐
5 DAY ☑ 10 DAY ☐ Other:

Method Of Shipment

☐ Courier
☑ Hand Delivered
☐ Postal
Courier Consignment # :

M·H
20, 12, 21

Temperature on arrival:
1 - 8

Report number:
872446

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

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Office Address : 18/24 GARLING ROAD
KINGS PARK, N.S.W. 2148
PH: 9671 4443 FAX: 9671 4343

Contact Name : DAVID SPASOJEVIC
Project Manager : Jacob Barnes
Email for results : admin@geotestservices.com.au

Purchase Order :
PROJECT Number : P33603.2
PROJECT Name : 531 Cobbitty Road

COC Number :
Eurofins | mgt quote ID :
Data output format:

Special Directions & Comments :

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	ELECTRICAL CONDUCTIVITY	pH	SUITE B18	C.E.C	E.S.P	HOLD
97	TP21 2.0	17/12/2021	SOIL	X	X				
98	TP21 2.5	17/12/2021	SOIL	X	X				
99	TP21 3.0	17/12/2021	SOIL	X		X	X	X	
100	TP22 0.2	17/12/2021	SOIL	X	X				
101	TP22 0.5	17/12/2021	SOIL	X	X				
102	TP22 1.0	17/12/2021	SOIL						X
103	TP22 1.5	17/12/2021	SOIL	X	X				
104	TP23 0.2	17/12/2021	SOIL	X	X				
105	TP23 0.5	17/12/2021	SOIL	X	X				
106	TP23 1.0	17/12/2021	SOIL	X	X				
107	TP23 1.5	17/12/2021	SOIL	X	X				
108	TP24 0.2	17/12/2021	SOIL	X	X				
109	TP24 0.5	17/12/2021	SOIL	X	X				
110	TP24 1.0	17/12/2021	SOIL						X
111	TP24 1.5	17/12/2021	SOIL	X	X				
112	TP25 0.2	17/12/2021	SOIL	X	X				

Some common holding times (with correct preservation).
For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

500ML	60ML METALS	120ML MICROBIO	1LA	40mL vial	125mL A	Jar	ZIP.BAG
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X
							X

Sample comments:

Laboratory Staff

Relinquished By: Jacob Barnes
Date & Time : 20/12/2021
Signature:

Received By:
Date & Time :
Signature:

Turn around time

1 DAY ☐ 2 DAY ☐ 3 DAY ☐
5 DAY ☑ 10 DAY ☐ Other:

Method Of Shipment

☐ Courier
☑ Hand Delivered
☐ Postal
Courier Consignment # :

M-H
20/12/21

Temperature on arrival: 4-8

Report number: # 852446

Appendix E – Concrete Strength & Detailing Requirements

Geotest Services

Exposure Classification For Concrete In Saline Soils

AS 2870-2011 (Table 5.1)

Saturated extract Electrical Conductivity (EC_e), dS/m	Exposure classification
<4	A1
4-8	A2
8-16	B1
>16	B2

1 Guidance on concrete in saline environments can be found in CCAA T56
2 Exposure classifications are from AS 3600
3 The current accepted method of determining the salinity level of the soil is by measuring the extract electrical conductivity (EC) of a soil and water mixture in deciSiemens per metre (dS/m) and using conversion factors that allow for soil texture, to determine the saturated extract electrical conductivity (EC_e).
4 The division between a non-saline and saline soil is generally regarded as an EC_e value of 4 dS/m, therefore no increase in the minimum concrete strength is required below this value.

Exposure Classification For Concrete In Sulfate Soils

AS 2870-2011 (Table 5.2)

Exposure Conditions			Exposure Classification	
Sulfates (expressed as $S0_4$)*		pH	Soil Conditions A^	Soil conditions B^^
In Soil ppm	In groundwater ppm			
<5000	<1000	>5.5	A2	A1
5000-10,000	1000-3000	4.5-5.5	B1	A2
10,000-20,000	3000-10,000	4-4.5	B2	B1
>20,000	>10,000	<4	C2	B2

* Approximately 100ppm $S0_4$ = 80 ppm $S0_3$
^ Soil Condition A – High permeability soils (e.g., sands and gravels) that are in groundwater
^^ Soil Condition B – Low permeability soils (e.g., silts and clays) or all soils above groundwater

Minimum Design Characteristic Strength (f'_c) And Curing Requirements For Concrete

AS 2870-2011 (Table 5.3)

Exposure Classification	Minimum $f'c$ MPa	Minimum initial curing requirement
A1	20	Cure continuously for at least 3 days
A2	25	
B1	32	Cure continuously for at least 7 days
B2	40	
C1	≥50	
C2	≥50	

Geotest Services

Minimum Reinforcement Cover For Concrete

As 2870-2011 (Table 5.4)

Exposure Classification	Minimum Cover in saline soils* (mm)	Minimum cover in sulfate soils ^ (mm)
A1	See Clause 5.3.2	40
A2	45	50
B1	50	60
B2	55	65
C1	^^	70
C2	^^	85

*Where a damp-proofing membrane is installed, the minimum reinforcement cover in saline soils may be reduced to 30 mm.

^Where a damp-proofing membrane is installed, the minimum reinforcement cover in sulfate soils may be reduced by 10 mm

^^Saline soils have a minimum exposure classification of B2 as per Table 5.1.1

Report Prepared by Geotest Services Pty Ltd.

– end –

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