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GEOTECHNICAL REPORT

285-289, 293-295 Mona Vale Road & 1 Flinders Road
St Ives NSW 2075

Opal HealthCare – November 2025

DOCUMENT CONTROL

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St Ives NSW 2075

PREPARED FOR

Opal HealthCare
C/- Onofrio Marzulli
Midson Group Pty Ltd
Suite 7, 33 Alexandra Street
Hunters Hill NSW 2110

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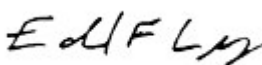
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Harsha Muthu
ME Environmental Engineer
Project Scientist



Edward Lilly
BS Civil Engineering, MIEAust
Associate Engineer

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1. INTRODUCTION

Geo-Logix Pty Ltd (Geo-Logix) was engaged by Midson Group Pty Ltd on behalf of Opal HealthCare to conduct a geotechnical investigation of the property located at 285-289, 293-295 Mona Vale Road & 1 Flinders Road, St Ives NSW 2075 (Figure 1). Geo-Logix understands that the purpose of the investigation is to characterise subsurface conditions to assist with design and construction of a proposed development.

1.1 Proposed Development

It is understood that Opal Healthcare is proposing to redevelop the site as a multi-storey residential aged care facility with basement, parking and landscape area (Attachment A).

1.2 Objectives and Scope of Work

The objective of the geotechnical investigation was to provide an assessment of subsurface conditions to assist with design and construction of the proposed development.

To satisfy the above objectives Geo-Logix completed the following scope of work:

- Review of available soil and geological maps and reports held within our files;
- Before You Dig Australia (BYDA) desktop search for buried services combined with scanning for buried services using a specialist contractor;
- Completion of eleven geotechnical boreholes to TC-bit refusal or a maximum depth of 6 Metres below grade (mbg);
- Extension of two boreholes to a depth of 9 mbg using NMLC rock coring, followed by installation of monitoring wells into these boreholes;
- Logging of fill and native soil by a Geo-Logix geologist in accordance with the Unified Soil Classification System (USCS);
- Standard Penetration Tests (SPTs) at regular intervals in each geotechnical bore to determine the consistency/density of in situ soils;
- Collection of representative samples for geotechnical laboratory testing from bores, including soil classification tests, California Bearing Ratio (CBR) tests, aggressivity tests, and point load strength index testing of rock core;
- Reinstatement of each borehole with soil cuttings at the completion of drilling;
- Measurement of groundwater elevations and completion of aquifer testing once groundwater levels had stabilised, approximately one week after well installation;
- Completion of an additional round of groundwater elevation measurements one week later; and
- Provision of this report detailing results of the investigation.

The Geo-Logix field investigation was conducted on 3 June 2022, and 28 to 29 August 2025. Groundwater elevation measurements and aquifer testing were completed on 12 September 2025. Additional Groundwater elevation measurements were made on 19 September 2025.

2. SITE INFORMATION

Site Information	Details
Address	285-289, 293-295 Mona Vale Road & 1 Flinders Road, St Ives NSW 2075
Lot and Deposited Plan (DP)	Lot 6 DP215732, Lot 7 DP215732, Lot 3 DP29593, Lots 1 & 2 DP1040841, Lot 1 DP783818 & Lot 3 DP527824
Approximate Area	12,742 m ²
Site Description (Figure 2)	The site is made up of seven separate residential blocks with 285-289, 293-295 Mona Vale Road to the north and 1 Flinders Avenue to the south of the site. At the time of the inspection the site was not occupied by residents. The site surface was mainly covered by houses and well-maintained gardens. Concrete and brick driveways, pools, tennis court, ponds along with residential structures covered the remaining areas of the site. Bonded asbestos fragments were uncovered during soil sampling adjacent to residential house 287A in the centre of the site. Lot 6 DP215732 – 295 Mona Vale Road The site is irregular in shape, single storey house with fibro cement walls, pool and backyard in the eastern boundary of the site. Garden in the western portion of the site. Lot 7 DP215732 – 293 Mona Vale Road The site is irregular in shape. The single storey house comprises of swimming pool in the northwestern portion, tennis court in the northeastern part of the site with garden in the centre of the site. Mature trees were present on both side of the driveway.
Topography and Elevation	The site is situated on a minor slope running from the north-west to the south-east. Site elevation ranges from 156-164 mAHD.
Geology	Ashfield Shale – Black to light grey shale and laminate.
Regional Hydrogeology	Groundwater is expected to follow regional topography and flow towards the southeast.
Acid Sulfate Soils	Based on the elevation and geology, Acid Sulfate Soils are not expected at the site.

3. METHOD OF INVESTIGATION

3.1 Investigation Methods

Geotechnical fieldwork was completed on 3 June 2022 and 28-29 August 2025. Groundwater monitoring was completed on 12 September 2025.

Prior to undertaking the borings, each location was scanned for underground services and utilities by an independent utility locator and cross-checked with the results of a 'Before You Dig Australia' (DBYA) search.

Bores (BH1, BH3, BH4, BH6, BH7, BH8 and BH9) were completed by utilising a ute mounted drill rig equipped with solid stem augers with a "V" shaped hardened steel bit (V-bit) to refusal. The bores were

then continued using a tungsten carbide tipped bit (TC-bit) to refusal. At the completion of drilling, the test bores were reinstated with soil cuttings and compacted.

Bore locations BH2 and BH5 were not accessible by ute. These bores were completed by hand-auger.

DCP/SPTs were completed at regular intervals to provide representative samples of the subsurface and blow counts indicative of the soil/rock strength.

Encountered soils were logged in accordance with the Unified Soil Classification System (USCS). The boring logs, including DCP/SPT results, are presented in Attachment B. Photos of rock cores are presented in Attachment C.

Preparatory Works

- Preparation of a site-specific health, safety and environment plan and sampling plan for field-based work.
- Underground utilities clearance to confirm the suitability of proposed drilling locations.
- The proposed drilling locations were modified as site access was restricted due to a locked gate. Final bore locations are shown in Figure 2.

Boreholes

- Boreholes were drilled using a solid stem auger on a truck-mounted drill rig. Holes were advanced using V-bit until refusal, then using tungsten carbide (TC) bit until refusal.
- Boreholes for groundwater well installation were completed using TC bit to a depth of 6 m. From 6 to 9 metres below ground (mbg), these holes were continued using NMLC coring.
- Soil and rock were logged in accordance with AS1726-2017.

Sampling

- Soil samples were collected at regular intervals in all boreholes for aggressivity analysis. Samples were placed into laboratory prepared glass jars with Teflon-sealed lids and packed tightly with minimal headspace. They were then stored in an esky with ice (during transport) or in a refrigerator prior to arrival at the laboratory.
- Four bulk soil samples for CBR testing were collected from the following locations: CBR1, near to boreholes BH6/BH7; CBR2, near to borehole BH3; and from boreholes BH8 and BH9.
- Rock core was inspected and rock defects logged prior to being placed into metal core boxes and photographed.
- Soil sample jars were sent to Eurofins laboratory under chain of custody documentation. Bulk samples and rock core was sent to Macquarie Geotechnical laboratory.

Well Installation

- Groundwater wells were installed after completion of coring.
- 6 m PVC well screen with end cap was first inserted into boreholes, followed by 3 m of 50 mm diameter PVC casing.
- Each well annulus was backfilled with 2 mm sand to a depth of 0.5 m above the top of the screen. To prevent bridging within the narrow-cored annulus, sand was poured in

at a slow rate. In wells MW1 and MW2, water was bailed from the well during the backfill process to help avoid bridging.

- 1 m of bentonite pellets were placed over the top of the sand.
- The remainder of the annulus was filled with cement to the surface. The well was covered with a gatic cover.

Well Development

- Wells were developed by removing water using a designated bailer.
- Three well volumes of water from each well were removed.
- Well development logs recording removal of water during well construction and later well development is provided in Attachment D.

Groundwater Monitoring

- Groundwater wells were gauged on 12 September 2025. Well caps were initially removed and a period of 20 minutes minimum allowed to enable head stabilisation. Groundwater levels were then gauged from top of casing using an interface probe. The interface probe was decontaminated between each location using Decon 90 detergent and tap water for rinsing. Groundwater gauging logs are located in Attachment E.
- Rising head aquifer tests were performed at each of the installed wells, MW1 and MW2 on 12 September 2025
- Interface probe, pump, and hosing were washed between well locations using Decon 90 detergent and tap water.
- For each rising head test, a volume of water between 1 and 5 L was removed using a Super Twister Pump or bailer. The rising water level was then gauged at 30 second intervals until the rate of water rising had stabilised to 25 mm/minute or less.

4. SITE GEOLOGY AND HYDROGEOLOGY

4.1 Site Geology

For detailed descriptions of individual locations please refer to the attached borehole logs.

Type	Depths Encountered (m)	Description
FILL	0 – 0.4 m	Fill was observed in few boreholes. Fill in BH8 and BH9 looks like imported fill.
TOPSOIL	0 – 0.2 m	Topsoil was encountered in MW1 which is silty sand, dark brown, dense, fine grained, and moist.
NATIVE SOIL	0.2 – 3.1 m	Subsoils were most commonly fine to medium grained clayey sand, grey, reddish brown, yellow and brown in colour. Some deeper subsoils, immediately overlying bedrock, contained weathered gravelly shale.
BEDROCK	1.7+	Siltstone observed in outcrop at the site was distinctly weathered, slightly granular, pale yellowish brown, and coarse-grained. Siltstone was encountered in some boreholes. Degree of weathering decreased with depth. Siltstones were light grey, greyish brown in colour. Cored siltstone was slightly weathered, high strength, and medium to coarse grained, with visible, often angled bedding. Shale was found in few boreholes. Shale was pale red, pinkish white, light grey in colour.

4.2 Site Hydrogeology

Groundwater was observed during drilling.

On 3 June 2022, Geo-Logix encountered water that appeared to be infiltrating from recent rainfall was encountered at the soil-rock interface between 1.1m and 3m depth.

Stabilised groundwater measurements, taken on 12 and 19 September 2025, are summarised in the table below.

Groundwater Well ID	Top of casing (mAHD)*	Total Depth (mbtoc**)	Standing Water Level (mbtoc**)		Standing Water Level (mAHD)	
			12 September	19 September	12 September	19 September
MW1	162.0	8.502	1.113	1.157	160.9	160.8
MW2	162.8	8.460	1.981	2.193	160.8	160.6

* elevation interpreted from existing topographical survey

** mbtoc = metres below top of casing

Hydraulic Conductivity

Rising head test results were used to calculate hydraulic conductivity using the Bouwer-Rice (1976) method. Conductivity was modelled using AQTESOLV aquifer modelling software using test results and these assumptions:

- Inside radius of well casing & radius of screened section = 0.025 m
- Average radius of sand pack = 0.02 m
- Unconfined aquifer in fractured sandstone
- Flat-lying bedding assumed (no folds or faults)

Results are shown in the following table:

Well ID	Hydraulic Conductivity (m/day)		
	Test 1	Test 2	Test 3
MW1	0.011	0.028	0.036
MW2	0.012	0.023	0.036

Estimated hydraulic conductivities are consistent with geology (Freeze and Cherry, 1979). AQTESOLV results are presented in Attachment F.

5. LABORATORY RESULTS

Representative samples of soil and rock were collected during the fieldwork and submitted to Macquarie Geotechnical and Eurofins Environment Testing Australia Pty Ltd (Eurofins) for laboratory testing. Testing included:

- Standard Maximum Dry Density (MDD), Optimum Moisture Content (OMC) and California Bearing Ratio (CBR) testing to assist with pavement and slab design;
- Aggressivity testing (electrical conductivity, sulphate, chloride and pH) to assess the exposure classification of the soil with respect to buried structural concrete and/or exposed steel;
- Point load strength index testing at regular intervals within rock core to determine rock strength; and
- Atterberg Limits and Linear Shrinkage tests to assess the plasticity and reactivity of specific soil samples to assist with classification and description.

The laboratory test results are presented in Attachment G. A summary of the results is provided in the following sections.

5.1 USCS Classification Testing

Soil samples were collected from locations BH3, BH4, BH6, BH8 and BH9 and submitted for laboratory analysis to Macquarie for NATA accredited Atterberg Limits and Linear Shrinkage tests. The samples were selected to confirm the USCS field classification of fill and natural soils across the site. Linear Shrinkage testing was completed to facilitate calculation of the free surface movement of the onsite soils for site classification in accordance with AS2870-2011. A summary of the results is provided in the following table:

Location/ Depth (m)	Laboratory sample description	Liquid Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Material Finer than 4.75 mm (%)	Material Finer than 425 μ m (%)	Material Finer than 75 μ m (%)
BH3/0.0-0.4	Silty Sandy CLAY, trace of Gravel	--	--	--	97	77	52
BH3/1.0-1.5	Silty Sandy Clay	54	34	12.5	--	--	--
BH4/0.4-0.5	Silty Clay	64	45	14.0	--	--	--
BH6/2.0-2.45	Silty Clay	45	32	13.0	--	--	--
BH8/0.6-0.9	Silty Clay	62	41	13.5	--	--	--
BH9/0.7-0.9	Silty Clay	67	43	14.0	--	--	--

Under the USCS material larger than 4.75 mm in size is considered Gravel, material between 4.75-75 μ m in size is considered Sand and material finer than 75 μ m in size is considered Silt or Clay. The Atterberg Limit test results indicate whether the fine-grained component of the samples is classified as Silt or Clay as well as the reactivity of the material. The potential for surface movement based on the reactivity of the soil to changes in moisture is discussed in Section 6.6.

5.2 Californian Bearing Ratio (CBR)

Bulk soil samples were collected from locations CBR1, CBR2, BH8 and BH9 are submitted for laboratory analysis to determine a CBR value for use in pavement design. These samples were submitted to Macquarie for NATA accredited testing of the CBR.

The CBR samples were remoulded in the laboratory and compacted to 100% standard maximum dry density (SMDD) at optimum moisture content (OMC). Prior to testing, the samples were soaked for four days under a surcharge load of 4.5 kg. The soaked CBR values are provided in the following table.

Location/ Depth (m)	Laboratory sample description	Maximum dry density t/m ³	OMC (%)	CBR Value (%)	Swell After Soaking (%)
CBR1/0.0-0.3	Sandy Silty CLAY	1.534	23.8	7	0.7
CBR2/0.0-0.4	Silty Clay	1.499	23.9	7	0.7
BH8/0.14-2.3	Clayey SILT	1.72	19.7	5	1.0
BH9/0.2-2.1	Silty CLAY	1.69	19.9	3.5	2.5

Pavement design based on these CBR results is discussed in Section 6.8.

5.3 Exposure Classification Tests

Selected soil samples were submitted to Eurofins for NATA accredited testing of pH, sulphate, chloride and electrical conductivity to determine the exposure classification (or aggressiveness/ corrosiveness potential of the soil) with respect to buried steel and/or concrete. The samples were selected as representative of onsite soils in which foundations were expected.

To determine the aggressiveness of the soil and water environment on concrete or steel, the chemical test results are compared to Tables 6.1 and 6.3 from Section 6 of the Australian Standard AS2159 – 2009. This section provides assessment criteria to assess the ‘exposure classification’ for a concrete or steel pile. The Standard has two classes of soil conditions:

- Type A – high permeability soils below groundwater; and
- Type B – low permeability soils and all soils above groundwater.

Based on the chemical testing results, the Standard provides a range of ‘exposure classifications’ from non-aggressive to very severe. For the range of chemical conditions in the soil surrounding the structure, the condition leading to the most severe aggressive conditions is adopted. A summary of the soil results is provided in the following table.

Location/ Depth (m)	Soil Type	Electrical Conductivity (EC) (dS/m)	Soil Texture Factor	Extract Electrical Conductivity (EC _e) (dS/m)	Electrical Resistivity ($\Omega \cdot \text{cm}$)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
BH2/0.0-0.2	B	0.020	7	0.14	51,000	6.3	< 10	< 10
BH2/0.4-0.5	B	0.013	7	0.091	77,000	6.1	< 10	< 10
BH2/0.7-0.8	B	0.031	7	0.22	33,000	5.0	< 10	13
BH2/1.1-1.2	B	0.017	7	0.12	58,000	4.8	< 10	42
BH3/2.1-2.4	B	0.019	7	0.13	53,000	4.6	< 10	23
BH4/0.0-0.2	B	0.077	7	0.54	13,000	8.9	< 10	< 10
BH4/0.6-0.9	B	0.020	7	0.14	49,000	5.2	< 10	36
BH6/0.0-0.15	B	0.029	7	0.20	34,000	7.1	11	19
BH6/0.4-0.5	B	0.072	7	0.50	14,000	6.6	37	120
BH6/1.9-2.0	B	0.11	7	0.77	9,000	5.1	40	79
BH6/2.8-2.9	B	0.072	7	0.50	14,000	5.6	62	55
BH8/0.6-0.9	B	0.027	7	0.19	37,000	6.0	26	53
BH8/1.7-1.9	B	0.048	7	0.34	21,000	4.8	<10	26
BH8/2.8-3	B	0.014	7	0.10	71,000	5.2	35	330
BH8/4.3-4.5	B	0.018	7	0.13	56,000	5.1	<10	<10
BH9/0.14-0.25	B	0.270	7	1.89	3,700	11	<10	75
BH9/0.6-0.8	B	0.170	7	1.19	5,900	4.7	210	23
BH9/1.6-1.8	B	0.130	7	0.91	7,700	4.3	19	230
BH9/2.8-3	B	0.150	7	1.05	6,667	4.9	200	27
BH9/4.3-4.5	B	0.210	7	1.47	4,762	4.6	280	16

Location/ Depth (m)	Soil Type	Electrical Conductivity (EC) (dS/m)	Soil Texture Factor	Extract Electrical Conductivity (EC _e) (dS/m)	Electrical Resistivity (Ω·cm)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
MW1/0.2-0.5	B	0.010	7	0.07	100,000	5.5	<10	12
MW1/1.6-1.9	B	0.091	7	0.64	10,989	4.8	40	84
MW1/2.9-3	B	0.065	7	0.46	15,385	5.4	<10	120
MW1/5.4-5.5	B	0.043	7	0.30	23,256	5.8	<10	39

The potential aggressivity of an environment towards concrete and steel is dependent on the sulphate, chloride and pH levels of the soil. Soil aggressivity is discussed in Section 8.9. Site Salinity is discussed in Section 6.10.

5.4 Point Load Strength Index Testing

To assess the strength of the encountered bedrock, representative samples of recovered rock core were submitted to Macquarie Geotech for NATA accredited testing of Point Load Strength Index (Is₍₅₀₎) to facilitate the assessment of bearing capacity and excavatability of the rock.

Point load tests were conducted at approximately 1 m intervals. Point load tests were conducted in the diametral and axial directions. A summary of the tests results from samples submitted by Geo-Logix is provided in the following table.

Borehole	Depth	Diametral Is(50) (MPa)	Axial Is(50) (MPa)	Estimated UCS* (Is(50) × 15)
MW1	6.4	0.69	0.75	11.3
MW1	7.4	0.71	1.1	16.5
MW1	8.4	0.76	1.4	21
MW2	6.5	0.63	1.0	15
MW2	7.5	0.47	0.98	14.7
MW2	8.5	0.77	1.2	18

* Estimated UCS based on multiplication of Axial Is₍₅₀₎ by a correlation factor of 15.

Based on rock strength, results for the majority of interbedded sandstone and siltstone is consistent with Class III sandstone (Bertuzzi & Pells, 2002).

The excavatability of rock is discussed in Section 6.2. Allowable bearing capacities of foundations on rock are discussed in Section 6.7.

6. DISCUSSION

6.1 Earthworks

The subject site should be prepared in accordance with AS 3798-2009 Section 6.1 and filled in accordance with AS 3798-2009 Section 6.2.

Initial Site Preparation

Initially surface features including pavements and building foundations should be stripped from the site, in accordance with demolition plans.

Utilities should be located and rerouted as necessary, and any abandoned pipes or utility conduits should be removed or filled with grout. Utility trench excavations must be cut to competent bearing soils and backfilled with properly compacted structural fill.

Structural Filling

Where the above site preparation procedures create excavations below the proposed final grade, the excavations should be backfilled with properly compacted structural fill. Materials selected for use as structural fill should not contain organic matter, waste construction debris, or deleterious materials. Fill materials should be granular material or should be of low or medium plasticity. Existing onsite fill meeting the above criteria may be used as structural fill. Under no circumstances should topsoil or other organic-laden soils be placed as fill beneath or within 1.5 horizontal metres of buildings, pavements or other structural areas.

Once final grade is reached in cut areas, and prior to fill placement in areas of the site that will receive new fill, the subgrade should be evaluated by a geotechnical engineer or their representative. Following subgrade evaluation, the exposed subgrade should be test-rolled in accordance with AS 3798-2009. Any unstable areas failing the evaluation or test-roll should be excavated to the depth of competent bearing material and filled in accordance with the general site fill placement methodology outlined below.

Fill materials should be placed in individual lifts of 300 mm or less loose measurement and compacted using a sheep's foot roller for cohesive soils and a smooth drum roller for cohesionless soils. Fill should be compacted to a minimum of 98% of standard compaction with a moisture content within $\pm 2\%$ of the optimum moisture content.

Test rolling and fill placement is to be undertaken under Level 1 Supervision or Level 2 Inspection and Testing.

6.2 Excavations

It is expected that on-site fill soils and weathered sandstone will generally be excavatable using medium sized excavation equipment. Excavations in Class III or better sandstones may require the use of ripper, rock hammer, or rock saw.

Groundwater management, batter and shoring of excavations are discussed in the following sections.

6.3 Groundwater Inflow

Stabilised groundwater in wells was located 1–2 mbg (approximately 161 mAHD).

Based on the average calculated hydraulic conductivity, 0.024 m/day, and a groundwater elevation of 161 mAHD, groundwater inflow to the basement is estimated at up to 100 m³/day or 37 ML per year. Preliminary calculations are included as Attachment H.

Permanent drainage systems should allow for water collection of seepage and flows from joints, with sumps and pumps suitably sized to dispose of the water in accordance with council and EPA regulations. Based on iron banding observed in the rock profile groundwater is expected to have significant concentrations of iron which will precipitate as iron oxide/hydroxide sludge. This should be taken into account when designing drainage lines and pump-out systems through provision for maintenance to remove the sludge incorporated into the design.

6.4 Batter Slopes and Shoring

Excavations must be designed and constructed in a stable manner. The sides of the excavation should be shored or battered so as to maintain stability of both the excavation sides and bottom. Assuming that excavations are undertaken prior to any other construction works, and provided all surcharge loads, including plant and stockpiled material are kept well clear of the top of the batters, minimum temporary batter slopes are recommended as 2H:1V for soils and 1H:1V for sandstone. Near vertical temporary batters may be achievable Class III or better sandstone subject to inspection by a suitably qualified person.

Stormwater runoff should be directed away from the tops of batters by use of berm drains. Where runoff must be directed down the face of a batter, the batter drains/chutes should be lined to prevent erosion. Properly installed silt fence should be used at the base of batter slopes to prevent offsite migration of sediment. Scouring of excavation faces due to runoff should be repaired prior to further works within the excavation(s). All permanent batters should be protected from erosion by vegetation or other measures and designed with adequate surface and subsurface drainage.

The contractor is solely responsible for temporary excavation design and should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench depth, exceed those specified in local, state, and national safety regulations.

The following earth pressure coefficients and parameters are recommended for use in design of temporary and permanent retaining structures:

Retained Material	Bulk Density (kN/m ³)	Earth Pressure Coefficients		
		At rest (K ₀)	Active (K _a)	Passive (K _p)
Onsite Clay (CL)	20	0.80	0.40	2.5
Weathered Shale (Class IV)	25	0.40	0.33	3.0
Weathered Sandstone (Class IV)	24	0.40	0.22	4.5
Sandstone (Class III)	24	0.30	0.17	6.0

The 'at rest' earth pressure coefficient (K_0) is suitable for retaining structures where anchors or other methods restrain retaining wall movement or where significant movements cannot be tolerated (rigid wall). A uniform or trapezoidal earth pressure distribution should be adopted. It should be noted that shoring which is designed for this 'at rest' coefficient will still undergo some lateral movements.

The active earth pressure coefficient (K_a) is suitable for retaining structures allowing movement of the top such as cantilevered pile walls. For these structures the pressure acting on the wall can be estimated on the basis of a triangular earth pressure distribution.

The passive earth pressure coefficient (K_p) is suitable for the calculation of resisting forces at the toe of concrete, reinforced stone, or masonry walls.

Any surcharge affecting the walls (e.g. traffic, construction loads, adjacent footings, inclined backfill surface, etc.) should be allowed in the design using the appropriate earth pressure coefficient from above.

Design of all retaining structures should be undertaken in accordance with AS4678-2002. Furthermore, the design of any retaining structures should make allowance for all applicable surcharge loadings including construction activities around the perimeter of the excavation, traffic loadings and adjacent buildings. Consideration should be given to the possibility of a hydrostatic pressure due to build-up of water behind the wall (e.g. from broken services), unless permanent subsurface drainage can be provided.

6.5 Construction Induced Vibrations

If percussive piling or excavation equipment (e.g. rock hammer) is used, consideration must be given to possible construction induced ground vibration. Construction induced ground vibration is unlikely to be an issue at the site unless heavy impact tools are required for excavation. The use of other techniques which do not involve impact (e.g. rock saws), although less productive, would reduce or possibly eliminate risks of damage due to vibrations.

If adopting a rock hammer or similar, on-site guidance by a vibration specialist is recommended during the early part of excavation. This should include vibration characterisation trials that are used to define vibration levels for the selected equipment.

Peak Particle Velocity (PPV) is usually the adopted measure of ground vibration and the safe limits depend on the sensitivity of the adjoining structures and services. There are a number of Australian and overseas publications that provide vibration velocity guideline levels (or safe limits) including:

- Australian Standard AS2187.2-2006 Explosives - Storage and use - Use of explosives - Appendix J: Ground Vibrations and Airblast Overpressure;
- DIN 4150 – Part 3 – 1999. Effects of Vibration on Structures;
- Department of Environment and Conservation NSW, 2006. Assessing Vibration: a technical guideline;
- British Standard BS 7385-1:1990. Evaluation and measurement for vibration in buildings. Guide for measurement of vibrations and evaluation of their effects on buildings;
- British Standard BS 7385-2:1993. Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration.

The most appropriate guidelines levels for the proposed excavation work are provided in AS2187.2-2006, which refers to guideline values from BS7385-2 for the prevention of minor or cosmetic damage occurring in structures from ground vibration. Additionally, the guideline levels provided in DIN 4150 Part 3 is considered an appropriate source for guideline levels.

Ideally, safe limits should be determined by a specialist vibration consultant. However, as a preliminary guide, and considering the above guidelines and the type of adjoining structures present, Geo-Logix recommend a maximum PPV of 10 mm/sec (measured at the foundations of adjoining structures) to prevent cosmetic and structural damage.

The PPV limits of 10 mm/sec are expected to be achievable if rock breaker equipment or other excavation methods are restricted as indicated in the following table:

Distance from Adjoining structure (m)	Maximum Peak Particle Velocity 10 mm/sec*	
	Equipment	Operating Limit (% of Maximum Capacity)
1.5 to 2.5	300 kg rock hammer	50
2.5 to 5.0	300 kg rock hammer	100
	or 600 kg rock hammer	50
5.0 to 10.0	600 kg rock hammer	100
	Or 900 kg rock hammer	50

Geo-Logix notes human discomfort levels caused by vibration are typically less than the levels that are likely to cause cosmetic or structural damage to structures. Therefore, neighbours may lodge complaints before any cosmetic or structural damage occurs.

Regardless of excavation, retention or foundation methods, Geo-Logix recommends dilapidation surveys be carried out on neighbouring buildings prior to construction to confirm that the construction works are not causing damage. These surveys should be agreed to, and the report signed, by the owners of the adjacent building prior to work commencing.

6.6 Site Classification

Based on Linear Shrinkage testing results, for structures with foundations in the onsite natural soils, the appropriate site classification is considered to be equivalent to Class 'H1' with a characteristic free surface movement (y_s) of 40–60 mm with changes in moisture (AS2870-2011).

Where foundations on rock are proposed little or no ground movement from changes in moisture is expected.

Geo-Logix notes that this site classification has not included the effects of trees, poor site drainage, leaking plumbing, and exceptionally wet or dry moisture conditions.

For foundations in rock, including basement foundations, significant surface movement is not expected with changes in moisture.

6.7 Foundations

Geo-Logix recommends that footings be founded on a consistent medium to minimise any potential differential settlements. However, depending on the building loads and whether the structures are designed to be relatively flexible, this may not be significant. Existing on-site fill is generally considered to be a suitable founding medium, subject to 'proof roll' inspection by a geotechnical engineer.

Provided new structural fill is placed in a controlled manner as advised in Section 6.1, fill and natural soils are expected to be capable of supporting shallow footings. Assuming an allowable settlement of 25 mm shallow footings in natural soil may be designed based on an allowable bearing capacity of 150 kPa. Shallow footings bearing on weathered sandstone may be designed based on 1000 kPa.

Geo-Logix recommend that foundation subgrade surfaces be observed and tested by a geotechnical engineer using Dynamic Cone Penetrometer (DCP) testing equipment or other satisfactory methods prior to steel or concrete placement. Any unsatisfactory soil detected during this evaluation should be undercut as directed by the geotechnical engineer. Footing excavations should be protected from surface water run-off; if water is allowed to accumulate within a footing excavation and soften the bearing soils, the deficient soils should be removed from the excavation prior to concrete placement.

Allowable bearing pressure and adhesion for deep foundations including bored piers and basements founded on rock are summarised in the following table.

Bearing Stratum	Ultimate Bearing Pressure (kPa) ¹	Serviceability Bearing Pressure (kPa) ²	Ultimate Adhesion (kPa) ³	Young's Modulus, E (MPa)	Poisson's Ratio, ν
Weathered Shale (Class IV)	3,000	700	150	110	0.30
Weathered Sandstone (Class IV)	4,000	1,000	300	500	0.25
Shale (Class III)	6,000	2,000	350	300	0.25
Sandstone (Class III)	20,000	3,500	800	1,000	0.25

1 Ultimate end bearing pressures occur at large settlements > 5% minimum footing dimension.

2 Serviceability end bearing pressures based on settlement < 1% minimum footing dimension.

3 For pier foundations only, not applicable for footings. Assumes a clean socket of roughness R2 or better.

For piered foundations in rock, the adhesion of overlying soil strata should be ignored for design purposes. To ensure allowable end bearing pressure is fully available, piers should be embedded a minimum of two pier diameters into the bearing stratum. Shaft adhesion should be ignored for the residual soils overlying rock.

The bearing stratum should be verified prior to the placement of rebar or concrete. Pier borings should be filled on the same day as drilling. Pier borings should be dewatered immediately prior to placement of concrete. If required dewatering for pier borings may be accomplished by sump pump.

All footing systems should be designed and constructed in accordance with the recommendations contained in AS 2870-2011 and/or AS 2159-2009 by a suitably qualified and experienced structural engineer.

6.8 Ground Slabs and Pavements

Slab and pavement designs are based on the California Bearing Ratio (CBR) and modulus of the subgrade materials encountered after any excavation or re-grading has taken place. The principal aim of the subgrade preparation is to provide a uniform foundation over the entire slab/pavement formation which will not give rise to unevenness in the slab/pavement surface under the design loads. The final subgrade, following the earthworks recommended in Section 6.1, may comprise natural soil or well compacted structural fill provided the material performs satisfactorily under test-rolling as detailed in AS3798-2007. Following the demolition of existing pavements, existing fill subgrades should be subject to inspection by a geotechnical engineer in order to determine if subgrade rectification is necessary.

Based on laboratory results and Geo-Logix's experience with similar soil and provided the final subgrade performs under test-rolling and is compacted to at least 98% standard compaction, design of pavements and slabs-on-grade may be based on a CBR of 5%.

In order to provide uniform support beneath any proposed floor slab-on-grade, Geo-Logix recommends that floor slabs be underlain by a minimum of 100 mm of well graded gravel or crushed rock base course (having a maximum particle size of 20 mm with less than 5 percent material passing the 75 μ m sieve).

Exterior slabs and pavements should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

6.9 Aggressivity/Exposure Classification

Based on the preliminary exposure classification test results, and in accordance with AS3600-2009 and AS2159-2009, steel and concrete structures in contact with fill, natural soils and rock above the water table should be designed based on non-aggressive, A2, exposure.

6.10 Salinity Risk

Soil salinity risk is based on extract electrical conductivity (EC_e). Based on laboratory testing of the selected samples, the on-site shallow soils do not appear to be saline (Department of Land and Water Conservation NSW, 2002).

6.11 Earthquake Design

Structural design for earthquake loads should be carried out in accordance with the relevant provisions in AS1170.4–2007. Based on the subsurface profile encountered at the base elevation of the proposed excavation, and with reference to Tables 3.2 and 4.1 of AS1170.4, the site subsoil class is considered to be C_e (shallow soil site) with a hazard factor (Z) of 0.08.

7. LIMITATIONS

This report should be read in full, and no executive summary, conclusion or other section of the report may be used or relied on in isolation or taken as representative of the report as a whole. No responsibility is accepted by Geo-Logix, and any duty of care that may arise but for this statement is excluded, in relation to any use of any part of this report other than on this basis.

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This report is based on the available project information and the subsurface information obtained by Geo-Logix. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Geo-Logix should be notified immediately to determine if there are consequences to the recommendations provided in this report. If Geo-Logix is not retained to perform these functions, Geo-Logix cannot be responsible for the impact of those conditions on the performance of the project.

Unless otherwise expressly stated, Geo-Logix has assumed that the information and data contained in previous reports carried out by others and reviewed in preparation of this report are completely accurate and has not sought independently to verify the accuracy of the information or data.

Where laboratory tests have been carried out by others on Geo-Logix' behalf, the tests are reproduced in this report on the assumption that the tests are accurate. Geo-Logix has not sought independently to verify the accuracy of those tests and assumes no responsibility in respect of them.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area at the time of this report. No other warranties are implied or expressed.

This report has been prepared for the specific application to the proposed development as described in the report. After the plans and specifications for the project are more complete the geotechnical engineer should be provided with the opportunity to review the final design plans and specifications to assess whether our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations.

8. REFERENCES

Australian Standard (2007) AS1170.4–2007 Structural design actions – Earthquake actions in Australia, Standards Australia.

Australian Standard (2007) AS3798–2007 Guidelines on earthworks for commercial and residential developments, Standards Australia.

Australian Standard (2009) AS2159–2009 *Piling Design and Installation*, Standards Australia.

Australian Standard (2009) AS3600–2009 *Concrete Structures*, Standards Australia.

Australian Standard (2011) AS2870–2011 *Residential slabs and footings*, Standards Australia.

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Bertuzzi, R, and Pells, PJN (2002) Geotechnical parameters of Sydney Sandstone and Shale. *Australian Geomechanics*, vol 37 no 5.

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FIGURES



SITE LOCATION

Project No. 2501056

Figure 1

Filepath: Z:\06_Proj\2025\2501056 NSW Opal SI Ives GTR PS13 Data\GIS - Geotech\2501056 Opal SI Ives - Geotech.gpx | Project CRS: GDA2020 MGA zone 56 | Published: 2025-06-23 | A4 Scale: 1:1,200



KEY

Site Boundary

Borehole Locations

2025

2021

Groundwater Monitoring Well Locations

CBR Sample Locations

0 5 10 15 20 25 m

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SITE MAP

Geotechnical Investigation

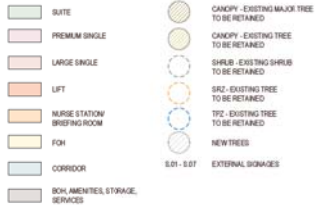
285-295 Mona Vale Road, 1 Flinders Avenue St Ives NSW

Project No. 2501056

Figure 2

ATTACHMENT A

LEGEND:



TOTAL SITE AREA 12,743 sqm
210 BEDS @ 61sqm/ BED

LOWER GROUND (CARPARK)
TOTAL BED = 26

GROUND FLOOR
TOTAL BED = 43

LEVEL 01 (MAIN ENTRY)
TOTAL BED = 66
dividing into 33 & 33

LEVEL 02
TOTAL BED = 46

LEVEL 03
TOTAL BED = 29

TOTAL NUMBER OF BEDS 210

Issue	Description	Date
A	SSGA	27.03.24
B	RPI RESPONSE	18.10.24
C	FOR INFORMATION	24.07.25
D	FOR COORDINATION	25.10.25
E	FOR INFORMATION	28.10.25
F	FOR INFORMATION	31.10.25
G	FOR INFORMATION	07.11.25
H	DRAFT SSGA MODIFICATION	11.11.25
I	SSGA MODIFICATION	17.11.25

MODIFICATIONS

1. BASEMENT EXTENDED TO INCREASE CAR PARKING SPACES
2. HOME A CONVERTED INTO MCN
3. BOH + KITCHEN LAUNDRY WASTE ROOM AREA AMENDED
4. MINOR ADJUSTMENTS TO INTERNAL COMMUNAL AREA
5. MINOR ADJUSTMENT TO LANDSCAPE DESIGN FOR COURTYARD 03
6. MINOR ADJUSTMENT TO LANDSCAPE DESIGN FOR COURTYARD 04. SOUTHERN SETBACK TO REFLECT THE REMOVAL OF TERRACES FROM HOME A.

NOTE:

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN DETAILS.



S4.55 SUBMISSION

Project Manager

Midson Group Pty Ltd
Suite 7, 33 Alexandra Street
Hunters Hill NSW 2110

BCA

Formiga1
Level 2, 33 King Street
Rockdale NSW 2216

Structural & Civil

Henry & Hymas
Suite 2.01, 838 Pacific Highway
Gordon NSW 2072

Building Services

JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client

OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com

T +612 9361 4144 F +612 9332 3458

architecture interior design urban design landscape
non architect Lea-Marie Campan 7568

Project Title

OPAL ST IVES BOTANICA

Drawing Title

LOWER GROUND LEVEL

Scale As indicated

Drawing Created (date) 14/10/22

Drawing Created (by) HN

Plotted and checked by HN

Verified NT

Approved LMC

Project No Drawing No Issue

A241932 DA 2001

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Do not scale drawings. Use Figured Dimensions.

LEGEND:

	SUITE		CANOPY - EXISTING MAJOR TREE TO BE RETAINED
	PREMIUM SINGLE		CANOPY - EXISTING TREE TO BE RETAINED
	LARGE SINGLE		SHRUB - EXISTING SHRUB TO BE RETAINED
	LIFT		SRZ - EXISTING TREE TO BE RETAINED
	NURSE STATION / BRIEFING ROOM		TPZ - EXISTING TREE TO BE RETAINED
	FOH		NEW TREES
	CORRIDOR		S.01 - S.07 EXTERNAL SIGNAGES
	BOOKABLE THEATRE, STORAGE, SERVICES		



TOTAL SITE AREA 12,743 sqm
210 BEDS @ 61sqm/ BED

LOWER GROUND (CARPARK)	HOME A	14
TOTAL BED = 26	HOME B	12
GROUND FLOOR	HOME C	14
TOTAL BED = 43	HOME D	14
	HOME E	15
LEVEL 01 (MAIN ENTRY)	HOME F	15
TOTAL BED = 66 dividing into 33 & 33	HOME G	18
	HOME H	7
	HOME I	15
	HOME J	11
LEVEL 02	HOME K	10
TOTAL BED = 46	HOME L	12
	HOME M	13
	HOME N	11
LEVEL 03	HOME O	6
TOTAL BED = 29	HOME P	12
	HOME Q	11
TOTAL NUMBER OF BEDS		210

MODIFICATIONS
1. MINOR ADJUSTMENT TO INTERNAL COMMUNAL AREAS
2. MINOR ADJUSTMENT TO BEDROOMS

NOTE:

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN DETAILS.



S4.55 SUBMISSION

Project Manager
Midson Group Pty Ltd
Suite 7, 30 Alexandra Street
Hurlers Hill NSW 2110

BCA
Formiga1
Level 2, 10 King Street
Rockdale NSW 2216

Structural & Civil
Henry & Hymas
Suite 2.01, 828 Pacific Highway
Gordon NSW 2072

Building Services
JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client
OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com

T +612 9361 4144 F +612 9332 3458

architecture interior design urban design landscape
*room architect Lea-Marie Carrigan 7560
Project Title

OPAL ST IVES BOTANICA

Drawing Title

GROUND LEVEL

Scale As indicated

Drawing Created (date) 14/10/22

Drawing Created (by) HN

Plotted and checked by HN

Verified NT

Approved LMC

Project No Drawing No Issue

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LEGEND:

	SITE		CANOPY - EXISTING MAJOR TREE TO BE RETAINED
	PREMIUM SINGLE		CANOPY - EXISTING TREE TO BE RETAINED
	LARGE SINGLE		SHRUB - EXISTING SHRUB TO BE RETAINED
	LIFT		SRZ - EXISTING TREE TO BE RETAINED
	NURSE STATION / BRIEFING ROOM		TPZ - EXISTING TREE TO BE RETAINED
	FOH		NEW TREES
	CORRIDOR		S.O.1 - S.O.7
	BOILER ROOMS, STORAGE, SERVICES		EXTERNAL SIGNAGES



TOTAL SITE AREA 12,743 sqm
210 BEDS @ 61sqm/ BED

LOWER GROUND (CARPARK)	HOME A	14
TOTAL BED = 26	HOME B	12
GROUND FLOOR	HOME C	14
TOTAL BED = 43	HOME D	14
	HOME E	15

LEVEL 01 (MAIN ENTRY)	HOME F	15
TOTAL BED = 66	HOME G	18
dividing into 33 & 33	HOME H	7
	HOME I	15
	HOME J	11

LEVEL 02	HOME K	10
TOTAL BED = 46	HOME L	12
	HOME M	13
	HOME N	11

LEVEL 03	HOME O	6
TOTAL BED = 29	HOME P	12
	HOME Q	11

TOTAL NUMBER OF BEDS 210

MODIFICATIONS
1. HOME I ADDED
2. HOME J ADDED
3. COMMUNAL AREAS AMENDED
4. WELLNESS CENTRE AMENDED

NOTE:

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN DETAILS.



S4.55 SUBMISSION

Project Manager
Midson Group Pty Ltd
Suite 7, 30 Alexandra Street
Hunters Hill NSW 2110

BCA

Formiga1
Level 2, 30 King Street
Rockdale NSW 2216

Structural & Civil

Henry & Hymas
Suite 2.01, 828 Pacific Highway
Gordon NSW 2072

Building Services

JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client

OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com

T +612 9361 4144 F +612 9332 3458

architecture interior design urban design landscape

room architect Lea-Marie Carigan 7560

Project Title

OPAL ST IVES BOTANICA

Drawing Title

LEVEL 01

Scale As indicated

Drawing Created (date) 14/10/22

Drawing Created (by) HN

Plotted and checked by HN

Verified NT

Approved LMC

Project No Drawing No Issue

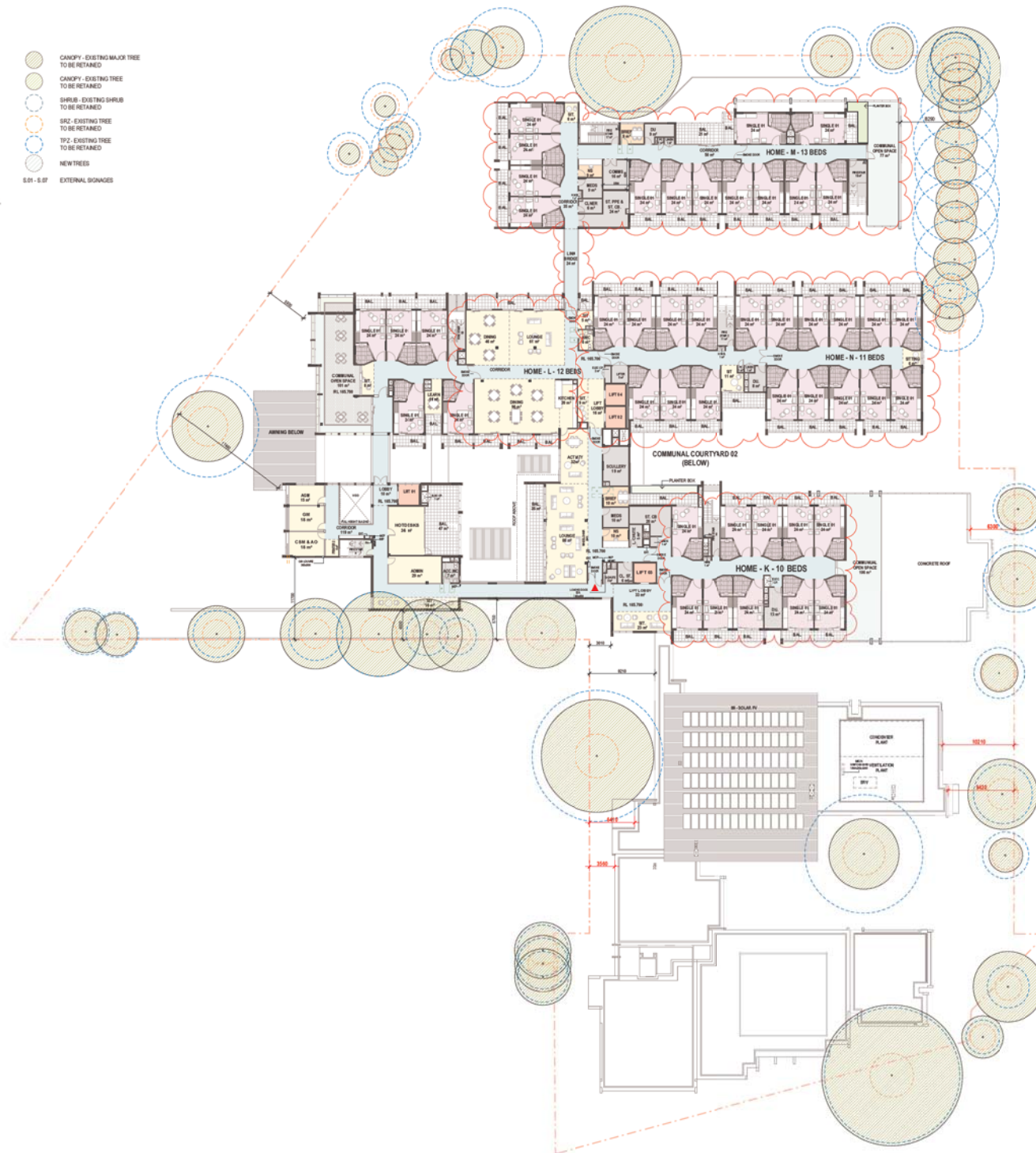
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LEGEND:

	SITE		CANOPY - EXISTING MAJOR TREE TO BE RETAINED
	PREMIUM SINGLE		CANOPY - EXISTING TREE TO BE RETAINED
	LARGE SINGLE		SHRUB - EXISTING SHRUB TO BE RETAINED
	LIFT		SRZ - EXISTING TREE TO BE RETAINED
	NURSE STATION / BRIEFING ROOM		TPZ - EXISTING TREE TO BE RETAINED
	FOH		NEW TREES
	CORRIDOR		EXTERNAL SIGNAGES
	SOULAMENTS, STORAGE, SERVICES		



TOTAL SITE AREA 12,743 sqm
210 BEDS @ 61sqm/ BED

LOWER GROUND (CARPARK)	HOME A	14
TOTAL BED = 26	HOME B	12
GROUND FLOOR	HOME C	14
TOTAL BED = 43	HOME D	14
	HOME E	15
LEVEL 01 (MAIN ENTRY)	HOME F	15
TOTAL BED = 66	HOME G	18
dividing into 33 & 33	HOME H	7
	HOME I	15
	HOME J	11
LEVEL 02	HOME K	10
TOTAL BED = 46	HOME L	12
	HOME M	13
	HOME N	11
LEVEL 03	HOME O	6
TOTAL BED = 29	HOME P	12
	HOME Q	11
TOTAL NUMBER OF BEDS		210

MODIFICATIONS
1. HOME M ADDED
2. HOME N ADDED
3. COMMUNAL AREAS AMENDED
4. HOME K ADDED

NOTE:

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN DETAILS.



S4.55 SUBMISSION

Project Manager
Midson Group Pty Ltd
Suite 7, 33 Alexandra Street
Hurstville NSW 2110

BCA
Formiga1
Level 2, 10 King Street
Rocksdale NSW 2116

Structural & Civil
Henry & Hymas
Suite 2.01, 838 Pacific Highway
Gordon NSW 2072

Building Services
JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client
OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com

T +612 9361 4144 F +612 9332 3458

architecture interior design urban design landscape
*non architect Lisa-Marie Carrigan 7568

Project Title

OPAL ST IVES BOTANICA

Drawing Title

LEVEL 02

Scale As indicated

Drawing Created (date) 09/06/22

Drawing Created (by) HN

Plotted and checked by HN

Verified NT

Approved LMC

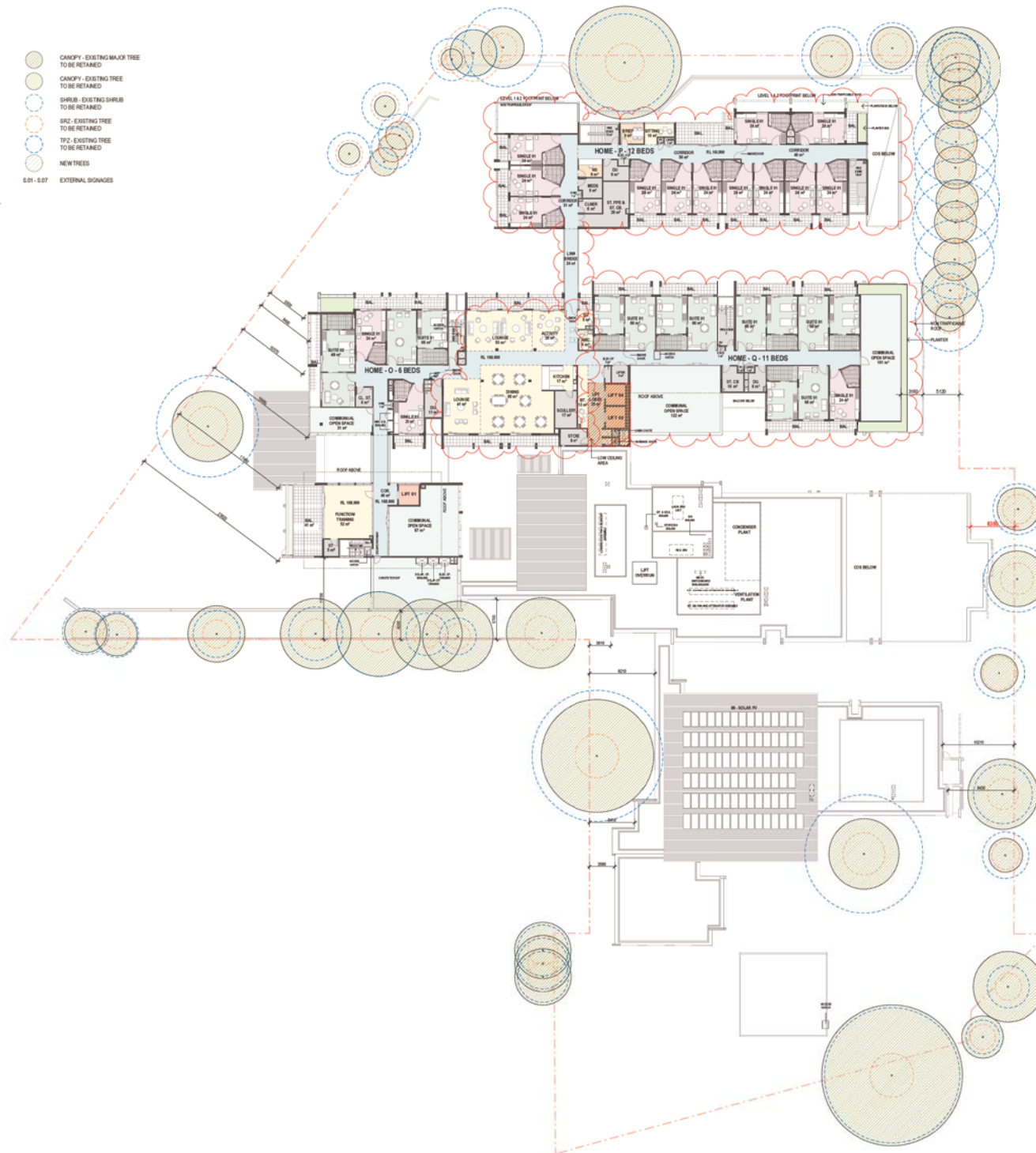
Project No Drawing No Issue

A241932 DA 2005

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LEGEND:

	SUITE		CANOPY - EXISTING MAJOR TREE TO BE RETAINED
	PREMIUM SINGLE		CANOPY - EXISTING TREE TO BE RETAINED
	LARGE SINGLE		SHRUB - EXISTING SHRUB TO BE RETAINED
	LIFT		SRF - EXISTING TREE TO BE RETAINED
	NURSE STATION / BRIEFING ROOM		T2P - EXISTING TREE TO BE RETAINED
	FOH		NEW TREES
	CORRIDOR		EXTERNAL SIGNAGES
	BOH, AMENITIES, STORAGE, SERVICES		



TOTAL SITE AREA 12,743 sqm
210 BEDS @ 61sqm/ BED

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	HOME M	13
	HOME N	11
LEVEL 03	HOME O	6
TOTAL BED = 29	HOME P	12
	HOME Q	11
TOTAL NUMBER OF BEDS		210

MODIFICATIONS

1. HOME F ADDED
2. HOME G ADDED
3. COMMUNAL AREAS AMENDED

NOTE:

REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN DETAILS.



North Point

S4.55 SUBMISSION

Project Manager

Midson Group Pty Ltd
Suite 7, 33 Alexandra Street
Hunters Hill NSW 2110

BCA

Formiga1
Level 2, 10 King Street
Rocksdale NSW 2216

Structural & Civil

Henry & Hymas
Suite 2.01, 828 Pacific Highway
Gordon NSW 2072

Building Services

JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client

OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com

T +612 9361 4144 F +612 9332 3458

architecture interior design urban design landscape
room architect Lee-Marie Carrigan 7568
Project Title

OPAL ST IVES BOTANICA

Drawing Title

LEVEL 03

Scale As indicated

Drawing Created (date) 09/17/18

Drawing Created (by) HN

Plotted and checked by HN

Verified NT

Approved LMC

Project No Drawing No Issue

A241932 DA 2007

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Issue	Description	Date
A	SCA	27.03.24
B	RPI RESPONSE	18.10.24
C	FOR COORDINATION	23.10.25
D	FOR INFORMATION	28.10.25
E	FOR INFORMATION	31.10.25
F	FOR INFORMATION	07.11.25
G	DRAFT SIDA MODIFICATION	11.11.25
H	SIDA MODIFICATION	17.11.25

North Point

S4.55 SUBMISSION

Project Manager

Midson Group Pty Ltd
Suite 7, 33 Alexandra Street
Hunters Hill NSW 2110

BCA

Formiga1
Level 2, 33 King Street
Rosedale NSW 2136

Structural & Civil

Henry & Hymas
Suite 2.01, 838 Pacific Highway
Gordon NSW 2072

Building Services

JHA
Level 25, 101 Miller Street
North Sydney NSW 2060

Client

OPAL HealthCare
Level 11, 420 George Street
Sydney NSW 2000

GROUP GSA

Group GSA Pty Ltd ABN 76 002 113 779
Level 7, 80 William St East Sydney NSW
Australia 2011
www.groupgsa.com
T +612 9361 4144 F +612 9332 3458
architecture interior design urban design landscape
non architect Lea-Marie Carigan 7568
Project Title

OPAL ST IVES BOTANICA

Drawing Title

ROOF

Scale

As indicated

Drawing Created (date)

11/08/23

Drawing Created (by)

Author

Plotted and checked by

Designer

Verified

Checker

Approved

Approver

Project No

Drawing No

Issue

A241932 DA 2008

H

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ATTACHMENT B



Geo-Logix
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Geo-Logix Pty Ltd

Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number: **2201040**
Hole Depth: **2.90 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Solid Flight Auger (Ute mounted)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											SPT	
HA		0.40	D	Z	BH1/0.2-0.4	Fill			FILL - dark reddish brown / moderate brown (5YR 3/4), 40% clay, 50% sand, 10% gravel, poorly compacted.	damp		
			D	Z	BH1/0.4-0.5				CLAY with Gravel - light red / moderate reddish orange (10R 6/6), 80% clay, 5% sand, 15% gravel, medium plasticity, stiff, ironstone gravel.	damp	2,5,8 N=13	
		1.10	B	Z	BH1/0.5-0.9	CL			CLAY - light red / moderate reddish orange (10R 6/6), 90% clay, 10% silt, stiff.	dry		
SFA		1.50							Extremely Weathered SHALE - pale red (10R 6/2), low drilling resistance.			
		2.20	D	Z	BH1/1.7-2.0	Natural			SHALE - hard, medium drilling resistance.		10,21,30/10	V-bit refusal at 1.5m.
		3							Terminated at 2.900 m TC-bit refusal.			

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments:

GLLOG2022 2201040 ST IVES.GPJ GL.GDT 7/4/22 3:49:04 PM - drawn by laurie white at www.reumad.com.au



Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**



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Geo-Logix Pty Ltd

Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number: **2201040**
Hole Depth: **1.50 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Hand Auger**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											blows/100mm 10 20 30	
HA		0.40	D	Z	BH2/0.0-0.2	Fill	F		FILL - dark reddish brown / moderate brown (5YR 3/4), 60% clay, 40% sand, medium plasticity, poorly compacted.	damp		
		0.70	D	Z	BH2/0.4-0.5	Natural	CL		CLAY - light red / moderate reddish orange (10R 6/6), 90% clay, 10% silt, medium plasticity, firm.	damp		
		0.90	D	Z	BH2/0.7-0.8		CL		CLAY - red / moderate reddish brown (10R 4/6), 95% clay, 5% silt, medium plasticity, stiff.	damp		
		1										
		1.40	D	Z	BH2/1.0-1.2		CL		CLAY - red / moderate reddish brown (10R 4/6), 90% clay, 10% silt, medium plasticity, stiff, with ironstone.	damp		
							CL		CLAY with Gravel - 80% clay, 20% gravel, very stiff, ironstone gravel. Terminated at 1.500 m			
		2										
		3										
		4										

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments: DCP test performed near BH2.



Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Harri Mayjor**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**



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Project Number: **2201040**
Hole Depth: **3.78 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Solid Flight Auger (Ute mounted)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											SPT	
HA		0.40	B D	Z Z	BH3/0.0-0.4 BH3/0.1-0.3	Fill	F		FILL - dark grey (N3) and dark reddish brown / moderate brown (5YR 3/4), 50% clay, 45% sand, 5% gravel, loose.	damp		V-bit refusal at 1.5m.
			U	Z	BH3/0.6-0.9				CLAY - light red / moderate reddish orange (10R 6/6), 80% clay, 15% silt, 5% gravel, high plasticity, firm to stiff.	damp	1,5,5 N=10	
		1.50	B	Z	BH3/1.0-1.5				CLAY & Shale Layers - pink / moderate orange pink (5YR 8/4), 60% clay, very stiff.	damp		
		2.10	U	Z	BH3/2.1-2.4	Natural			Weathered SHALE - moderate red (5R 4/6) and pinkish white (5R 8/2), medium drilling resistance.	dry	8,11,16 N=27	
		3.60							SHALE - hard, high drilling resistance.		13,30/130	
		4							Terminated at 3.780 m SPT & TC-bit refusal.			

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments:

GLLOG2022 2201040 ST IVES.GPJ GL.GDT 7/4/22 3:49:08 PM - drawn by laurie white at www.reumad.com.au



Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**



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Warriewood NSW 2102
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Project Number: **2201040**
Hole Depth: **2.45 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Solid Flight Auger (Ute mounted)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											SPT	
HA		0.40	D	Z	BH4/0.0-0.2	Fill	F		FILL - pink / moderate orange pink (5YR 8/4), 95% sand, 5% gravel, moderately compacted.	damp		
			D	Z	BH4/0.4-0.5				CLAY - light red / moderate reddish orange (10R 6/6), 95% clay, 5% silt, high plasticity, soft to firm.	damp	3,4,5 N=9	
		1	U	Z	BH4/0.6-0.9							
SFA		1.80				Natural						
		2							CLAY - light red / moderate reddish orange (10R 6/6), 85% clay, 15% silt, stiff.	damp		
		2.20	U	Z	BH4/2.0-2.4				Weathered SHALE - moderate red (5R 4/6) and pinkish white / greyish orange pink (10R 8/2), very stiff, ironstone, high drilling resistance.	dry	5,15,26 N=43	V-bit refusal at 2.0m.
		3							Terminated at 2.450 m			
		4										

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments:



Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**



Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Hand Auger**

[illegible]

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT	Standard Penetration Test
DCP	Dynamic Cone Penetrometer
PP	Pocket Penetrometer

Water Levels

 Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments: DCP test performed near BH5.



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Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
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Project Number: **2201040**
Hole Depth: **3.09 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Solid Flight Auger (Ute mounted)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											SPT	
HA		0.20	D	Z	BH6/0.0-0.15	Fill	F		FILL - dark grey (N3), 10% clay, 80% sand, 10% gravel, moderately compacted.	moist		
			D	Z	BH6/0.4-0.5				CLAY - yellowish red / light brown (5YR 5/6), 90% clay, 5% silt, 5% gravel, high plasticity, soft, ironstone.	damp		
			U	Z	BH6/0.5-0.95						3,4,3 N=7	
		1.10	B	Z	BH6/0.5-1.0							
SFA			D	Z	BH6/0.9-2.0	Natural	CL		CLAY - light reddish brown / light brown (5YR 6/4), 80% clay, 20% silt, medium plasticity, firm.	damp		
		1.70										
		2							CLAY - light reddish brown / light brown (5YR 6/4) and pinkish white (5R 8/2), 60% clay, 40% silt, medium plasticity, firm to stiff.	damp		
		2.30	B	Z	BH6/2.0-2.4						3,10,13 N=23	
			U	Z	BH6/2.0-2.45				CLAY - light grey (N7), 70% clay, 30% silt, medium plasticity, stiff.	damp		
		2.80										
		2.90	D	Z	BH6/2.8-2.9				SANDSTONE - pinkish white (5R 8/2) and light red (5R 6/6), ironstone.	damp		V-bit refusal at 2.8m.
		3							SANDSTONE - light grey (N7), hard, fine sandstone layers, high drilling resistance.		17,30/35	TC-bit refusal at 2.9m.
		4							Terminated at 3.085 m SPT refusal in Sandstone.			

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments:

GLLOG2022 2201040 ST IVES.GPJ GL.GDT 7/4/22 3:49:14 PM - drawn by laurie white at www.reumad.com.au



Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**



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Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number: **2201040**
Hole Depth: **3.64 m**
Date Started: **03/06/2022**
Date Completed: **03/06/2022**

Project Name: **Geotechnical and Environmental Investigation**
Location / Site: **285-289 Mona Vale Rd & 1 Flinders Ave, St Ives NSW**
Client: **Opal Aged Care**
Contractor: **Fico Group Pty Limited**
Method: **Solid Flight Auger (Ute mounted)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests	Observations / Comments
											SPT	
HA		0.20	D	Z	BH7/0.0-0.2 DS1, TS1	Fill	F		FILL - dark grey (N3), 15% clay, 80% sand, 5% gravel, poorly compacted.	moist		
		0.60	D	Z	BH7/0.4-0.5		CH		CLAY - light red / moderate reddish orange (10R 6/6) and red / moderate reddish brown (10R 4/6), 90% clay, 10% silt, high plasticity, soft to firm.	damp		
			U	Z	BH7/0.5-0.9				CLAY - light red / moderate reddish orange (10R 6/6), 75% clay, 10% sand, 5% gravel, medium plasticity, firm, with ironstone.	damp	3,5,8 N=13	
		1.80	B	Z	BH7/1.5-1.8							
SFA		2.00	U	Z	BH7/1.8-2.2	Natural			IRONSTONE - moderate red (5R 4/6).		29,22,19 N=41	V-bit refusal at 1.8m.
		3.50							Weathered SANDSTONE - light grey (N7), soft, medium drilling resistance.			
									SANDSTONE - light grey (N7) and moderate red (5R 5/4), high drilling resistance.		10/140	
									Terminated at 3.640 m SPT refusal.			

Abbreviations:

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type

D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing

SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels

Encountered Groundwater
 Stabilised Groundwater

Abandonment Method: Backfill with soil and compact.

Additional Comments:

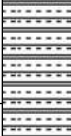
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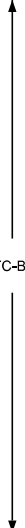


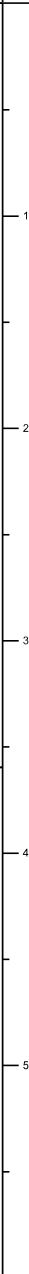
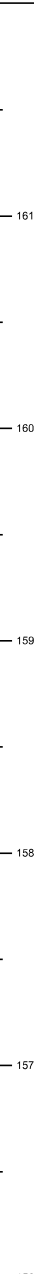
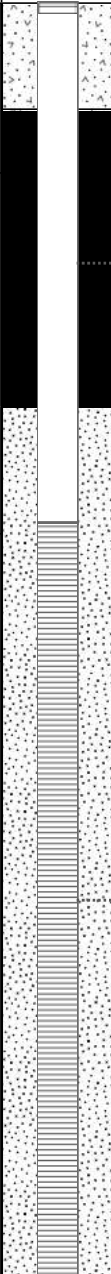
Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby**
Checked By: **Kiran Baby**

Date: **03/06/2022**
Date: **04/07/2022**

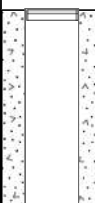
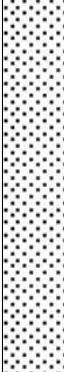
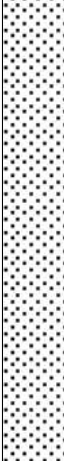
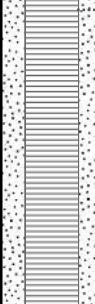
			Borehole Record: BH8					Page: 1 OF 1			
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075			Position: E: 330362.55 N: 6266810.32 Datum: 56H Ground Surface Elevation (mAHD): 163.5					Date: : 28/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drilling Method: Canter Truck Logged/Checked: HM/CB			
Drilling Method	Depth (m)	Elevation (mAHD)	Water	Samples	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Remarks	
										Observations / Comments	
V-Bit	0.14		During Drilling		Non-Soil	CCT			Non-Soil - Concrete	Elevation estimated from site survey.	
	0.3	BH8/0.14-0.2		Fill	F		M	Fill Gravelly SAND dark brown, medium grained, medium sized gravel, trace low plasticity clay, moist.			
		BH8/0.6-0.9		Natural	CI		M	CLAY CI: stiff, medium plasticity, orange brown, inorganic, moist.			
	1			Residual	CL		M	CLAY CL: stiff, low plasticity, orange mottled with light grey, inorganic, moist, with extremely weathered gravelly shale.			
		BH8/1.7-1.9		Rock	SLT		M	SILTSTONE: distinctly weathered, very low strength, dark brownish red, fine grained, moist.			
	1.7										
	2										
		161.0		BH8/2.8-3	Rock	SLT		M	As above, but greyish brown.	V-Bit refusal at 2.3	
	2.8				Rock	SLT		M	As above, but wet.		
		160.0		BH8/4.3-4.5	Rock	SLT		W			
TC-Bit	4								Resistance during drilling between this depth		
		159.0									
	5								High and low resistance while drilling between this depth.		
		158.0									
						BH8 Terminated at 6 m					
Sample Type D Disturbed UD Undisturbed B Bulk R Representative C Continuous ASB Asbestos Groundwater In Out During Drilling Stabilised			Field Tests PID Photo Ionisation Detector PP Pocket Penetrometer (kPa) SPT Standard Penetration Test DCP Dynamic Cone Penetration			Moisture D Dry SLM Slightly Moist M Moist D Dry Hydrocarbon odour H High M Medium L Low Z Zero			Geo-Logix Pty Ltd Building Q2, Level 3 Unit 2309 / Daydream Street Warriewood NSW 2102 www.geo-logix.com.au 02 9979 1722		

				Borehole Record: BH9				Page: 1 OF 1		
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075				Position: E: 330407.65 N: 6266805.18 Datum: 56H Ground Surface Elevation (mAHD): 163.0				Date: : 29/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drilling Method: Canter Truck Logged/Checked: HM/CB		
Drilling Method	Depth (m)	Elevation (mAHD)	Water	Samples	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Remarks
 V-Bit	0.14		 During Drilling		Non-Soil	CCT			Non-Soil - Concrete	Elevation estimated from site survey.
	0.3			BH9/0.14-0.25	Fill	F		M	Fill Gravelly SAND dark brown, medium grained, medium sized gravel, moist.	
				BH9/0.3-0.5	Natural	CI		M	CLAY CI: stiff, medium plasticity, orange mottled with light brown, inorganic, moist.	
				BH9/0.6-0.8						
	1	162.0			Natural	CL		M	CLAY CL: stiff, low plasticity, orange mottled with light grey, inorganic, moist.	
	1.2									
 TC-Bit	1.6		 During Drilling	BH9/1.3-1.5	Natural	CL		M	As above, but yellowish grey mottled with red.	
	2	161.0								
	2.1				Rock	SLT		M	SILTSTONE: distinctly weathered, very low strength, light grey with light brown, moist.	V-Bit refusal
	2.8			BH9/2.8-3						
	3	160.0			Rock	SLT		W	As above, but dark grey with brown, wet.	Resistance encountered while drilling at this depth
	3.9									
	4	159.0		BH9/4.3-4.5	Rock	SLT		W	As above, but light brown.	
									BH9 Refusal at 4.6 m	
Sample Type D Disturbed UD Undisturbed B Bulk R Representative C Continuous ASB Asbestos Groundwater  In  Out  During Drilling  Stabilised			Field Tests PID Photo Ionisation Detector PP Pocket Penetrometer (kPa) SPT Standard Penetration Test DCP Dynamic Cone Penetration			Moisture D Dry SLM Slightly Moist M Moist D Dry Hydrocarbon odour H High M Medium L Low Z Zero			Geo-Logix Pty Ltd Building Q2, Level 3 Unit 2309 / Daydream Street Warriewood NSW 2102 www.geo-logix.com.au 02 9979 1722	

				Borehole Record: MW1					Page: 1 OF 3			
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075				Position: E: 330432.35 N: 6266793.1200917 Datum: 56H Surface Elevation (mAHD): 162.00 Top Of Casing (mAHD):			Screened Interval: 2.45 - 8.45 mbg Depth to water (during drilling): 4.4 mbg Depth to water (stabilised): 1.113 mbg		Date: : 28/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drill Method: Canter Truck Logged/Checked: HM/CB			
Drilling Method	Depth (m)	Elevation (m)	Water	Samples	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Well Diagram		
				MW1/0-0.2	Topsoil	0.00-0.20 m, SM		M	Silty SAND SM: dark brown, dense, fine grained, moist.			
				MW1/0.2-0.5	Natural	0.20-0.80 m, CI		M	Gravelly CLAY CI: stiff, medium plasticity, pale red mottled with light grey, fine sized gravel, inorganic, moist.			
					Natural	0.80-1.20 m, CI		M	CLAY CI: very stiff, medium plasticity, pale red mottled with light grey, inorganic, moist.			
					Natural	1.20-1.60 m, CI		M	As above, but None red.			
					MW1/1.6-1.9							As above, but grey mottled with light red.
						Natural	1.60-2.50 m, CI		M			
						Residual	2.50-3.10 m, CL		M		CLAY CL: friable, low plasticity, grey mottled with light brown, inorganic, moist.	
					MW1/2.9-3							
						Rock	3.10-4.40 m, SLT		M		SILTSTONE: distinctly weathered, very low strength, grey mottled with red, fine grained, moist.	
						Rock	4.40-6.20 m, SLT		W		As above, but dark greyish brown, wet.	
				MW1/5.4-5.5								
Sample Type D Disturbed UD Undisturbed B Bulk R Representative C Continuous ASB Asbestos Groundwater  In  Out  During Drilling  Stabilised			Field Tests PID Photo Ionisation Detector PP Pocket Penetrometer (kPa) SPT Standard Penetration Test DCP Dynamic Cone Penetration			Moisture D Dry SLM Slightly Moist M Moist D Dry Hydrocarbon odour H High M Medium L Low Z Zero		Geo-Logix Pty Ltd Building Q2, Level 3 Unit 2309 / Daydream Street Warriewood NSW 2102 www.geo-logix.com.au 02 9979 1722				

				Borehole Record: MW1				Page: 2 OF 3		
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075				Position: E: 330432.35 N: 6266793.1200917 Datum: 56H Surface Elevation (mAHD): 162.00 Top Of Casing (mAHD):		Screened Interval: 2.45 - 8.45 mbg Depth to water (during drilling): 4.4 mbg Depth to water (stabilised): 1.113 mbg		Date: : 28/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drill Method: Canter Truck Logged/Checked: HM/CB		
Drilling Method	Depth (m)	Elevation (m)	Water	Samples	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Well Diagram
TC-Bit					Rock	4.40-6.20 m, SLT		W	As above, but dark greyish brown, wet. (continued)	
					Rock	6.20-6.30 m, SST		M	SANDSTONE: slightly weathered, high strength, light to medium grey, fine to medium grained, moist, bedded sandstone. Commenced Coring at 6.3 m	
Sample Type D Disturbed UD Undisturbed B Bulk R Representative C Continuous ASB Asbestos Groundwater ➤ In ➤ Out ➤ During Drilling ➤ Stabilised				Field Tests PID Photo Ionisation Detector PP Pocket Penetrometer (kPa) SPT Standard Penetration Test DCP Dynamic Cone Penetration			Moisture D Dry SLM Slightly Moist M Moist D Dry Hydrocarbon odour H High M Medium L Low Z Zero		Geo-Logix Pty Ltd Building Q2, Level 3 Unit 2309 / Daydream Street Warriewood NSW 2102 www.geo-logix.com.au 02 9979 1722	

			Borehole Record: MW1					Page: 3 OF 3			
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075			Position: E: 330432.35 N: 6266793.1200917 Datum: 56H Surface Elevation (mAHD): 162.00 Top Of Casing (mAHD):			Screened Interval: 2.45 - 8.45 mbg Depth to water (during drilling): 4.4 mbg Depth to water (stabilised): 1.113 mbg			Date: : 28/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drill Method: Canter Truck Logged/Checked: HM/CB		
Drilling Method	Depth (m)	Elevation (m)	Material Description	Weathering	Estimated Strength	RQD% and TCR%	Defect Spacing (mm)	Defect Description	Well Diagram	Remarks	
			Commenced Coring at 6.3 m								
</											

					Borehole Record: MW2					Page: 1 OF 3			
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075					Position: E: 330370.52 N: 6266782.0006088 Datum: 56H Surface Elevation (mAHD): 163.0 Top Of Casing (mAHD):			Screened Interval: 3.2 - 9.2 mbg Depth to water (during drilling): 2.7 mbg Depth to water (stabilised): 1.981 mbg		Date: : 29/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drill Method: Canter Truck Logged/Checked: HM/CB			
Depth (mbg)	Elevation (mAHD)	Water	Samples	Testing	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Remarks	Well Diagram		
			Soil Sample	SPT						Observations / Comments			
1	162.1	 Stabilised  During Drilling			Non-Soil	PAV			Non-Soil - Pavers Sandstone pavement	Elevation estimated from site survey			
			MW2/0.3-0.5		Natural	CI		M	CLAY CI: firm, medium plasticity, dark brown mottled with red, inorganic, moist.				
				SPT 3,4,6 (N=10)									
			MW2/1.5-1.7	SPT 10,16,21 (N=37)	Natural	CH		M	CLAY CH: very stiff, high plasticity, yellowish brown mottled with red, inorganic, moist, distinctly weathered gravelly shale.				
					Rock	SST		M	SANDSTONE: distinctly weathered, very low strength, dark brown mottled with red, medium grained, moist.				
4	159.1								As above, but dark brown.				
					Rock	SST		M					
5	158.1												
													
Sample Type D Disturbed UD Undisturbed B Bulk R Representative C Continuous ASB Asbestos Groundwater  In  Out  During Drilling  Stabilised					Field Tests PID Photo Ionisation Detector PP Pocket Penetrometer (kPa) SPT Standard Penetration Test DCP Dynamic Cone Penetration					Moisture D Dry SLM Slightly Moist M Moist D Dry Hydrocarbon odour H High M Medium L Low Z Zero		Geo-Logix Pty Ltd Building Q2, Level 3 Unit 2309 / Daydream Street Warriewood NSW 2102 www.geo-logix.com.au 02 9979 1722	

Client name: Opal Healthcare
Project name: Opal St Ives GTK PSI
Project Number: 2501056
Location: 289-293 Mona Vale Rd, St Ives NSW 2075

Position: E: 330370.52
N: 6266782.0006088
Datum: 56H
Surface Elevation (mAHD): 163.0
Top Of Casing (mAHD):

Screened Interval: 3.2 - 9.2 mbg
Depth to water (during drilling): 2.7 mbg
Depth to water (stabilised): 1.981 mbg

Date: : 29/08/2025
Drill Rig Supplier:
 Fico Group Pty Ltd
Drill Method: Canter Truck
Logged/Checked: HM/CB

Depth (mbg)	Elevation (mAHD)	Water	Samples	Testing	Soil Origin	Classification Code	Graphic Log	Moisture	Material Description	Remarks	Well Diagram
			Soil Sample	SPT						Observations / Comments	
					Rock	SST		M	As above, but dark brown. (continued)		 2.50-6.10, 2
									Commenced Coring at 6.1 m		 3.20-6.10, 50mm PVC Slotted

Sample Type	Field Tests	Moisture	Geo-Logix Pty Ltd
D Disturbed	PID Photo Ionisation Detector	D Dry	Building Q2, Level 3
UD Undisturbed	PP Pocket Penetrometer (kPa)	SLM Slightly Moist	Unit 2309 / Daydream Street
B Bulk	SPT Standard Penetration Test	M Moist	Warriewood NSW 2102
R Representative	DCP Dynamic Cone Penetration	D Dry	
C Continuous			www.geo-logix.com.au
ASB Asbestos		Hydrocarbon odour	02 9979 1722
Groundwater		H High	
▶ In		M Medium	
◀ Out		L Low	
⚑ During Drilling		Z Zero	
⚑ Stabilised			

 Geo-Logix environment • geotech				Borehole Record: MW2					Page: 3 OF 3			
Client name: Opal Healthcare Project name: Opal St Ives GTK PSI Project Number: 2501056 Location: 289-293 Mona Vale Rd, St Ives NSW 2075				Position: E: 330370.52 N: 6266782.0006088 Datum: 56H Surface Elevation (mAHD): 163.0 Top Of Casing (mAHD):			Screened Interval: 3.2 - 9.2 mbg Depth to water (during drilling): 2.7 mbg Depth to water (stabilised): 1.981 mbg			Date: : 29/08/2025 Drill Rig Supplier: Fico Group Pty Ltd Drill Method: Canter Truck Logged/Checked: HM/CB		
Drilling Method	Water	Depth (m)	Elevation (m)	Material Description	Weathering	Estimated Strength	RQD% and TCR%	Defect Spacing (mm)	Defect Description	Well Diagram	Remarks	
NMLC Coring		7		SANDSTONE: highly weathered, medium strength, light gray (7.5yr/7/1), medium grained, moist.	HW							

ATTACHMENT C

CORE PHOTOGRAPHS

283 -295 Mona Vale Road, St Ives NSW



Borehole MW1: 6.2 – 9 m.



Borehole MW2: 6.2 – 9.2 m.

ATTACHMENT D

**WELL ID:**

MW 1

PROJECT NAME: 5t lues	PROJECT NUMBER: 2501056
DATE OF INSTALLATION: 28.8.25	INITIALS: HM CB
DATE OF DEVELOPMENT: 28.8.25	WEATHER: Sunny, breeze
WATER LEVEL (PRE-PURGE): 0.05m TIME: 2:20pm	WELL DEPTH: 8.8m
DEVELOPMENT METHOD: ☒ HDPE BAILER ☐ STEEL BAILER ☐ SUPER TWIRLER PUMP ☐ PUMP & WQM ☐ OTHER	

(Water column height [m]) $\times 2L \times 3 =$ purge volume (L)	CALCULATED PURGE VOLUME (L): 546
---	----------------------------------

VOLUME REMOVED (L):	WATER LEVEL, POST-PURGE:
	TIME:

WELL CONDITION NOTES: (WELL CONDITION, COLOUR, CLARITY, ODOUR, SEDIMENT, SHEEN)
Water brown, cloudy. No odour, no sheen.

Well Development Notes: (Surging, Technique, Decontamination, Equipment)

Commenced development during install (after inserting casing, before inserting sand) to avoid bridging.

Surged well regularly during well development.

Used PPS-free string.

clean

RECHARGE BEHAVIOUR: FAST RECHARGING ☐

SLOW RECHARGING (<80% RECHARGE AFTER 2 HRS) ☐

TIME	DTW (mbTOC)	TOTAL DISCHARGE (L)	PH +/- 0.1	CONDUCTIVITY (MS/CM) +/- 3%	REDOX (MV) +/- 10MV	DO (MG/L) +/-10%	TEMP (°C)
TOTAL PURGE VOLUME (L):		542	APPROX. PURGE RATE (LPM):				

Q3.2.1 QF_035 Well Development Log

Version: V2
Issued: August 2025
Review: August 2027

WELL DEVELOPMENT LOG

WELL ID: MW2

PROJECT INFORMATION

PROJECT NAME: St. Ives	PROJECT NUMBER: 2501056
DATE OF INSTALLATION: 29.8.25	INITIALS: HM
DATE OF DEVELOPMENT: 29.08.25	WEATHER: Sun Cloudy, breeze
WATER LEVEL (PRE-PURGE): 0.05m TIME: 3:50 PM	WELL DEPTH: 9.2m
DEVELOPMENT METHOD: ☒ HDPE BAILER ☐ STEEL BAILER ☐ SUPER TWIRLER PUMP ☐ PUMP & WQM ☐ OTHER	

PURGE VOLUME CALCULATION : 3 WELL VOLUMES

(Water column height [m]) $\times$ 2L $\times$ 3 = purge volume (L) CALCULATED PURGE VOLUME (L): 56L

WELL DEVELOPMENT - ALL METHODS

VOLUME REMOVED (L):	WATER LEVEL, POST-PURGE: TIME:
---------------------	-----------------------------------

WELL CONDITION NOTES: (WELL CONDITION, COLOUR, CLARITY, ODOUR, SEDIMENT, SHEEN)
brown Colour, Cloudy, No odour, No sheen.

WELL DEVELOPMENT NOTES: (SURGING, TECHNIQUE, DECONTAMINATION, EQUIPMENT)

Well development after Installing Casing.
Surged regularly
used PFAS - free string

RECHARGE BEHAVIOUR: FAST RECHARGING ☐ SLOW RECHARGING (<80% RECHARGE AFTER 2 HRS) ☐

FIELD PARAMETERS - IF USING WQM

TIME	DTW (mbTOC)	TOTAL DISCHARGE (L)	PH +/- 0.1	CONDUCTIVITY (MS/CM) +/- 3%	REDOX (MV) +/- 10MV	DO (MG/L) +/- 10%	TEMP (°C)
TOTAL PURGE VOLUME (L):		56L	APPROX. PURGE RATE (LPM):				

ORIGINAL FIELD RECORD

ATTACHMENT E



WELL ID: MW2

PROJECT NUMBER: 2501056	INITIALS: HM
DATE: 12.09.2025	WEATHER: Sunny
SAMPLING METHOD:	LOW FLOW: ☐ HYDRASLEEVE: ☐ BAILER: ☐

STANDING WATER LEVEL (mBTC):	1.981	TOTAL DEPTH (mBTC):	8-460	STICK-UP (m):	
DEPTH TO PSH (mBTC):		THICKNESS OF PSH (m):		TIME:	1:50 PM

TIME	DTW (mBTOC)	TOTAL DISCHARGE (L)	pH +/- 0.1	CONDUCTIVITY (MS/CM) +/- 3%	REDOX (MV) +/- 10MV	DO (MG/L) +/-10%	TEMP (°C)
TOTAL PURGE VOLUME (L):		APPROX. SAMPLE PURGE RATE (LPM):					

IP was muddy while finding the total depth.

FAST RECHARGING ☐

SLOW RECHARGING (<80% RECHARGE AFTER 2 HRS) ☐

ORIGINAL	DUPLICATE	TRIPLICATE
SAMPLE ID:	SAMPLE ID:	SAMPLE ID:
SAMPLE TIME:	SAMPLE TIME:	SAMPLE TIME:
NO. CONTAINERS:	NO. CONTAINERS	NO. CONTAINERS
ANALYSIS:	ANALYSIS:	ANALYSIS:

Q3.2.1 QF 004 Groundwater Sample Log

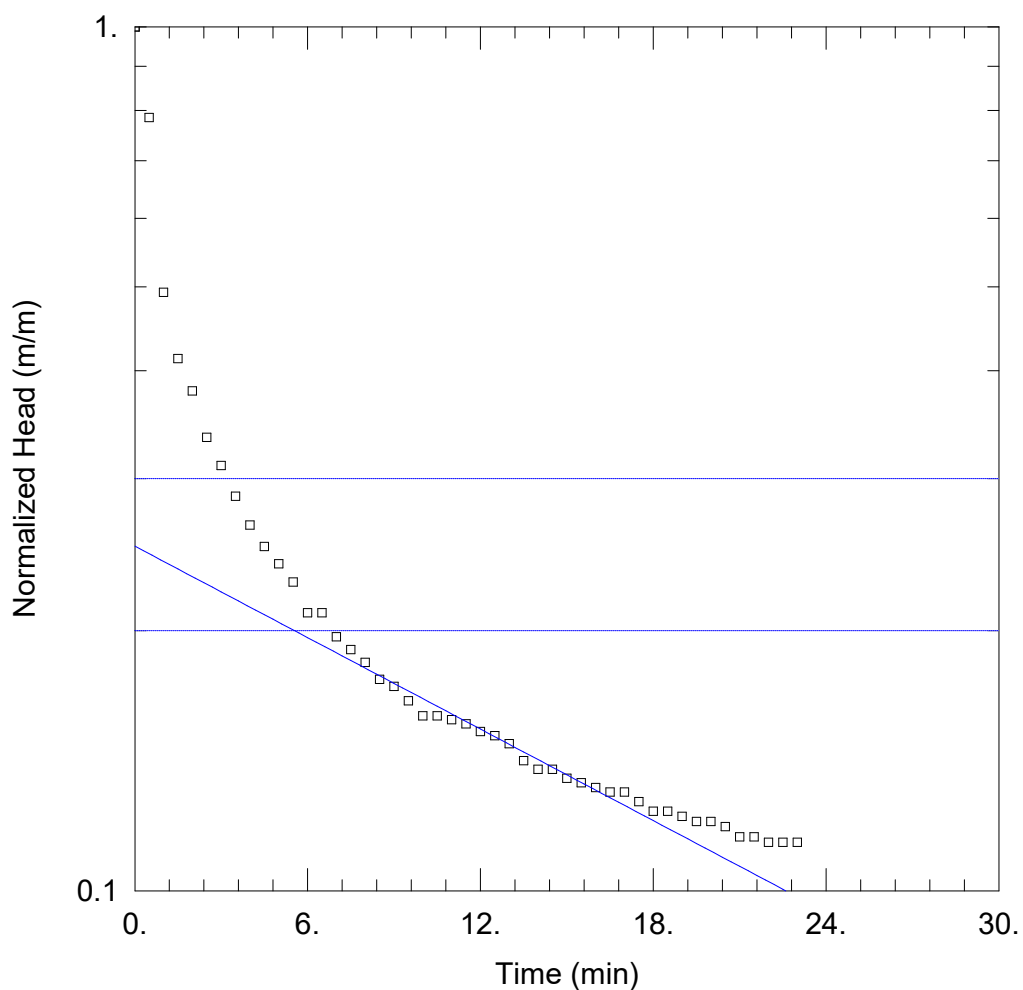
Version: V2
Issued: October 2016
Review: January 2022



BAILER: ☐

TIME: 9:30 am

ATTACHMENT F



WELL TEST ANALYSIS

Data Set: Z:\...\MW1.1.aqt

Date: 10/09/25

Time: 12:51:13

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW1.1)

Initial Displacement: 0.615 m

Total Well Penetration Depth: 8.8 m

Casing Radius: 0.025 m

Static Water Column Height: 7.389 m

Screen Length: 6. m

Well Radius: 0.045 m

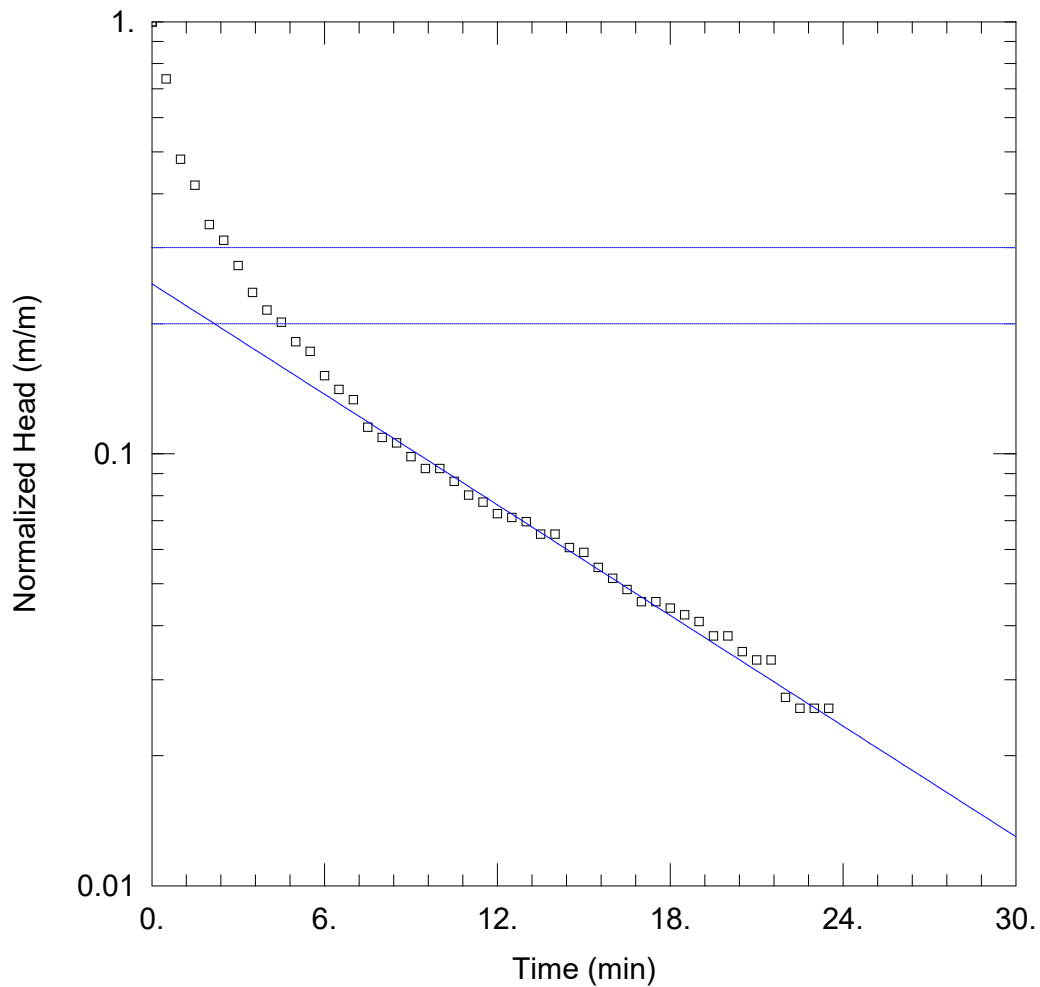
SOLUTION

Aquifer Model: Confined

$K = 0.01137$ m/day

Solution Method: Bouwer-Rice

$y_0 = 0.1541$ m



WELL TEST ANALYSIS

Data Set: Z:\...\MW1.2_TL.aqt

Date: 10/09/25

Time: 12:48:58

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW1.2)

Initial Displacement: 0.66 m

Total Well Penetration Depth: 8.8 m

Casing Radius: 0.025 m

Static Water Column Height: 7.321 m

Screen Length: 6. m

Well Radius: 0.045 m

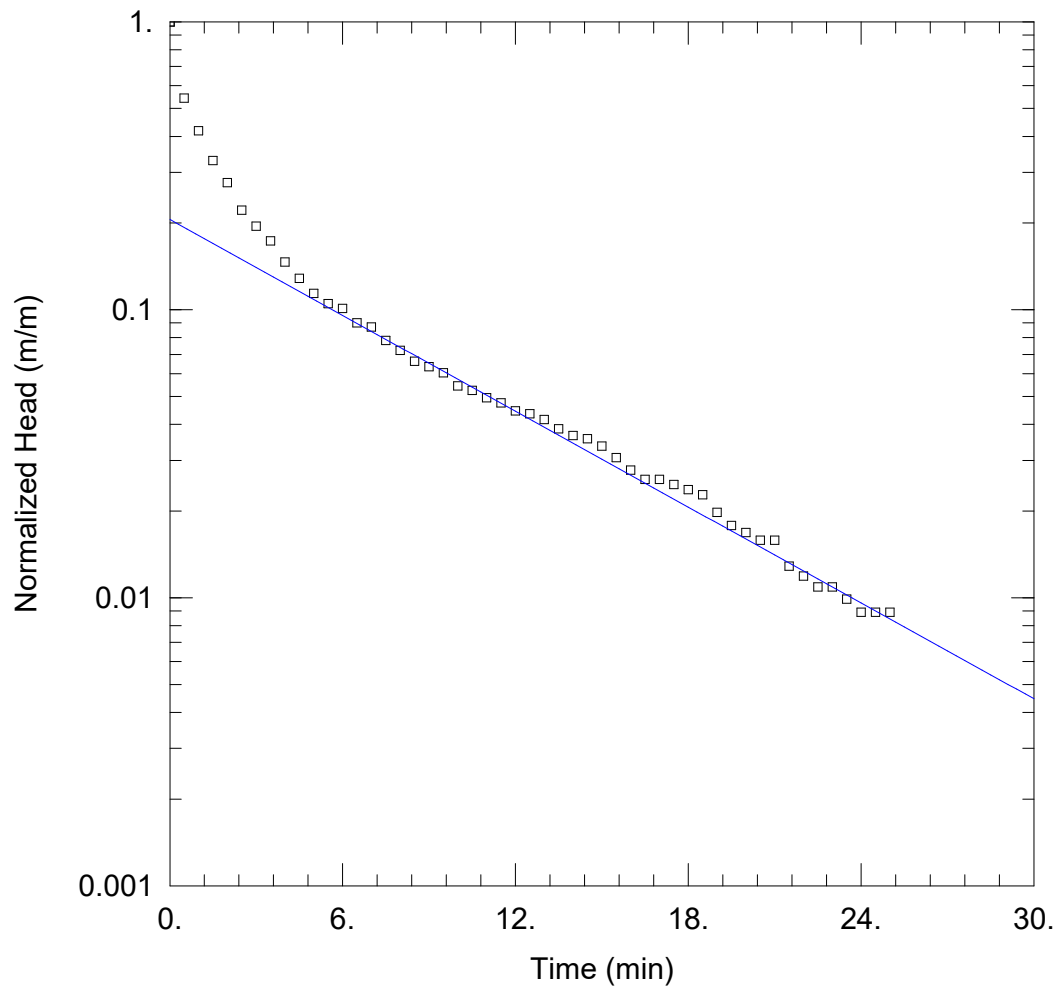
SOLUTION

Aquifer Model: Confined

$K = 0.02748$ m/day

Solution Method: Bouwer-Rice

$y_0 = 0.1634$ m



WELL TEST ANALYSIS

Data Set: Z:\...\MW1.3_TL.aqt

Date: 10/09/25

Time: 12:57:32

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW1.3)

Initial Displacement: 1.01 m

Static Water Column Height: 7.306 m

Total Well Penetration Depth: 8.8 m

Screen Length: 6. m

Casing Radius: 0.025 m

Well Radius: 0.045 m

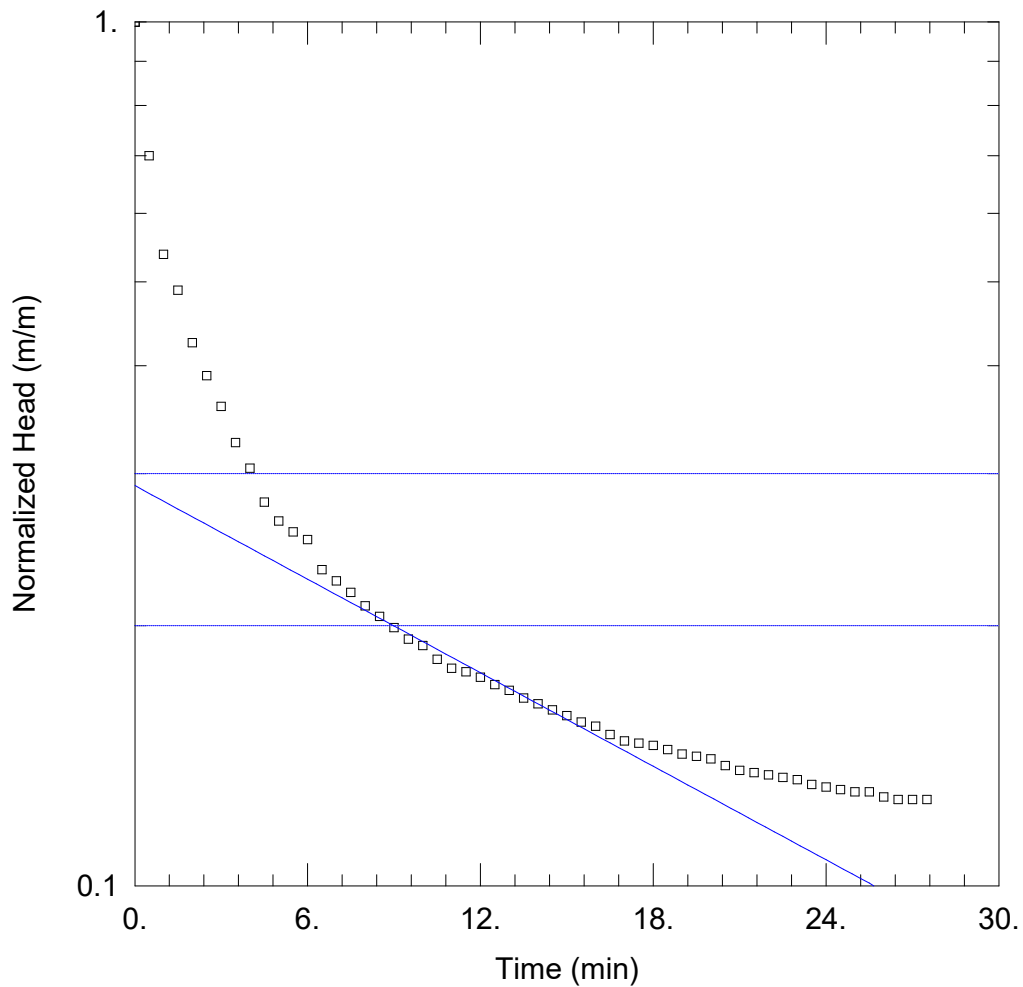
SOLUTION

Aquifer Model: Confined

Solution Method: Bouwer-Rice

K = 0.03572 m/day

y0 = 0.2078 m



WELL TEST ANALYSIS

Data Set: Z:\...\MW2.1.aqt

Date: 10/09/25

Time: 12:53:45

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW2.1)

Initial Displacement: 1.176 m

Static Water Column Height: 6.479 m

Total Well Penetration Depth: 9. m

Screen Length: 6. m

Casing Radius: 0.025 m

Well Radius: 0.045 m

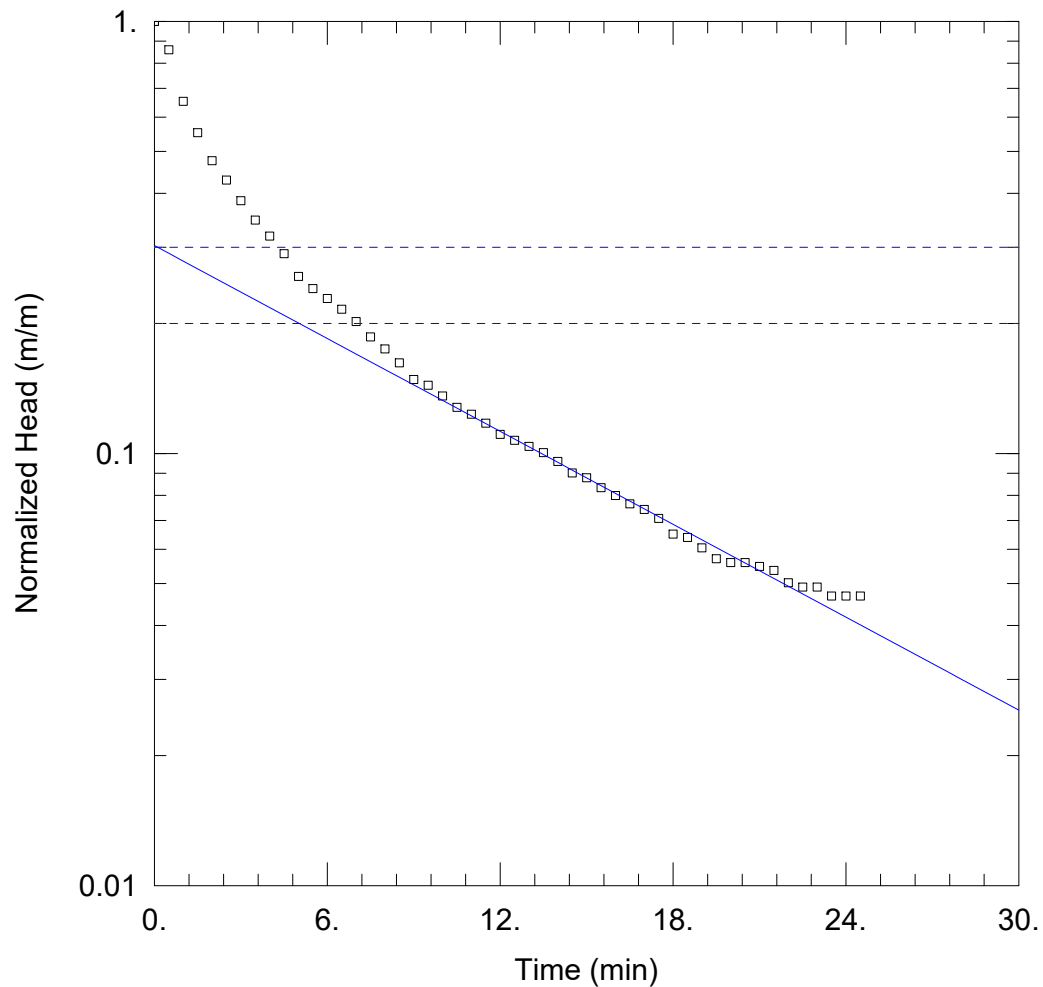
SOLUTION

Aquifer Model: Confined

Solution Method: Bouwer-Rice

$K = 0.01171$ m/day

$y_0 = 0.3416$ m



WELL TEST ANALYSIS

Data Set: Z:\...\MW2.2.aqt

Date: 10/09/25

Time: 15:31:26

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW2.2)

Initial Displacement: 0.876 m

Total Well Penetration Depth: 9. m

Casing Radius: 0.025 m

Static Water Column Height: 6.329 m

Screen Length: 6. m

Well Radius: 0.045 m

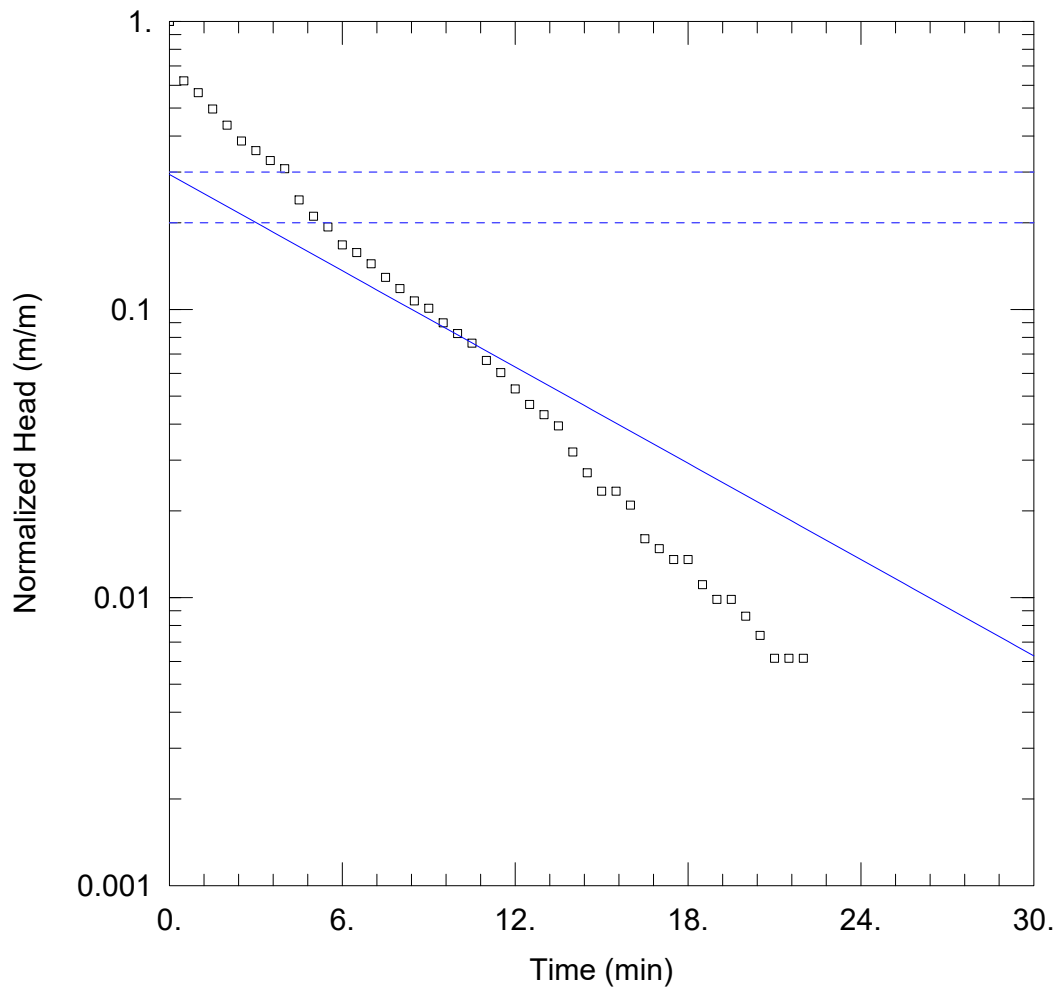
SOLUTION

Aquifer Model: Confined

$K = 0.02325$ m/day

Solution Method: Bouwer-Rice

$y_0 = 0.2652$ m



WELL TEST ANALYSIS

Data Set: Z:\...MW2.3.aqt

Date: 10/09/25

Time: 15:30:06

PROJECT INFORMATION

Company: Geo-Logix

Client: Opal Health Care

Project: 2501056

Test Well: MW1

Test Date: 12.09.2025

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW2.2)

Initial Displacement: 0.812 m

Total Well Penetration Depth: 9. m

Casing Radius: 0.025 m

Static Water Column Height: 6.288 m

Screen Length: 6. m

Well Radius: 0.045 m

SOLUTION

Aquifer Model: Confined

$K = 0.03615$ m/day

Solution Method: Bouwer-Rice

$y_0 = 0.239$ m

ATTACHMENT G

Client Sample ID			BH1/0.2-0.4	BH2/0-0.2	BH2/0.4-0.5	BH2/0.7-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017110	S22-Jn0017111	S22-Jn0017112	S22-Jn0017113
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	21	30	25	23
Chloride	10	mg/kg	-	< 10	< 10	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	20	13	31
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	6.3	6.1	5.0
Resistivity*	0.5	ohm.m	-	510	770	330
Sulphate (as SO4)	10	mg/kg	-	< 10	< 10	13

Client Sample ID			BH2/1.1-1.2	BH3/0.1-0.3	BH3/2.1-2.4	BH4/0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017114	S22-Jn0017115	S22-Jn0017116	S22-Jn0017117
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	-	< 20	-	< 20
TRH C10-C14	20	mg/kg	-	< 20	-	< 20
TRH C15-C28	50	mg/kg	-	< 50	-	< 50
TRH C29-C36	50	mg/kg	-	< 50	-	< 50
TRH C10-C36 (Total)	50	mg/kg	-	< 50	-	< 50
Naphthalene ^{N02}	0.5	mg/kg	-	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	-	< 20	-	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	< 20	-	< 20
TRH >C10-C16	50	mg/kg	-	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	-	< 50	-	< 50
TRH >C16-C34	100	mg/kg	-	< 100	-	< 100
TRH >C34-C40	100	mg/kg	-	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	-	< 100
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	-	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	-	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	-	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	62	-	62
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	-	1.2
Acenaphthene	0.5	mg/kg	-	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	-	< 0.5	-	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5

Client Sample ID			BH2/1.1-1.2	BH3/0.1-0.3	BH3/2.1-2.4	BH4/0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017114	S22-Jn0017115	S22-Jn0017116	S22-Jn0017117
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	20	23	11	11
Chloride	10	mg/kg	< 10	-	< 10	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	17	-	19	77
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.8	-	4.6	8.9
Resistivity*	0.5	ohm.m	580	-	530	130
Sulphate (as SO4)	10	mg/kg	42	-	23	< 10

Client Sample ID			BH4/0.6-0.9	BH5/0-0.2	BH6/0-0.15	BH6/0.4-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017118	S22-Jn0017119	S22-Jn0017120	S22-Jn0017121
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	-	< 20	< 20	-
TRH C10-C14	20	mg/kg	-	< 20	< 20	-
TRH C15-C28	50	mg/kg	-	< 50	99	-
TRH C29-C36	50	mg/kg	-	< 50	150	-
TRH C10-C36 (Total)	50	mg/kg	-	< 50	249	-
Naphthalene ^{N02}	0.5	mg/kg	-	< 0.5	< 0.5	-
TRH C6-C10	20	mg/kg	-	< 20	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	< 20	< 20	-
TRH >C10-C16	50	mg/kg	-	< 50	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	-	< 50	< 50	-
TRH >C16-C34	100	mg/kg	-	< 100	200	-
TRH >C34-C40	100	mg/kg	-	< 100	130	-
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	330	-
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	-	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	-	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	-	< 0.1	< 0.1	-
Xylenes - Total*	0.3	mg/kg	-	< 0.3	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	-	83	62	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	1.2	-
Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-

Client Sample ID			BH4/0.6-0.9	BH5/0-0.2	BH6/0-0.15	BH6/0.4-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017118	S22-Jn0017119	S22-Jn0017120	S22-Jn0017121
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	22	18	25	26
Chloride	10	mg/kg	< 10	-	11	37
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	20	-	29	72
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2	-	7.1	6.6
Resistivity*	0.5	ohm.m	490	-	340	140
Sulphate (as SO4)	10	mg/kg	36	-	19	120

Client Sample ID			BH6/1.9-2	BH6/2.8-2.9	BH7/0-0.2	DS1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017122	S22-Jn0017123	S22-Jn0017124	S22-Jn0017125
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	-	-	< 20	< 20
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	55
TRH C29-C36	50	mg/kg	-	-	70	62
TRH C10-C36 (Total)	50	mg/kg	-	-	70	117
Naphthalene ^{N02}	0.5	mg/kg	-	-	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	-	-	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	-	< 20	< 20
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	< 100	< 100
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	< 100	< 100
BTEX						
Benzene	0.1	mg/kg	-	-	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	-	-	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	55	62
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.2	1.2
Acenaphthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	-	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5

Client Sample ID			BH6/1.9-2	BH6/2.8-2.9	BH7/0-0.2	DS1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Jn0017122	S22-Jn0017123	S22-Jn0017124	S22-Jn0017125
Date Sampled			Jun 03, 2022	Jun 03, 2022	Jun 03, 2022	Jun 03, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	16	13	27	24
Chloride	10	mg/kg	40	62	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	110	72	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.1	5.6	-	-
Resistivity*	0.5	ohm.m	90	140	-	-
Sulphate (as SO4)	10	mg/kg	79	55	-	-

CHAIN OF CUSTODY

Project Manager: Ted & Harsha
TLILLY@Geo-LOGIX.COM.AU
Contact email: HMUTHU@Geo-LOGIX.COM.AU
Project Name: St Ives
Project Number: 2501056 Date Submitted: 02/09/25

Page 1 of 1
Purchase Order No: P06930
Quote Reference: _____
Send Invoice to: accounts@geo-logix.com.au
TAT required: STD

ANALYSIS REQUIRED

Lab ID	Sample ID	Date	Matrix					Comments	COMPOSITE	TRH - C6 - C10	TRH - C10 - C40	VOCs	BTEXN	PAHs	PCBs	OCPs	OPPs	Phenols	Metals - M8	Metals - Lead	Metals - Specify **	TCLP	Asbestos (ID only)	Asbestos (WA DOH)	Foreign Materials	Conductivity (EC)	pH	Grain Size (by sieve)	Aggressivity	Hold	SUITE	Eurofins MGT Suite Codes
			soil	water	air	paint, filters	other																									
	MW1/0-2-0-5	28-09-25	X																									X			B1 TRH/BTEXN	
	MW1/1-6-1-9	"	X																									X			B1A TRH/MAH	
	MW1/5-4-5-5	"	X																									X			B2 TRH/BTEXN/Pb	
	MW1/2-9-3	"	X																									X			B2A TRH/MAH/Pb	
	BH8/0-6-0-9	"	X																									X			B3 PAH/Phenols	
	BH8/1-7-1-9	"	X																									X			B4 TRH/BTEXN/PAH	
	BH8/2-8-3	"	X																									X			B4A TRH/BTEXN/PAH/Phenols	
	BH8/4-3-4-5	"	X																									X			B5 TRH/BTEXN/M7	
	BH9/0-6-0-8	29-09-25	X																									X			B6 TRH/BTEXN/M8	
	BH9/1-6-1-8	"	X																									X			B7 TRH/BTEXN/PAH/M8	
	BH9/2-8-3	"	X																									X			B7A TRH/BTEXN/PAH/Phenols/M8	
	BH9/4-3-4-5	"	X																									X			B8 TRH/VOC/PAH/M8	
	BH9/0-14-0-25	"	X																									X			B9 TRH/BTEXN/PAH/OCP/M8	
	MW1/0-0-0-2	28-09-25	X												X																B10 TRH/BTEXN/PAH/OCP/OPP/M8	
	BH8/0-14-0-2	28-09-25	X												X																B11 Na/K/Ca/Mg/Cl/SO ₄ /CO ₃ /HCO ₃ /NH ₃ /NO ₃	
	BH9/0-3-0-5	29-09-25	X												X																B11A B11/Alkalinity	
																												X			B11B B11/EC/TDS	
																															B12 TRH/BTEXN/Oxygenates/Ethanol	
																												X			B12A TRH/BTEXN/Oxygenates	
																															B13 OCP/PCB	
															X																B14 OCP/OPP	
															X																B15 OCP/OPP/PCB	
															X																B16 TDS/SO ₄ /CH ₄ /Alk/BOD/COD/HPC/CUB	
																															B17 SO ₄ /NO ₃ /Fe++/HPC/CUB	
																															B18 Cl-/SO ₄ /pH	
																																B19 N/P/K
																																B20 CEC/%ESP/Ca/Ma/Na/K

Metals**(circle) As, Cd, Cr, Cu, Ni, Pb, Zn, Hg, Cr 6+, Cr 3+, Fe 2+, Fe 3+, Be, B, Al, V, Mn, Fe, Co, Se, Sr, Sn, Mo, Ag, Ba, Ti, Bi, Sb

Chain of Custody

Relinquished by: Harsha Date/Time: 02/09/25 Signature: [Signature] Received by: [Signature] Date/Time: 02/09/25 Signature: [Signature]

#1263289
SOL CH

Re: Eurofins Sample Receipt Advice - Report 1263289 : Site ST IVES (2501056)

From Harsha Muthu <hmuthu@geo-logix.com.au>

Date Tue 02/09/2025 9:41 PM

To SH_AU25_Enviro_Sample_NSW <EnviroSampleNSW@eurofinsanz.com>; Ted Lilly <tlilly@geo-logix.com.au>

Unverified Sender: The sender of this email has not been verified. Review the content of the message carefully and verify the identity of the sender before acting on this email: replying, opening attachments or clicking links.

Hi,

Yes, it is a typo. Please use the sample labels for sampling date

Get [Outlook for Android](#)

From: Cathy Ninh <EET-ELVIS@eurofinsanz.com>

Sent: Tuesday, September 2, 2025 9:31:18 PM

To: Ted Lilly <tlilly@geo-logix.com.au>

Cc: Harsha Muthu <hmuthu@geo-logix.com.au>

Subject: Eurofins Sample Receipt Advice - Report 1263289 : Site ST IVES (2501056)

Dear Valued Client,

On COC sampling dates state 28/09 and 29/09, however received samples labeled with 28/08 and 29/08, assuming typo, sample labels will be used for sampling date. Please Confirm.

Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested analysis. If there are any irregularities then please contact your Eurofins Analytical Services Manager as soon as possible to make certain that they get changed.

Kind Regards

Cathy Ninh

Sample Receipt

Eurofins | Environmental Testing

179 Magowar Road,

GIRRAWEE, NSW 2145

AUSTRALIA

Phone: +61 02 9900 8421

Email: EnviroSampleNSW@eurofins.com

Website: <http://environment.eurofins.com.au>

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[View our latest EnviroNotes](#)

[View our latest EnviroNotes](#)

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarie QLD 4172 +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Perth
46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road Penrose Auckland 1061 +64 9 526 4551 IANZ# 1327	Unit C1/4 Pacific Rise Mount Wellington Auckland 1061 +64 9 525 0568 IANZ# 1308	43 Detroit Drive Rolleston Christchurch 7675 +64 3 343 5201 IANZ# 1290	1277 Cameron Road Gate Pa Tauranga 3112 +64 9 525 0568 IANZ# 1402

Sample Receipt Advice

Company name: Geo-Logix P/L
Contact name: - ALL RESULTS Ted Lilly
Project name: ST IVES
Project ID: 2501056
Turnaround time: 5 Day
Date/Time received: Sep 2, 2025 4:00 PM
Eurofins reference: 1263289

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 6 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✗ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

On COC sampling dates state 28/09 and 29/09, however received samples labeled with 28/08 and 29/08, assuming typo, sample labels will be used for sampling date. Please Confirm.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Bonnie Pu on phone : or by email: Bonnie.Pu@eurofinsanz.com

Results will be delivered electronically via email to - ALL RESULTS Ted Lilly - tlilly@geo-logix.com.au.

Note: A copy of these results will also be delivered to the general Geo-Logix P/L email address.

Geo-Logix P/L
Bld Q2 Level 3, 2309/4 Daydream St
Warriewood
NSW 2102



NATA Accredited
Accreditation Number 1261
Site Number 18217

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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: - ALL RESULTS Ted Lilly

Report 1263289-S
Project name **ST IVES**
Project ID **2501056**
Received Date **Sep 02, 2025**

Client Sample ID			MW1/0.2-0.5	MW1/1.6-1.9	MW1/5.4-5.5	MW1/2.9-3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007301	S25-Se0007302	S25-Se0007303	S25-Se0007304
Date Sampled			Aug 28, 2025	Aug 28, 2025	Aug 28, 2025	Aug 28, 2025
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	< 10	40	< 10	< 10
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	< 10	91	43	65
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	5.5	4.8	5.8	5.4
Resistivity*	0.5	ohm.m	1300	110	230	150
Sulphate (as SO4)	10	mg/kg	12	84	39	120
Sample Properties						
% Moisture	1	%	17	15	19	24

Client Sample ID			BH8/0.6-0.9	BH8/1.7-1.9	BH8/2.8-3	BH8/4.3-4.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007305	S25-Se0007306	S25-Se0007307	S25-Se0007308
Date Sampled			Aug 28, 2025	Aug 28, 2025	Aug 28, 2025	Aug 28, 2025
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	26	< 10	35	< 10
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	27	48	14	18
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	6.0	4.8	5.2	5.1
Resistivity*	0.5	ohm.m	370	210	710	570
Sulphate (as SO4)	10	mg/kg	53	26	330	< 10
Sample Properties						
% Moisture	1	%	20	8.4	18	19

Client Sample ID			BH9/0.6-0.8	BH9/1.6-1.8	BH9/2.8-3	BH9/4.3-4.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007309	S25-Se0007310	S25-Se0007311	S25-Se0007312
Date Sampled			Aug 29, 2025	Aug 29, 2025	Aug 29, 2025	Aug 29, 2025
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	210	19	200	280
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	170	130	150	210
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	4.7	4.3	4.9	4.6
Resistivity*	0.5	ohm.m	59	76	67	49
Sulphate (as SO4)	10	mg/kg	23	230	27	16
Sample Properties						
% Moisture	1	%	15	11	17	21

Client Sample ID			BH9/0.14-0.25	MW1/0-0.2	G01BH8/0.14-0.2	BH9/0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007313	S25-Se0007314	S25-Se0007315	S25-Se0007316
Date Sampled			Aug 29, 2025	Aug 28, 2025	Aug 29, 2025	Aug 29, 2025
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	< 10	-	-	-
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	270	-	-	-
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	11	-	-	-
Resistivity*	0.5	ohm.m	36	-	-	-
Sulphate (as SO4)	10	mg/kg	75	-	-	-
Sample Properties						
% Moisture	1	%	13	25	5.1	20
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	-	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	-	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	-	< 50	82	< 50
TRH C29-C36	50	mg/kg	-	< 50	250	< 50
TRH C10-C36 (Total)	50	mg/kg	-	< 50	332	< 50
TRH C6-C10	20	mg/kg	-	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	-	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{*N01}	50	mg/kg	-	< 50	< 50	< 50
Naphthalene ^{N02}	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
TRH >C16-C34	100	mg/kg	-	< 100	260	< 100
TRH >C34-C40	100	mg/kg	-	< 100	320	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	580	< 100
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	-	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	128	139	106

Client Sample ID			BH9/0.14-0.25	MW1/0-0.2	G01BH8/0.14-0.2	BH9/0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007313	S25-Se0007314	S25-Se0007315	S25-Se0007316
Date Sampled			Aug 29, 2025	Aug 28, 2025	Aug 29, 2025	Aug 29, 2025
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	103	64	95
p-Terphenyl-d14 (surr.)	1	%	-	86	59	77
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	< 1	< 0.1
4,4'-DDD	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
4,4'-DDE	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
4,4'-DDT	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
α-HCH	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Aldrin	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
β-HCH	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
δ-HCH	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Dieldrin	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endosulfan I	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endosulfan II	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endrin	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endrin aldehyde	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Endrin ketone	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
γ-HCH (Lindane)	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Heptachlor	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Methoxychlor	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Toxaphene	0.5	mg/kg	-	< 0.5	< 10	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	< 0.5	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Dibutylchloroendate (surr.)	1	%	-	125	G01INT	127
Tetrachloro-m-xylene (surr.)	1	%	-	107	63	98

Client Sample ID			BH9/0.14-0.25	MW1/0-0.2	G01 BH8/0.14-0.2	BH9/0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S25-Se0007313	S25-Se0007314	S25-Se0007315	S25-Se0007316
Date Sampled			Aug 29, 2025	Aug 28, 2025	Aug 29, 2025	Aug 29, 2025
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1221	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1232	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1242	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1248	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1254	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Aroclor-1260	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Total PCB*	0.1	mg/kg	-	< 0.1	< 1	< 0.1
Dibutylchloroendate (surr.)	1	%	-	125	INT	127
Tetrachloro-m-xylene (surr.)	1	%	-	107	63	98
Heavy Metals						
Arsenic	2	mg/kg	-	16	2.5	7.4
Cadmium	0.4	mg/kg	-	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	-	9.6	61	16
Copper	5	mg/kg	-	13	24	9.7
Lead	5	mg/kg	-	27	7.5	19
Mercury	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	-	< 5	62	< 5
Zinc	5	mg/kg	-	39	70	6.7

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
Chloride	Sydney	Sep 03, 2025	28 Days
- Method: In-house method LTM-INO-4090 Chloride by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25 °C as rec.)	Sydney	Sep 03, 2025	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (1:5 Aqueous extract at 25 °C as rec.)	Sydney	Sep 03, 2025	7 Days
- Method: LTM-GEN-7090 pH by ISE			
Sulphate (as SO ₄)	Sydney	Sep 03, 2025	28 Days
- Method: In-house method LTM-INO-4110 Sulphate by Discrete Analyser			
% Moisture	Sydney	Sep 02, 2025	14 Days
- Method: LTM-GEN-7080 Moisture			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Sydney	Sep 03, 2025	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Polychlorinated Biphenyls	Sydney	Sep 03, 2025	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Metals M8	Sydney	Sep 03, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			



web: www.eurofins.com.au

email: EnviroSales@eurofinsanz.com

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079
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Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554
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Auckland 35 O'Rorke Road Penrose Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise Mount Wellington Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road Gate Pa Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name: Geo-Logix P/L
Address: Bld Q2 Level 3, 2309/4 Daydream St
Warriewood
NSW 2102

Project Name: ST IVES
Project ID: 2501056

Order No.: P06930
Report #: 1263289
Phone: 02 9979 1722
Fax: 02 9979 1222

Received: Sep 2, 2025 4:00 PM
Due: Sep 9, 2025
Priority: 5 Day
Contact Name: - ALL RESULTS Ted Lilly

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail

Aggressivity Soil Set

Moisture Set

Suite
B10A:TRH/TEXN/PAH/OC/P/PCB/ Metals 8

Sydney Laboratory - NATA # 1261 Site # 18217

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	MW1/0.2-0.5	Aug 28, 2025		Soil	S25-Se0007301	X	X	
2	MW1/1.6-1.9	Aug 28, 2025		Soil	S25-Se0007302	X	X	
3	MW1/5.4-5.5	Aug 28, 2025		Soil	S25-Se0007303	X	X	
4	MW1/2.9-3	Aug 28, 2025		Soil	S25-Se0007304	X	X	
5	BH8/0.6-0.9	Aug 28, 2025		Soil	S25-Se0007305	X	X	
6	BH8/1.7-1.9	Aug 28, 2025		Soil	S25-Se0007306	X	X	
7	BH8/2.8-3	Aug 28, 2025		Soil	S25-Se0007307	X	X	
8	BH8/4.3-4.5	Aug 28, 2025		Soil	S25-Se0007308	X	X	
9	BH9/0.6-0.8	Aug 29, 2025		Soil	S25-Se0007309	X	X	
10	BH9/1.6-1.8	Aug 29, 2025		Soil	S25-Se0007310	X	X	
11	BH9/2.8-3	Aug 29, 2025		Soil	S25-Se0007311	X	X	
12	BH9/4.3-4.5	Aug 29, 2025		Soil	S25-Se0007312	X	X	
13	BH9/0.14-0.25	Aug 29, 2025		Soil	S25-Se0007313	X	X	
14	MW1/0-0.2	Aug 28, 2025		Soil	S25-Se0007314		X	X



web: www.eurofins.com.au
email: EnviroSales@eurofinsanz.com

ABN: 50 005 085 521

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ABN: 91 05 0159 898

Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554
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NZBN: 9429046024954

Auckland 35 O'Rorke Road Penrose Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise Mount Wellington Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road Gate Pa Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name: Geo-Logix P/L
Address: Bld Q2 Level 3, 2309/4 Daydream St
Warriewood
NSW 2102

Project Name: ST IVES
Project ID: 2501056

Order No.: P06930
Report #: 1263289
Phone: 02 9979 1722
Fax: 02 9979 1222

Received: Sep 2, 2025 4:00 PM
Due: Sep 9, 2025
Priority: 5 Day
Contact Name: - ALL RESULTS Ted Lilly

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Aggressivity Soil Set	Moisture Set	Suite B10A:TRH/BTEXN/PAH/OC/P/CB/ Metals8
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
15	BH8/0.14-0.2	Aug 29, 2025		Soil	S25-Se0007315		X	X
16	BH9/0.3-0.5	Aug 29, 2025		Soil	S25-Se0007316		X	X
Test Counts						13	16	3

Internal Quality Control Review and Glossary

General

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

Holding Times

Please refer to the '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 before sample receipt deadlines as stated on the SRA.

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

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

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

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - 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.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
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 only be used as a guide 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. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as 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 are 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	
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Sulphate (as SO ₄)	mg/kg	< 10			10	Pass	
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Sulphate (as SO ₄)	mg/kg	< 10			10	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
α-HCH	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Conductivity (1:5 aqueous extract at 25 °C as rec.)	%	96			70-130	Pass	
LCS - % Recovery							
Chloride	%	107			70-130	Pass	
Sulphate (as SO4)	%	90			70-130	Pass	
LCS - % Recovery							
Chloride	%	107			70-130	Pass	
Sulphate (as SO4)	%	91			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	84			70-130	Pass	
TRH C10-C14	%	114			70-130	Pass	
TRH C6-C10	%	82			70-130	Pass	
TRH >C10-C16	%	112			70-130	Pass	
Naphthalene	%	91			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	92			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Toluene	%	91			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	95			70-130	Pass	
o-Xylene	%	95			70-130	Pass	
Xylenes - Total*	%	95			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	94			70-130	Pass	
Acenaphthylene	%	97			70-130	Pass	
Anthracene	%	72			70-130	Pass	
Benz(a)anthracene	%	91			70-130	Pass	
Benzo(a)pyrene	%	99			70-130	Pass	
Benzo(b&j)fluoranthene	%	98			70-130	Pass	
Benzo(k)fluoranthene	%	110			70-130	Pass	
Chrysene	%	101			70-130	Pass	
Dibenz(a,h)anthracene	%	104			70-130	Pass	
Fluoranthene	%	110			70-130	Pass	
Fluorene	%	112			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	108			70-130	Pass	
Naphthalene	%	104			70-130	Pass	
Phenanthrene	%	82			70-130	Pass	
Pyrene	%	117			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4,4'-DDD	%	119			70-130	Pass	
4,4'-DDE	%	117			70-130	Pass	
4,4'-DDT	%	89			70-130	Pass	
a-HCH	%	95			70-130	Pass	
Aldrin	%	122			70-130	Pass	
b-HCH	%	91			70-130	Pass	
d-HCH	%	83			70-130	Pass	
Endosulfan I	%	107			70-130	Pass	
Endosulfan II	%	92			70-130	Pass	
Endosulfan sulphate	%	126			70-130	Pass	
Endrin	%	114			70-130	Pass	
Endrin aldehyde	%	97			70-130	Pass	
g-HCH (Lindane)	%	104			70-130	Pass	
Hexachlorobenzene	%	127			70-130	Pass	
Methoxychlor	%	123			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	82			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	95			80-120	Pass	
Cadmium	%	96			80-120	Pass	
Chromium	%	91			80-120	Pass	
Copper	%	92			80-120	Pass	
Lead	%	91			80-120	Pass	
Mercury	%	85			80-120	Pass	
Nickel	%	91			80-120	Pass	
Zinc	%	91			80-120	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g,h,i)perylene			%	100			70-130	Pass	
LCS - % Recovery									
Organochlorine Pesticides									
Dieldrin			%	96			70-130	Pass	
Heptachlor			%	105			70-130	Pass	
Heptachlor epoxide			%	105			70-130	Pass	
LCS - % Recovery									
Polychlorinated Biphenyls									
Aroclor-1260			%	100			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Chloride	S25-Se0007311	CP	%	100			70-130	Pass	
Sulphate (as SO ₄)	S25-Se0007311	CP	%	97			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S25-Se0002812	NCP	%	81			70-130	Pass	
TRH C10-C14	S25-Se0008845	NCP	%	122			70-130	Pass	
TRH C6-C10	S25-Se0002812	NCP	%	79			70-130	Pass	
TRH >C10-C16	S25-Se0008845	NCP	%	122			70-130	Pass	
Naphthalene	S25-Se0002812	NCP	%	81			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S25-Se0002812	NCP	%	82			70-130	Pass	
Toluene	S25-Se0002812	NCP	%	86			70-130	Pass	
Ethylbenzene	S25-Se0002812	NCP	%	85			70-130	Pass	
m&p-Xylenes	S25-Se0002812	NCP	%	87			70-130	Pass	
o-Xylene	S25-Se0002812	NCP	%	86			70-130	Pass	
Xylenes - Total*	S25-Se0002812	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	N25-Se0004765	NCP	%	111			70-130	Pass	
Acenaphthylene	N25-Se0004765	NCP	%	115			70-130	Pass	
Benz(a)anthracene	N25-Se0004765	NCP	%	110			70-130	Pass	
Benzo(a)pyrene	N25-Se0004765	NCP	%	101			70-130	Pass	
Benzo(b&j)fluoranthene	N25-Se0004765	NCP	%	106			70-130	Pass	
Benzo(k)fluoranthene	N25-Se0004765	NCP	%	106			70-130	Pass	
Chrysene	N25-Se0004765	NCP	%	115			70-130	Pass	
Dibenz(a,h)anthracene	N25-Se0004765	NCP	%	115			70-130	Pass	
Fluorene	N25-Se0004765	NCP	%	128			70-130	Pass	
Indeno(1,2,3-cd)pyrene	N25-Se0004765	NCP	%	92			70-130	Pass	
Naphthalene	N25-Se0004765	NCP	%	123			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4,4'-DDD	N25-Se0004765	NCP	%	128			70-130	Pass	
4,4'-DDT	N25-Se0004765	NCP	%	116			70-130	Pass	
a-HCH	N25-Se0004765	NCP	%	103			70-130	Pass	
b-HCH	N25-Se0004765	NCP	%	114			70-130	Pass	
d-HCH	N25-Se0004765	NCP	%	114			70-130	Pass	
Endosulfan I	N25-Se0004765	NCP	%	108			70-130	Pass	
Endosulfan II	N25-Se0004765	NCP	%	106			70-130	Pass	
Endosulfan sulphate	N25-Se0004765	NCP	%	119			70-130	Pass	
Endrin	N25-Se0004765	NCP	%	126			70-130	Pass	
Endrin aldehyde	N25-Se0004765	NCP	%	101			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
g-HCH (Lindane)	N25-Se0004765	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	N25-Se0004765	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Anthracene	S25-Se0002839	NCP	%	100			70-130	Pass	
Benzo(g,h,i)perylene	S25-Se0002839	NCP	%	101			70-130	Pass	
Fluoranthene	S25-Se0002839	NCP	%	110			70-130	Pass	
Phenanthrene	S25-Se0002839	NCP	%	99			70-130	Pass	
Pyrene	S25-Se0002839	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S25-Se0002839	NCP	%	102			70-130	Pass	
4,4'-DDE	S25-Se0002839	NCP	%	97			70-130	Pass	
Aldrin	S25-Se0002839	NCP	%	96			70-130	Pass	
Dieldrin	S25-Se0002839	NCP	%	95			70-130	Pass	
Endrin ketone	S25-Se0002839	NCP	%	100			70-130	Pass	
Heptachlor	S25-Se0002839	NCP	%	103			70-130	Pass	
Heptachlor epoxide	S25-Se0002839	NCP	%	105			70-130	Pass	
Hexachlorobenzene	S25-Se0002839	NCP	%	93			70-130	Pass	
Methoxychlor	S25-Se0002839	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	S25-Se0002839	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S25-Se0007316	CP	%	97			75-125	Pass	
Cadmium	S25-Se0007316	CP	%	95			75-125	Pass	
Chromium	S25-Se0007316	CP	%	90			75-125	Pass	
Copper	S25-Se0007316	CP	%	90			75-125	Pass	
Lead	S25-Se0007316	CP	%	96			75-125	Pass	
Mercury	S25-Se0007316	CP	%	91			75-125	Pass	
Nickel	S25-Se0007316	CP	%	89			75-125	Pass	
Zinc	S25-Se0007316	CP	%	88			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S25-Se0008484	NCP	mg/kg	13	11	13	30%	Pass	
Conductivity (1:5 aqueous extract at 25 °C as rec.)	S25-Se0008484	NCP	uS/cm	210	200	4.0	30%	Pass	
pH (1:5 Aqueous extract at 25 °C as rec.)	S25-Se0008484	NCP	pH Units	8.3	8.4	pass	30%	Pass	
Resistivity*	S25-Se0008484	NCP	ohm.m	48	49	4.0	30%	Pass	
Sulphate (as SO4)	S25-Se0007301	CP	mg/kg	12	< 10	99	30%	Fail	Q15
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	S25-Se0007301	CP	%	17	16	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Sulphate (as SO4)	S25-Se0007308	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S25-Se0007309	CP	mg/kg	210	220	3.0	30%	Pass	
Sulphate (as SO4)	S25-Se0007309	CP	mg/kg	23	15	41	30%	Fail	Q15

Duplicate								
				Result 1	Result 2	RPD		
Conductivity (1:5 aqueous extract at 25 °C as rec.)	S25-Se0002885	NCP	uS/cm	51	44	14	30%	Pass
pH (1:5 Aqueous extract at 25 °C as rec.)	S25-Se0002885	NCP	pH Units	6.0	6.0	pass	30%	Pass
Resistivity*	S25-Se0002885	NCP	ohm.m	200	230	14	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	S25-Se0007311	CP	%	17	17	5.0	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C10-C14	S25-Se0009274	NCP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C15-C28	S25-Se0009274	NCP	mg/kg	< 50	< 50	<1	30%	Pass
TRH C29-C36	S25-Se0009274	NCP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C10-C16	S25-Se0009274	NCP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	S25-Se0009274	NCP	mg/kg	< 100	< 100	<1	30%	Pass
TRH >C34-C40	S25-Se0009274	NCP	mg/kg	< 100	< 100	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Acenaphthylene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Anthracene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benz(a)anthracene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)pyrene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(b&j)fluoranthene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
4,4'-DDD	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDE	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDT	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
a-HCH	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Aldrin	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
b-HCH	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
d-HCH	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Dieldrin	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan I	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan II	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan sulphate	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin aldehyde	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin ketone	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
g-HCH (Lindane)	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor epoxide	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass

Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Methoxychlor	S25-Se0000837	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Toxaphene	S25-Se0000837	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1221	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1242	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1248	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1254	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1260	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Total PCB*	S25-Se0000837	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C6-C9	S25-Se0007315	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C6-C10	S25-Se0007315	CP	mg/kg	< 20	< 20	<1	30%	Pass
Naphthalene	S25-Se0007315	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
BTX				Result 1	Result 2	RPD		
Benzene	S25-Se0007315	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	S25-Se0007315	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	S25-Se0007315	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	S25-Se0007315	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	S25-Se0007315	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total*	S25-Se0007315	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S25-Se0007315	CP	mg/kg	2.5	3.1	20	30%	Pass
Cadmium	S25-Se0007315	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S25-Se0007315	CP	mg/kg	61	74	19	30%	Pass
Copper	S25-Se0007315	CP	mg/kg	24	26	9.0	30%	Pass
Lead	S25-Se0007315	CP	mg/kg	7.5	9.8	26	30%	Pass
Mercury	S25-Se0007315	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S25-Se0007315	CP	mg/kg	62	79	25	30%	Pass
Zinc	S25-Se0007315	CP	mg/kg	70	55	24	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
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
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
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:

Sharlene Santos	Analytical Services Manager
Mickael Ros	Senior Analyst-Metal
Ryan Phillips	Senior Analyst-Sample Properties
Dilani Samarakoon	Senior Analyst-Inorganic
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Organic
Ryan Phillips	Senior Analyst-Inorganic



Glenn Jackson
Managing Director

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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Particle Size Distribution Report

Client	Geo-Logix Pty Ltd	Source	BH3 0.0-0.40m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty Sandy CLAY, trace of Gravel
Project	St Ives Geotech (2201040)	Report No	S77600-PSD
Job No	S21636-1	Lab No	S77600

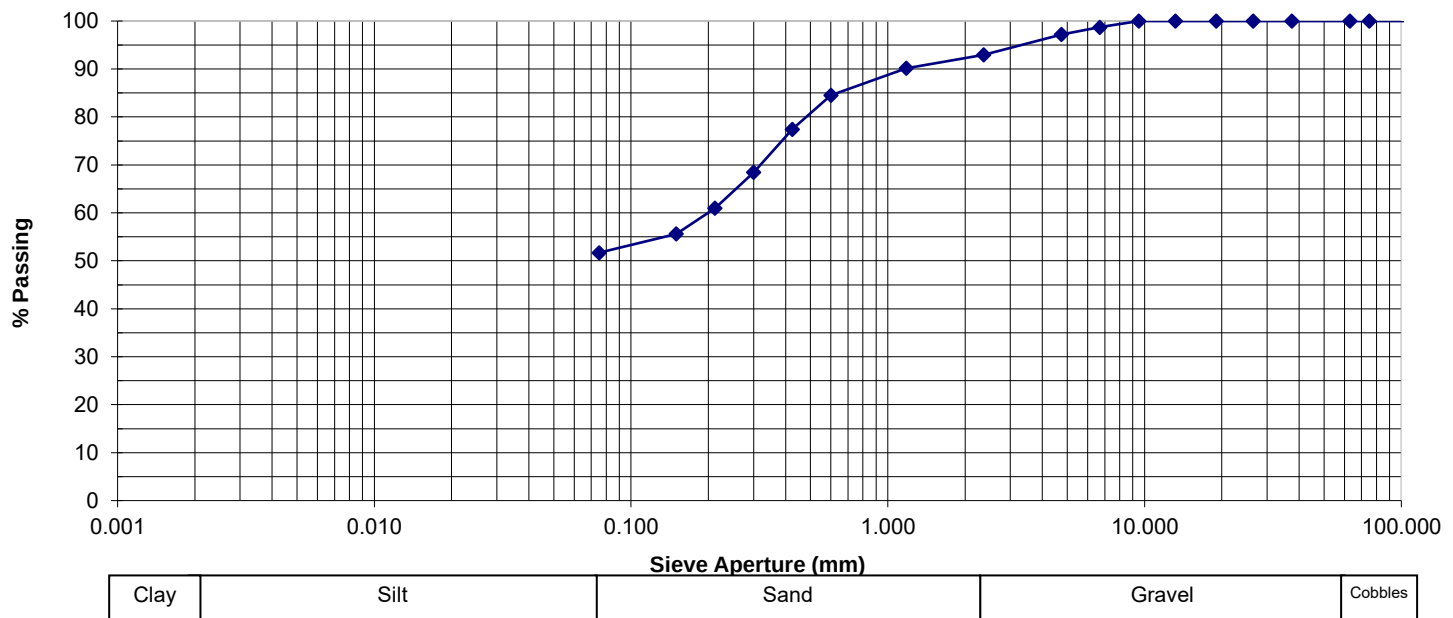
Test Procedure AS 1289.3.6.1 - Particle size distribution of a soil

Sampling Sampled by Client - results apply to the sample as received

Date Sampled 3/06/2022

Preparation Prepared in accordance with the test method

Date Tested 16/06/2022



Clay	Silt	Sand	Gravel	Cobbles
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Sieve Aperture: (mm)	% Passing	Specification (..) Envelope	Sieve Aperture: (mm)	% Passing	Specification (..) Envelope
200	100		4.75	97	
75	100		2.36	93	
63	100		1.18	90	
37.5	100		0.600	85	
26.5	100		0.425	77	
19	100		0.300	68	
13.2	100		0.212	61	
9.5	100		0.150	56	
6.7	99		0.075	52	

Notes



Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. This document shall not be reproduced, except in full. Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Date:

16/06/2022

Chris Lloyd

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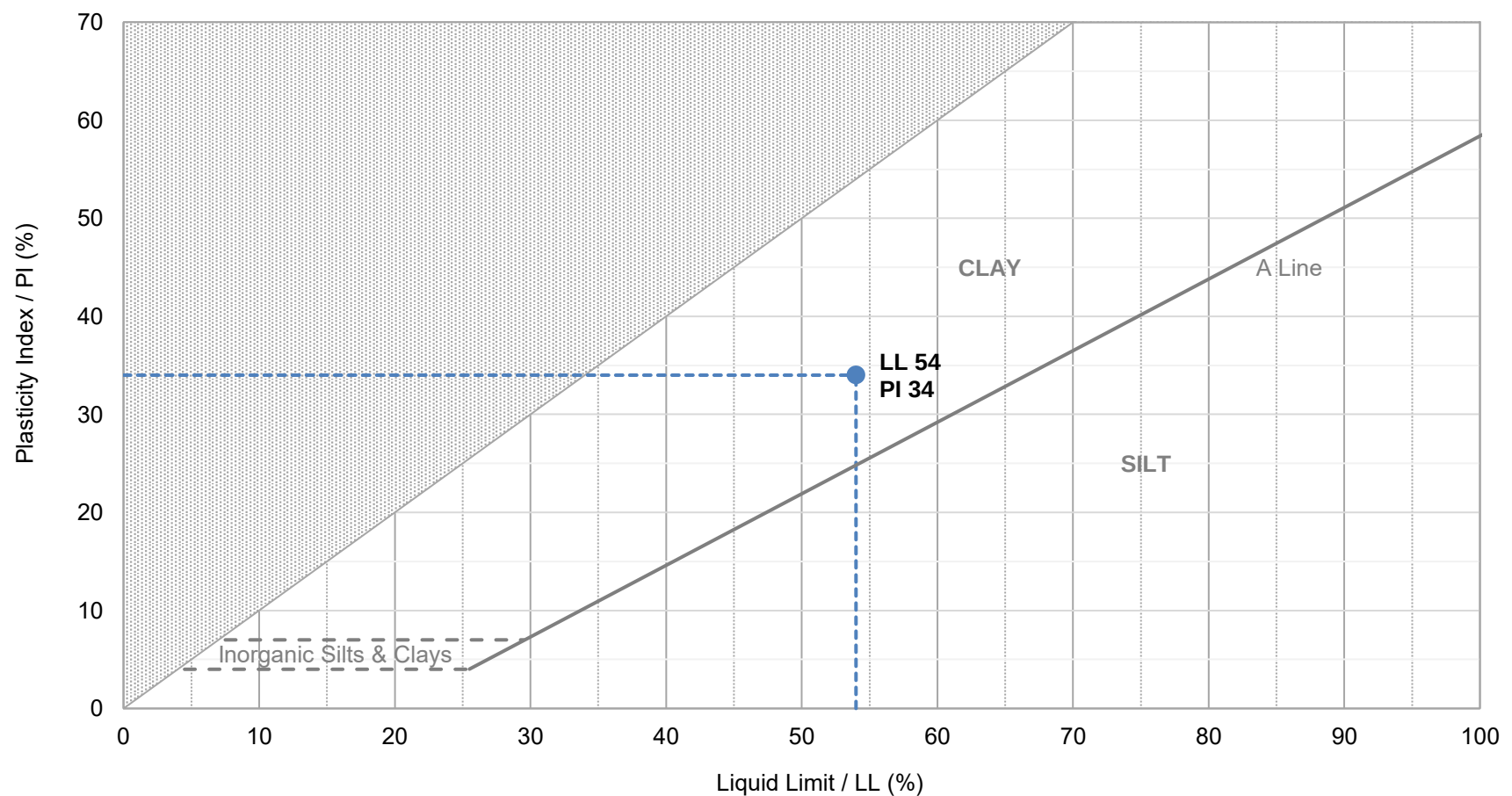
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14 Carter St
Lidcombe NSW 2141

SOIL CLASSIFICATION REPORT

Client	Geo-Logix Pty Ltd	Source	BH3 1.0-1.50m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty Sandy CLAY
Project	St Ives Geotech (2201040)	Report No.	S77601-PI
Job No.	S21636-1	Lab No.	S77601

Test Procedure	☐ AS1289 3.1.1 Liquid Limit - Four point Casagrande method ☒ AS1289 3.1.2 Liquid Limit - One point Casagrande method ☒ AS1289 3.2.1 Plastic Limit - Standard method ☒ AS1289 3.3.1 Calculation of the Plasticity Index ☒ AS1289 3.4.1 Linear Shrinkage - Standard method		
Sampling	Sampled by Client - results apply to the sample as received	Date Sampled	3/06/2022
Preparation	Prepared in accordance with the test method	Date Tested	21/06/2022

Plasticity Chart for Classification of Fine-Grained Soils
AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation		Results	
Method of Preparation	Dry Sieved	Liquid Limit / LL (%)	54
History of the Sample	Air Dried	Plastic Limit (%)	20
		Plasticity Index / PI (%)	34
		Linear Shrinkage (%)	12.5
		Condition upon Drying	Linear

Notes



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Authorised Signatory:

Chris Lloyd

22/06/2022

Date:



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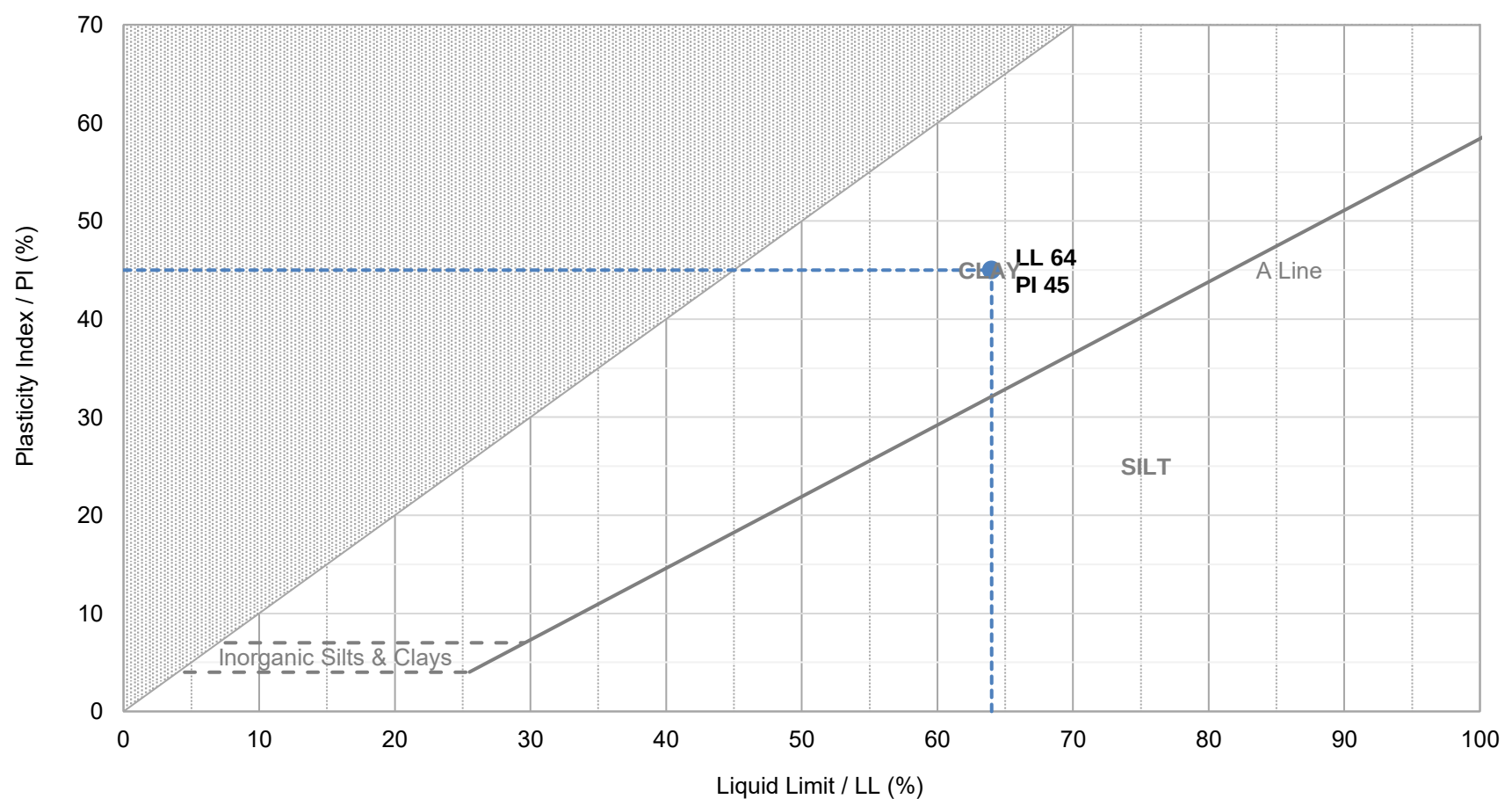
SOIL CLASSIFICATION REPORT

Client	Geo-Logix Pty Ltd	Source	BH4 0.40-0.50m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty CLAY
Project	St Ives Geotech (2201040)	Report No.	S77602-PI
Job No.	S21636-1	Lab No.	S77602

Test Procedure	☐ AS1289 3.1.1 Liquid Limit - Four point Casagrande method ☒ AS1289 3.1.2 Liquid Limit - One point Casagrande method ☒ AS1289 3.2.1 Plastic Limit - Standard method ☒ AS1289 3.3.1 Calculation of the Plasticity Index ☒ AS1289 3.4.1 Linear Shrinkage - Standard method		
Sampling	Sampled by Client - results apply to the sample as received	Date Sampled	3/06/2022
Preparation	Prepared in accordance with the test method	Date Tested	21/06/2022

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation		Results	
Method of Preparation	Dry Sieved	Liquid Limit / LL (%)	64
History of the Sample	Air Dried	Plastic Limit (%)	19
		Plasticity Index / PI (%)	45
		Linear Shrinkage (%)	14.0
		Condition upon Drying	Linear

Notes



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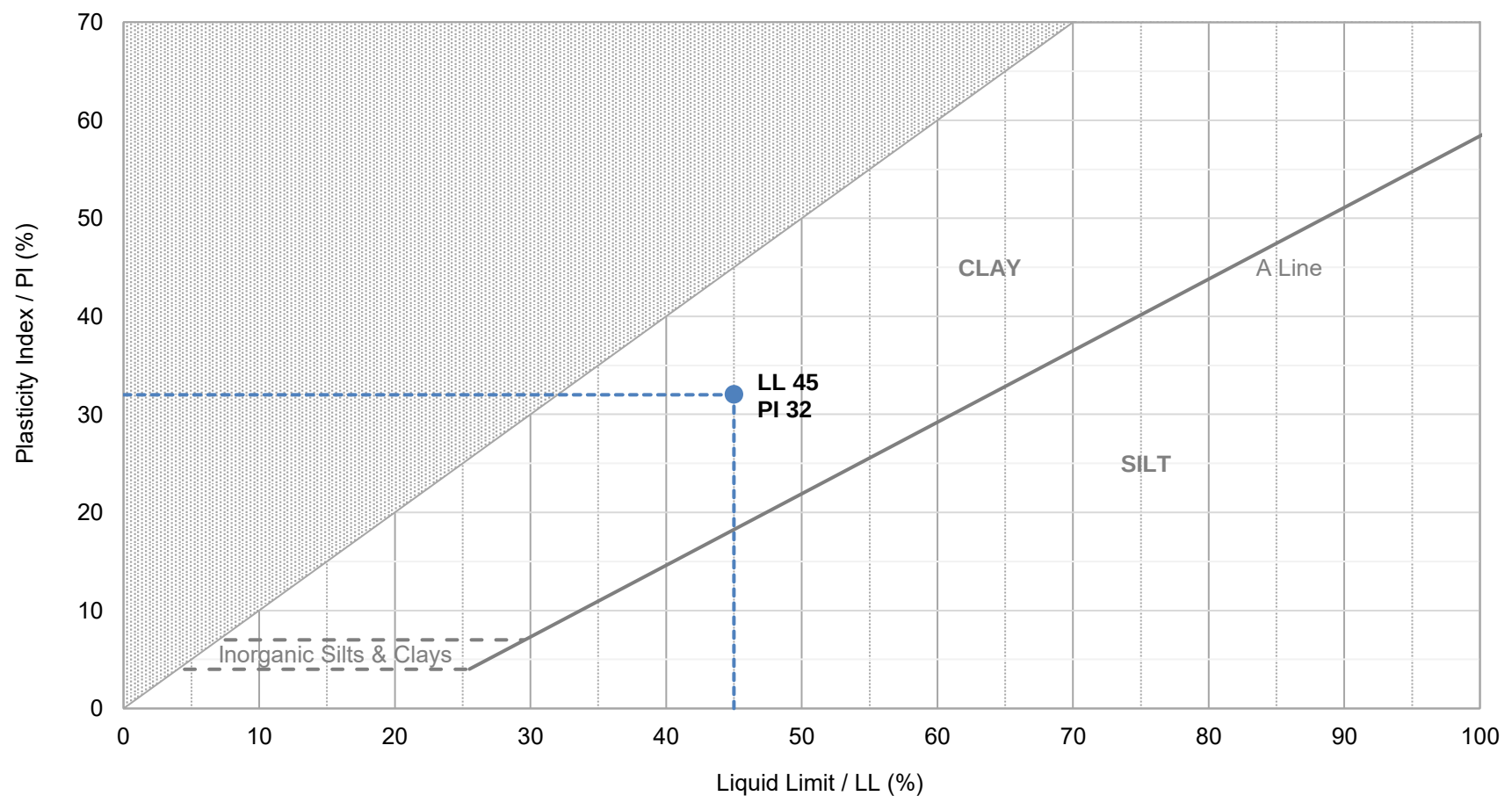
SOIL CLASSIFICATION REPORT

Client	Geo-Logix Pty Ltd	Source	BH6 2.0-2.45m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty CLAY
Project	St Ives Geotech (2201040)	Report No.	S77603-PI
Job No.	S21636-1	Lab No.	S77603

Test Procedure	☐ AS1289 3.1.1 Liquid Limit - Four point Casagrande method ☒ AS1289 3.1.2 Liquid Limit - One point Casagrande method ☒ AS1289 3.2.1 Plastic Limit - Standard method ☒ AS1289 3.3.1 Calculation of the Plasticity Index ☒ AS1289 3.4.1 Linear Shrinkage - Standard method		
Sampling	Sampled by Client - results apply to the sample as received	Date Sampled	3/06/2022
Preparation	Prepared in accordance with the test method	Date Tested	21/06/2022

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation		Results	
Method of Preparation	Dry Sieved	Liquid Limit / LL (%)	45
History of the Sample	Air Dried	Plastic Limit (%)	13
		Plasticity Index / PI (%)	32
		Linear Shrinkage (%)	13.0
		Condition upon Drying	Linear

Notes



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22/06/2022

Date:

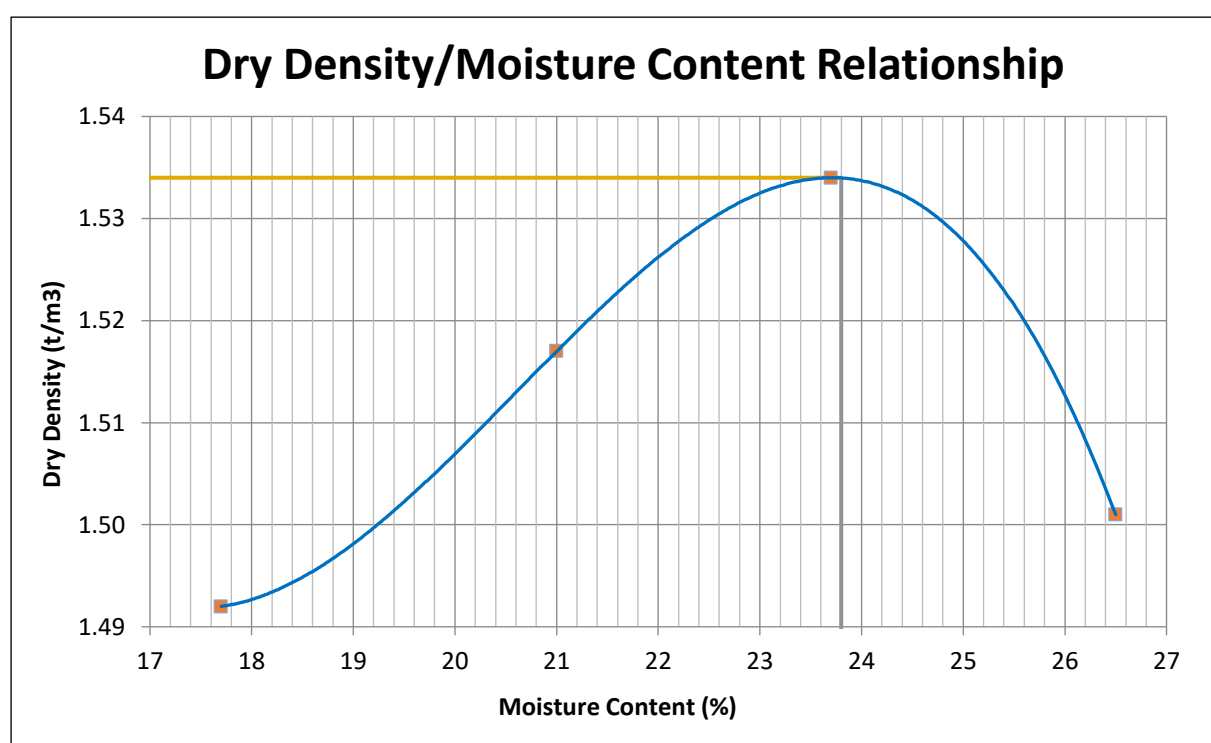
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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Geo-Logix Pty Ltd	Source	CBR1 0.0-0.30m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Sandy Silty CLAY
Project	St Ives Geotech (2201040)	Report No	S77598-MDD
Job No	S21636-1	Sample No	S77598

Test Procedure	☒ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction	Date Sampled	3/06/2022
	☒ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)	Date Tested	14/06/2022
Sampling	Sampled by Client - results apply to the sample as received		
Preparation	Prepared in accordance with the test method		



Maximum Dry Density (t/m³)	1.534
Optimum Moisture Content (%)	23.8
Oversize Retained on 19mm sieve (%)	0.5
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	89 hrs
Liquid Limit Determination	Technician Assessment

Notes



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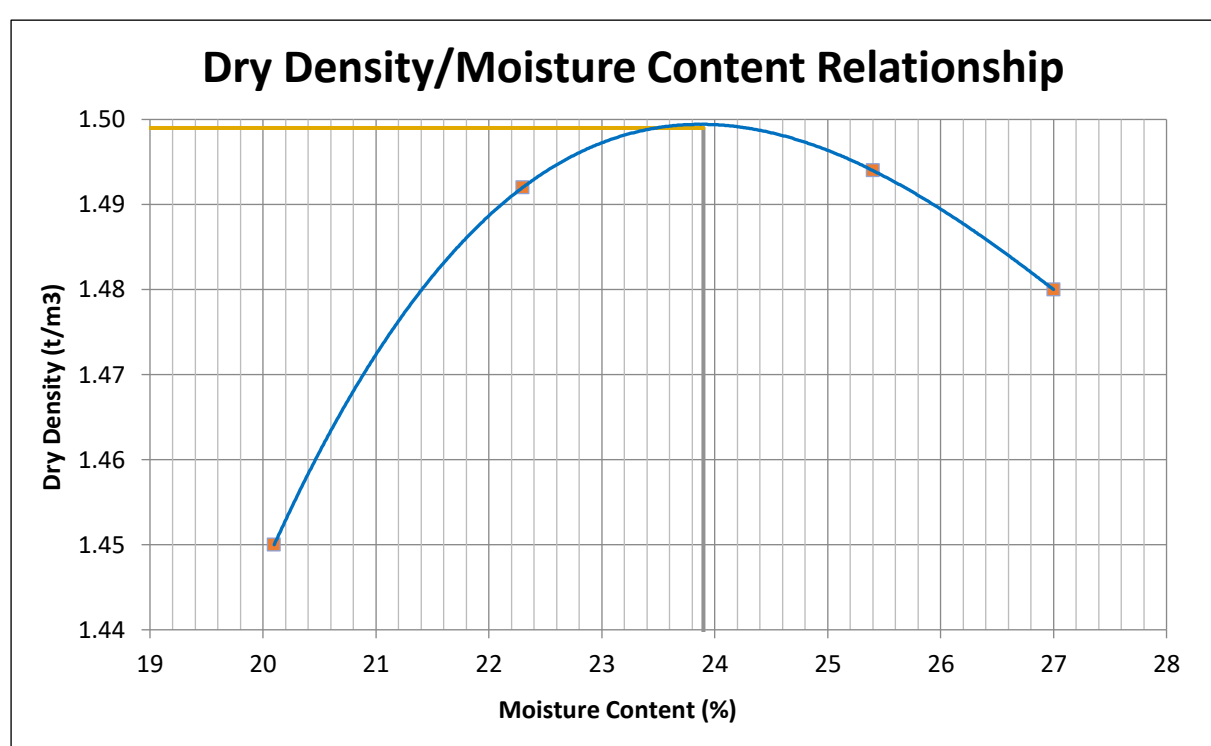
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CALIFORNIA BEARING RATIO REPORT																																																
Client Address Project Job No.	Geo-Logix Pty Ltd		Source	CBR1 0.0-0.30m																																												
	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102		Sample Description	Sandy Silty CLAY																																												
	St Ives Geotech (2201040)			Report No. S77598-CBR																																												
	S21636-1			Sample No. S77598																																												
Test Procedure	☒ AS 1289.6.1.1	☐ RMS T117	California Bearing Ratio																																													
	☒ AS 1289.5.1.1	☐ RMS T111	Dry Density / Moisture Content Relationship - Standard Compaction																																													
	☐ AS 1289.5.2.1	☐ RMS T112	Dry Density / Moisture Content Relationship - Modified Compaction																																													
	☒ AS 1289.2.1.1	☐ RMS T120	Moisture Content - Oven Drying Method (Standard Method)																																													
Sampling	Sampled by Client - results apply to the sample as received			Date Sampled	3/06/2022																																											
Preparation	Prepared in accordance with the test method			Date Tested	21/06/2022																																											
Load (kN) Penetration (mm)																																																
Preparation & Specification <table><tr><td>Retained on 19.0mm Sieve (%)</td><td>0</td></tr><tr><td>Method of Establishing Plasticity Level</td><td>Technician Assessment</td></tr><tr><td>Sample Curing Time (hrs)</td><td>51 hrs</td></tr><tr><td>Compaction Hammer Used</td><td>Standard</td></tr><tr><td>Surcharge Mass Applied (kg)</td><td>4.5</td></tr><tr><td>Period of Soaking (Days)</td><td>4</td></tr><tr><td>Maximum Dry Density - MDD (t/m³)</td><td>1.53</td></tr><tr><td>Optimum Moisture Content - OMC (%)</td><td>23.8</td></tr></table>			Retained on 19.0mm Sieve (%)	0	Method of Establishing Plasticity Level	Technician Assessment	Sample Curing Time (hrs)	51 hrs	Compaction Hammer Used	Standard	Surcharge Mass Applied (kg)	4.5	Period of Soaking (Days)	4	Maximum Dry Density - MDD (t/m³)	1.53	Optimum Moisture Content - OMC (%)	23.8	Density & Moisture <table><tr><td>Lab Moisture Ratio - LMR (%)</td><td>Achieved</td><td>Target</td></tr><tr><td>Lab Density Ratio - LDR (%)</td><td>98.0</td><td>100.0</td></tr><tr><td>Dry Density - At Compaction (t/m³)</td><td>100.0</td><td>100.0</td></tr><tr><td>Dry Density - After Soaking (t/m³)</td><td>1.53</td><td>1.53</td></tr><tr><td>Specimen Swell (%)</td><td>1.52</td><td></td></tr><tr><td>Moisture Content - At Compaction (%)</td><td>0.7</td><td></td></tr><tr><td>Moisture Content - Top 30mm (%)</td><td>23.4</td><td></td></tr><tr><td>Moisture Content - Remainder (%)</td><td>25.7</td><td></td></tr><tr><td></td><td>23.4</td><td></td></tr></table>			Lab Moisture Ratio - LMR (%)	Achieved	Target	Lab Density Ratio - LDR (%)	98.0	100.0	Dry Density - At Compaction (t/m³)	100.0	100.0	Dry Density - After Soaking (t/m³)	1.53	1.53	Specimen Swell (%)	1.52		Moisture Content - At Compaction (%)	0.7		Moisture Content - Top 30mm (%)	23.4		Moisture Content - Remainder (%)	25.7			23.4	
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	23.4																																															
Material CBR Value (%): 7 at a penetration of 5.0 mm																																																
Notes																																																
NATA Accredited for compliance with ISO/IEC 17025 - Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. This document shall not be reproduced, except in full. Results relate only to the samples tested. NATA Accredited Laboratory Number: 14874			Authorised Signatory: Chris Lloyd 22/06/2022 Date:																																													
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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Geo-Logix Pty Ltd	Source	CBR2 0.0-0.40m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty Sandy CLAY
Project	St Ives Geotech (2201040)	Report No	S77599-MDD
Job No	S21636-1	Sample No	S77599

Test Procedure	☒ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction	Date Sampled	3/06/2022
	☒ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)	Date Tested	14/06/2022
Sampling	Sampled by Client - results apply to the sample as received		
Preparation	Prepared in accordance with the test method		



Maximum Dry Density (t/m³)	1.499
Optimum Moisture Content (%)	23.9
Oversize Retained on 19mm sieve (%)	0.0
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	24 hrs
Liquid Limit Determination	Technician Assessment

Notes



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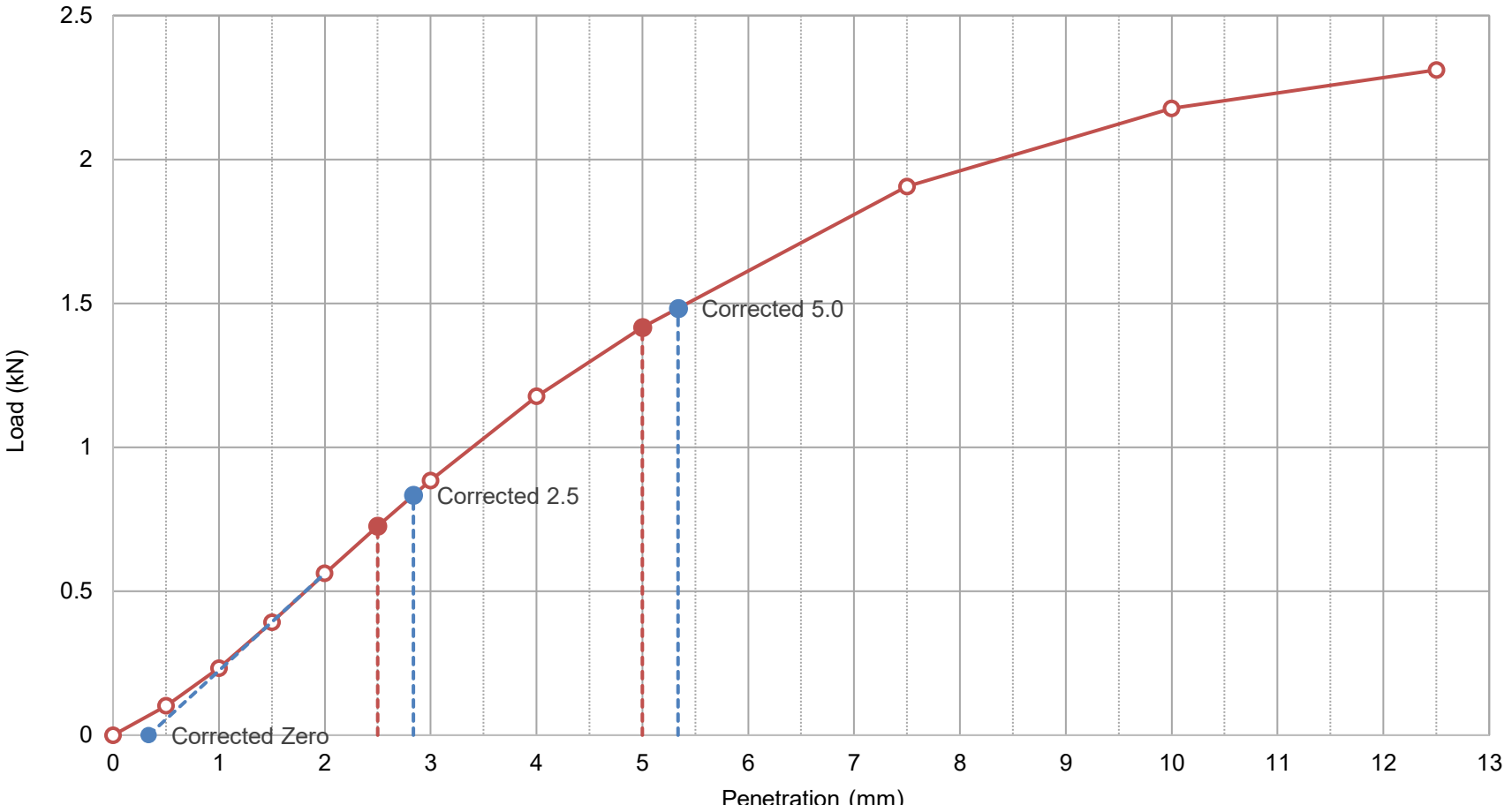
Chris Lloyd

22/06/2022

Date:



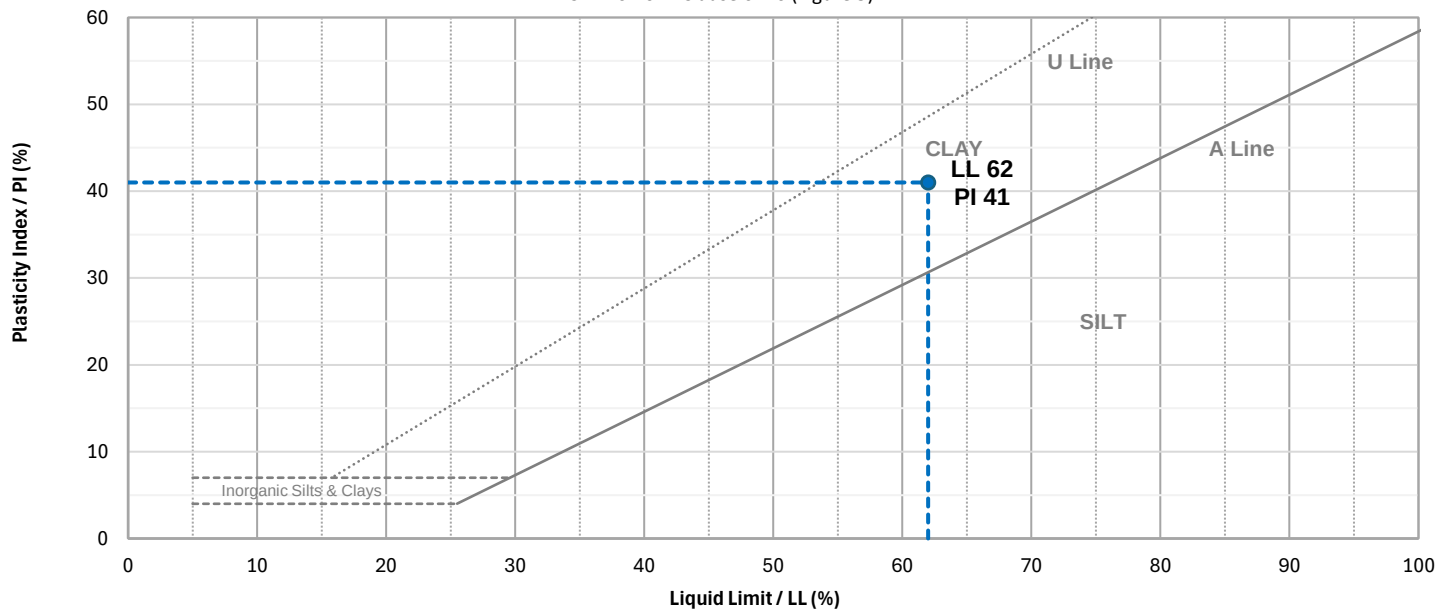
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Lidcombe NSW 2141

CALIFORNIA BEARING RATIO REPORT				
Client Address Project Job No.	Geo-Logix Pty Ltd	Source	CBR2 0.0-0.40m	
	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	Sample Description	Silty Sandy CLAY	
	St Ives Geotech (2201040)	Report No.	S77599-CBR	
	S21636-1	Sample No.	S77599	
Test Procedure	☒ AS 1289.6.1.1 ☐ RMS T117 ☒ AS 1289.5.1.1 ☐ RMS T111 ☐ AS 1289.5.2.1 ☐ RMS T112 ☒ AS 1289.2.1.1 ☐ RMS T120	California Bearing Ratio Dry Density / Moisture Content Relationship - Standard Compaction Dry Density / Moisture Content Relationship - Modified Compaction Moisture Content - Oven Drying Method (Standard Method)		
Sampling	Sampled by Client - results apply to the sample as received		Date Sampled	3/06/2022
Preparation	Prepared in accordance with the test method		Date Tested	21/06/2022
				
Preparation & Specification		Density & Moisture	Achieved	Target
Retained on 19.0mm Sieve (%)	0	Lab Moisture Ratio - LMR (%)	99.5	100.0
Method of Establishing Plasticity Level	Technician Assessment	Lab Density Ratio - LDR (%)	100.0	100.0
Sample Curing Time (hrs)	768 hrs	Dry Density - At Compaction (t/m³)	1.50	1.50
Compaction Hammer Used	Standard	Dry Density - After Soaking (t/m³)	1.49	
Surcharge Mass Applied (kg)	4.5	Specimen Swell (%)	0.7	
Period of Soaking (Days)	4	Moisture Content - At Compaction (%)	23.8	
Maximum Dry Density - MDD (t/m³)	1.50	Moisture Content - Top 30mm (%)	26.8	
Optimum Moisture Content - OMC (%)	23.9	Moisture Content - Remainder (%)	25.9	
Material CBR Value (%): 7 at a penetration of 5.0 mm				
Notes				
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		Macquarie Geotechnical 14 Carter St Lidcombe NSW 2141		

Methodology	AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109118
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	28/08/2025
Sample ID	BH8 0.6-0.9	Date Received	3/09/2025
Report No.	S109118-AS_PI	Date Tested	6/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Silty CLAY		

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation		Results	
Method of Preparation	Oven Dried	Liquid Limit (%)	62
History of the Sample	Dry Sieved	Plastic Limit (%)	21
Equipment Details		Plasticity Index (%)	41
Length of Linear Shrinkage Mould (mm)	126	Linear Shrinkage (%)	13.5
		Condition Upon Drying	Linear

Notes



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14 Carter Street, Lidcombe NSW 2141 (Sydney Laboratory)

Authorised Signatory

Raj Mani

Raj Mani

Date of Issue

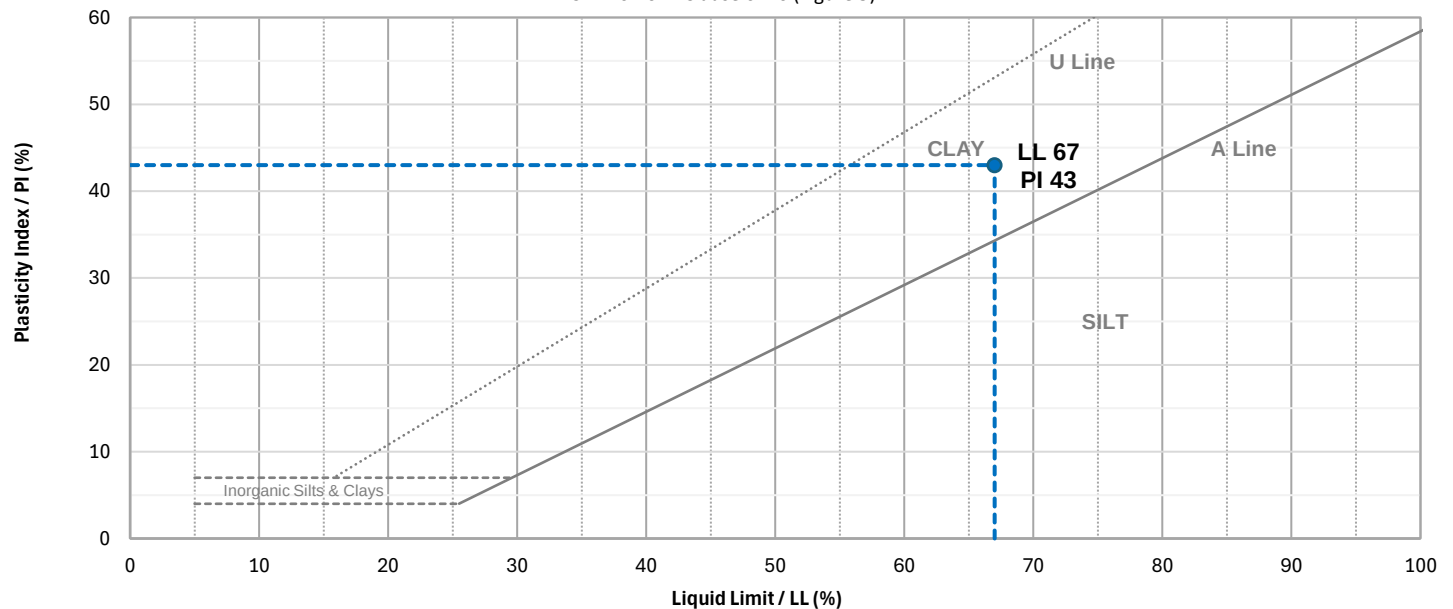
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Methodology	AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109119
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	29/08/2025
Sample ID	BH9 0.7-.09m	Date Received	3/09/2025
Report No.	S109119-AS_PI	Date Tested	6/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Silty CLAY		

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation		Results	
Method of Preparation	Oven Dried	Liquid Limit (%)	67
History of the Sample	Dry Sieved	Plastic Limit (%)	23
Equipment Details		Plasticity Index (%)	43
Length of Linear Shrinkage Mould (mm)	125	Linear Shrinkage (%)	14.0
		Condition Upon Drying	Linear

Notes



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Raj Mani

Raj Mani

Date of Issue

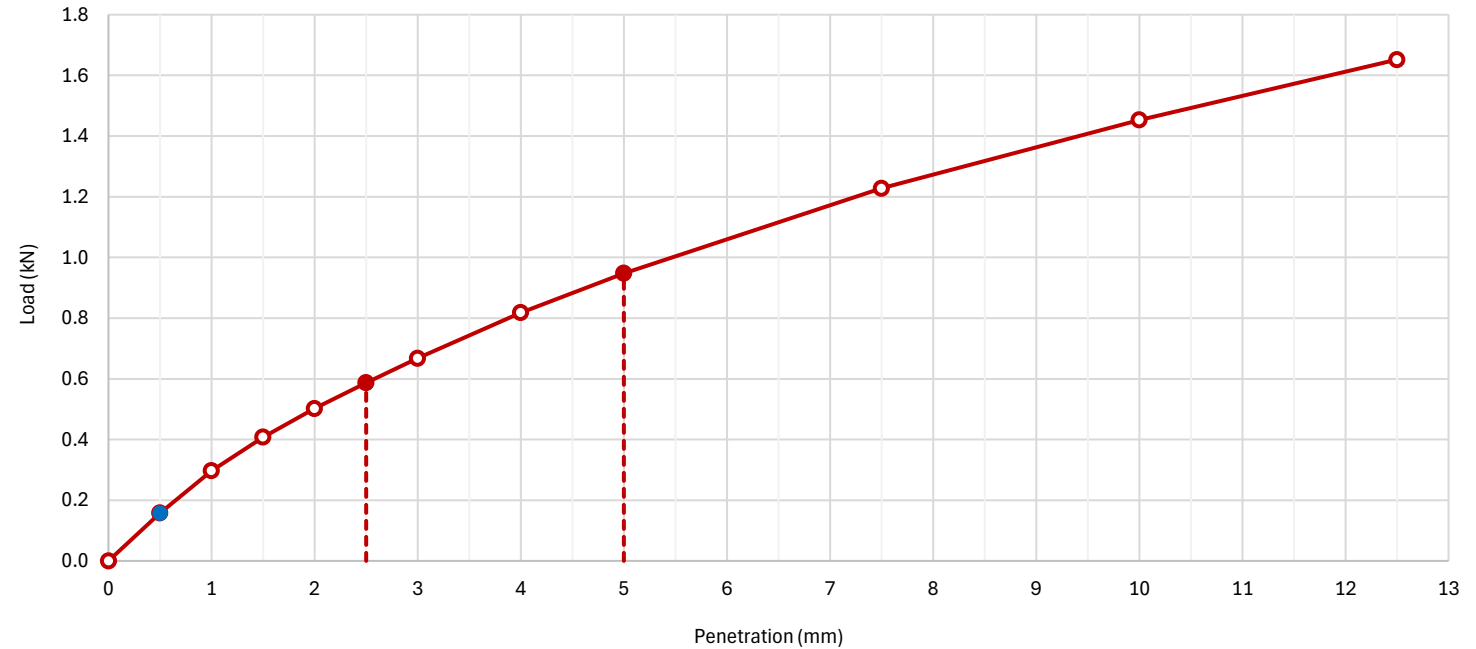
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Test Report

Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen

Methodology	AS 1289.6.1.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109120
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	28/08/2025
Sample ID	BH8 0.14 2.3m	Date Received	3/09/2025
Report No.	S109120-AS_CBR	Date Tested	19/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Clayey SILT		

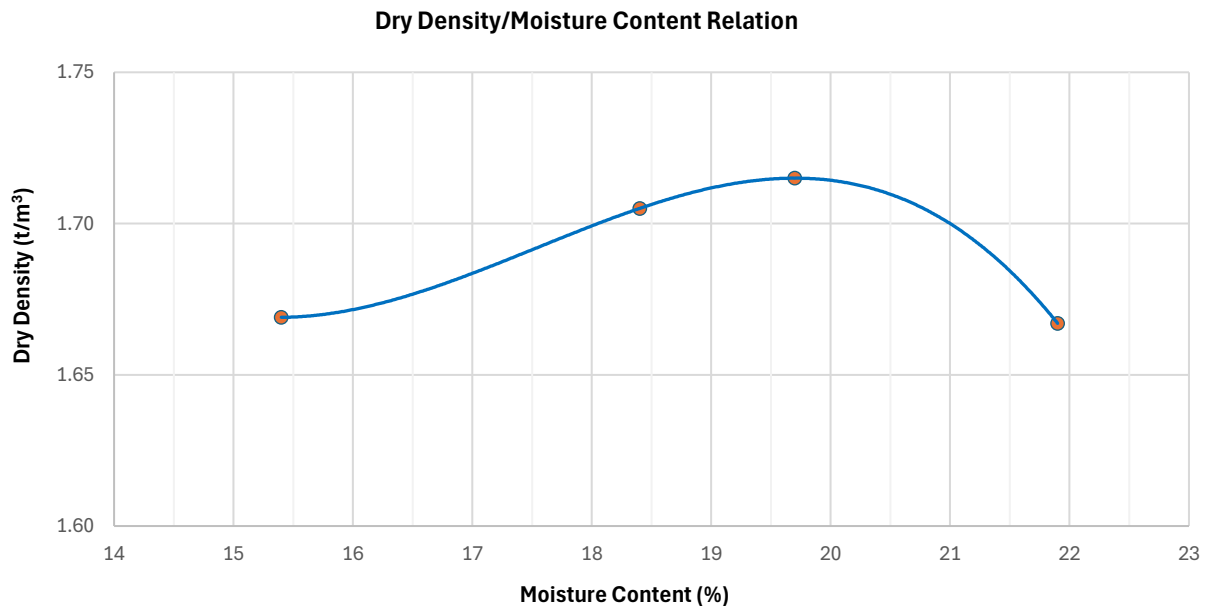


Preparation & Specification		Density & Moisture (AS 1289.2.1.1)	Achieved	Target
Material Retained on 19.0 mm Sieve (%)	0	Lab Moisture Ratio - LMR (%)	100.5	100.0
Method of Establishing Plasticity Level	Technician Assessment	Lab Density Ratio - LDR (%)	100.0	100.0
Sample Curing Time (hrs)	118 hrs	Dry Density - At Compaction (t/m ³)	1.71	1.72
Compaction Hammer Used	Standard	Dry Density - After Soaking (t/m ³)	1.69	
Surcharge Mass Applied (kg)	4.5	Specimen Swell (%)	1.0	
Period of Soaking (days)	4	Moisture Content - At Compaction (%)	19.8	
Maximum Dry Density (t/m ³)	1.72	Moisture Content - Top 30 mm (%)	21.8	
Optimum Moisture Content (%)	19.7	Moisture Content - Full Depth (%)	20.6	
CBR Value (%) at 5.0 mm Penetration	5			

Notes

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		Date of Issue	22/09/2025

Methodology	AS 1289.5.1.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109120
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	28/08/2025
Sample ID	BH8 0.14 2.3m	Date Received	3/09/2025
Report No.	S109120-AS_SMDD	Date Tested	8/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Clayey SILT		



Standard Maximum Dry Density (t/m³)	1.72
Standard Optimum Moisture Content (%)	19.5
Oversize Retained on 19 mm Sieve (%)	0
Oversize Retained on 37.5 mm Sieve (%)	0
Curing Time	97 hrs
Liquid Limit Determination	Technician Assessment

Notes



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Authorised Signatory

Raj Mani

Raj Mani

Date of Issue

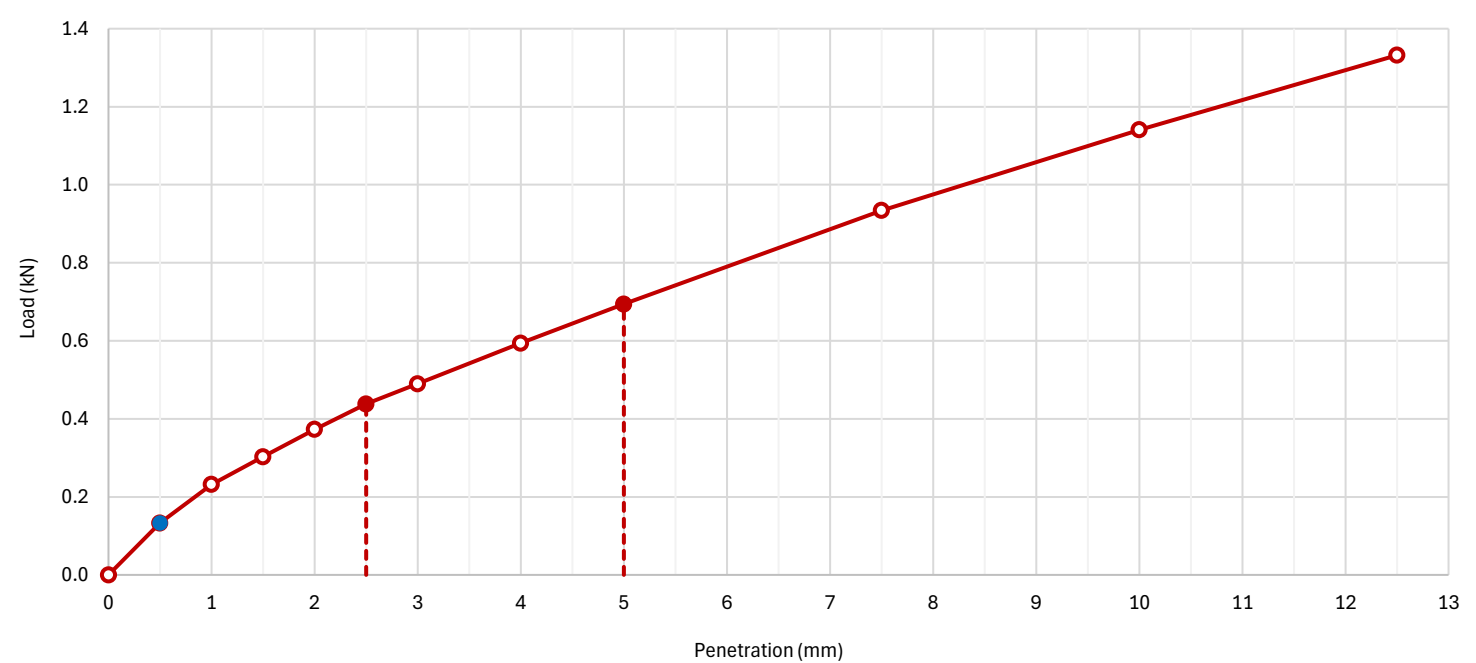
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Test Report

Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen

Methodology	AS 1289.6.1.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109121
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	29/08/2025
Sample ID	BH9 0.2-2.1m	Date Received	3/09/2025
Report No.	S109121-AS_CBR	Date Tested	19/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Silty CLAY		

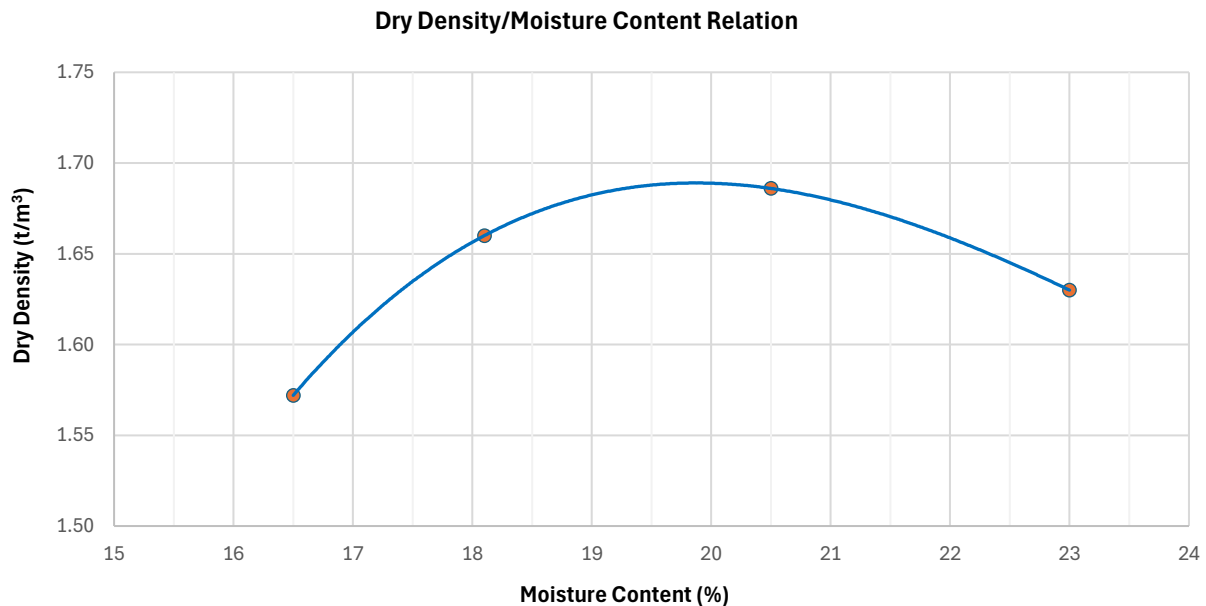


Preparation & Specification		Density & Moisture (AS 1289.2.1.1)	Achieved	Target
Material Retained on 19.0 mm Sieve (%)	0	Lab Moisture Ratio - LMR (%)	98.0	100.0
Method of Establishing Plasticity Level	Technician Assessment	Lab Density Ratio - LDR (%)	100.5	100.0
Sample Curing Time (hrs)	118 hrs	Dry Density - At Compaction (t/m ³)	1.69	1.69
Compaction Hammer Used	Standard	Dry Density - After Soaking (t/m ³)	1.66	
Surcharge Mass Applied (kg)	4.5	Specimen Swell (%)	2.5	
Period of Soaking (days)	4	Moisture Content - At Compaction (%)	19.5	
Maximum Dry Density (t/m ³)	1.69	Moisture Content - Top 30 mm (%)	25.7	
Optimum Moisture Content (%)	19.9	Moisture Content - Full Depth (%)	21.5	
CBR Value (%) at 2.5 mm Penetration	3.5			

Notes

 	Accredited for compliance with ISO/IEC 17025 - Testing. NATA Accredited Laboratory Number: 14874 Macquarie Geotechnical Pty Ltd 14 Carter Street, Lidcombe NSW 2141 (Sydney Laboratory)	Authorised Signatory	 Raj Mani
		Date of Issue	22/09/2025

Methodology	AS 1289.5.1.1		
Client	Geo-Logix Pty Ltd	MG Sample No.	S109121
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	MG Project No.	S25452-1
Project	St Ives (2501056)	Date Sampled	29/08/2025
Sample ID	BH9 0.2-2.1m	Date Received	3/09/2025
Report No.	S109121-AS_SMDD	Date Tested	8/09/2025
Sampling Method	Sampled by Client - results apply to the sample as received		
Preparation Method	Prepared in accordance with the test method		
Sample Description	Silty CLAY		



Standard Maximum Dry Density (t/m³)	1.69
Standard Optimum Moisture Content (%)	20.0
Oversize Retained on 19 mm Sieve (%)	0
Oversize Retained on 37.5 mm Sieve (%)	0
Curing Time	101 hrs
Liquid Limit Determination	Technician Assessment

Notes



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 14 Carter Street, Lidcombe NSW 2141 (Sydney Laboratory)

Authorised Signatory

Raj Mani

Raj Mani

Date of Issue

22/09/2025

Results relate only to the samples tested.
 This document shall not be reproduced, except in full.

Methodology	AS 4133.4.1
Client	Geo-Logix Pty Ltd
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102
Project	St Ives (2501056)
MG Project No.	S25452-1
Report No.	S109122-AS_PLT
Sampling Method	Sampled by Client - results apply to the sample as received
Preparation Method	Prepared in accordance with the test method

MG Sample No.	Sample ID	Date Sampled	Date Tested	Lithology	Moisture Condition	Test Type	Failure Load (kN)	Uncorrected Point Load Strength (Is)	Corrected Point Load Strength Index Is(50)	Failure Mode
S109122	MW1 6.4m	28/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.7	0.69	0.69	1
						Axial	1.8	0.76	0.75	1
S109123	MW1 7.4 m	28/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.5	0.74	0.71	1
						Axial	2.5	1.1	1.1	1
S109124	MW1 8.4 m	28/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.8	0.77	0.76	1
						Axial	3.4	1.4	1.4	1
S109125	MW2 6.5 m	29/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.5	0.64	0.63	1
						Axial	2.4	1.1	1.0	1
S109126	MW2 7.5m	29/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.1	0.47	0.47	1
						Axial	2.0	1.0	0.98	1
S109127	MW2 8.5 m	29/08/2025	10/09/2025	Sandstone	Moist	Diametral	1.8	0.79	0.77	1
						Axial	3.0	1.3	1.2	1

Failure Mode Key 1 - Fracture through fabric of specimen oblique to bedding, not influenced by weak planes. 2 - Fracture along bedding. 3 - Fracture influenced by pre-existing plane, microfracture, vein or chemical alteration. 4 - Chip or partial fracture.	Storage History of Test Specimens Core Box
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Notes

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		Date of Issue 12/09/2025

ATTACHMENT H



Geo-Logix

Groundwater Inflow Calculation Spreadsheet

Geotechnical Investigation

Project No.: 2501056

285-289, 293-295 Mona Vale Road & 1 Flinders Road,
St Ives NSW 2075

Component	Area A (m ²)	Hydraulic Conductivity k (m/day)	Hydraulic Gradient i	Flow Q = A·k·i (m ³ /day)
Base	3,600	0.024	1.0000	86.40
Wall 1	150	0.024	1.0000	3.60
Wall 2	150	0.024	1.0000	3.60
Wall 3	150	0.024	1.0000	3.60
Wall 4	150	0.024	1.0000	3.60
Total	4,200			100.80
Total Dewatering Time (Days)				365
Total Flow (m³)				36,792
Total Flow (ML)				36.792

PURPOSE:

This spreadsheet provides a first-pass, conservative estimate of groundwater inflows to a box excavation.

FORMULA:

$$Q = A \times k \times i$$

Where:

- Q = estimated seepage flow (m³/day)
- A = area of seepage face (m²) — base or wall
- k = hydraulic conductivity (m/day)
- i = hydraulic gradient (unitless), typically estimated as total head difference divided by flow path length.

LIMITATIONS:

- Ignores influence of aquifer boundaries, recharge, or anisotropy.
- Ignores influence of aquifer boundaries, recharge, or anisotropy.
- Hydraulic gradient often simplified as i = 1 (conservative).
- Does not account for drawdown shape, radius of influence, or transient inflows.

CONSERVATISM:

- The use of i = 1 assumes full head loss across the flow path, which likely overestimates actual inflow.
- This ensures design safety margin and avoids under-sizing dewatering systems in early planning.

Where the empirically estimated dewatering volume is:

1. Below your project's volume threshold (e.g. regulatory trigger or design constraint), and
2. Based on conservative assumptions (e.g. i=1, high-end hydraulic conductivity values, full-face seepage).

→ The result is considered sufficient to conclude that no further numerical or analytical modelling is required in the absence of other factors (i.e. near surface water bodies, etc.).

GEO-LOGIX PTY LTD
ABN 86 116 892 936

Building Q2, Level 3
Suite 2309, 4 Daydream Street
Warriewood NSW 2102

Phone 02 9979 1722
Fax 02 9979 1222

Email info@geo-logix.com.au
Web www.geo-logix.com.au