REPORT NO: 4230352-2 Final

CLIENT: Health Infrastructure
Locked Bag 2030
ST LEONARDS NSW 1590

PROJECT LOCATION: Albury Hospital Campus Redevelopment Project
201 Borella Road
EAST ALBURY NSW

COMMISSION: Carry out appropriate in-situ soil tests including SPT and DCP and observations at twelve locations as shown on the attached plan, to depths of up to 15.0 metres.

Obtain representative samples for further laboratory analysis: Moisture content, Atterberg limits, standard compaction to establish maximum dry density (MDD) and optimum moisture content (OMC), and soaked California Bearing Ratio (CBR) testing.

Recommend allowable bearing pressures for slabs, strip footings and pad footings, end bearing pressures and skin friction values for bored piers, and design parameters for retaining wall structures.

Recommend pavement design parameters and pavement profile(s).

Install a groundwater monitoring standpipe and monitor the groundwater level and inflow rates.

1. INTRODUCTION:

1.1 Aim:

This report discusses the field investigation works carried out between 12 and 19 December 2023 for the proposed Albury Hospital Campus Redevelopment, Clinical Services, including several buildings, internal access roads, on ground carparking and a multi-level carpark.

2. INVESTIGATION:

2.1 Site Geology:

Geological maps of the area suggest that the site is in an area of Ordovician Aged Metamorphics. The natural soils and weathered ROCK encountered during the site investigation confirmed this.

2.2 Site Topography:

The ground surface over the site is slightly inclined, with the fall down to the north. Groundcover consists of asphalt and native trees.

2.3 Fieldwork:

The fieldwork consisted of drilling twelve boreholes (BH) of depths up to 15.0 metres with a mechanical auger. The approximate locations of the boreholes are shown on the attached plan. Subsurface materials penetrated were visually classified to AS1726: Geotechnical Site Investigation. The engineering logs of each borehole are attached showing the soil descriptions and depths, along with any cohesive strengths measured and observed densities of non-cohesive soils.

Standard Penetration Testing (SPT) was conducted at regular 1.5 metre depth intervals in the boreholes, to 15.0 metres depth in the encountered soils.

Dynamic Cone Penetration (DCP) tests were conducted adjacent to some of the boreholes.

3. FINDINGS:

3.1 Field Data:

The boreholes revealed that the soil profile consisted of varying depths of FILL ranging from 400mm (in borehole 2) to 1850mm (in borehole 11) overlying the naturally occurring silty CLAY or weathered ROCK (SCHIST). The FILL unit was composed of sandy GRAVEL, gravelly SAND, clayey SAND, silty GRAVEL, and silty/sandy CLAY.

Groundwater was not encountered in the boreholes during the field investigation. A groundwater monitoring standpipe was installed. Groundwater level monitoring and inflow rate measurements will be conducted at a later stage, if water is present.

Weathered ROCK was encountered in some of boreholes. A summary of where ROCK was encountered is provided in the table below:

Borehole No.	Total Depth of Borehole (m)*	Depth to Top of Weathered ROCK (m)*	Remarks
1	5	0.5	Weathered ROCK on underside of FILL
2	10	Not encountered	SPT Hammer bounce below 4m depth
3	3	2.4	
4	10	2.0	
5	5	0.5	Weathered ROCK on underside of FILL
6	15	4.5	
7	15	Not encountered	SPT Hammer bounce below 1.0m depth
8	5	Not encountered	SPT Hammer bounce below 1.0m depth
9	3.45	Not encountered	
10	1.85	Not encountered	
11	1.85	Not encountered	Borehole 11 terminated in the FILL
12	2.3	Not encountered	

**Depth below the surface at the date of investigation.*

Substrata conditions encountered are such that infiltration and occurrence of perched water at the interface between different material layers should not be disregarded.

3.2 Laboratory Data:

Representative samples of the onsite materials likely to be used in the construction of the proposed development were subjected to the following laboratory tests:

- Moisture content
- Atterberg limits
- Sieve analysis
- Standard compaction to establish MDD and OMC
- Soaked CBR.

Results of the laboratory tests are appended to this report. A summary of the testing conducted is presented in the tables below:

Bore-hole No.	Material Description	Sample No.	CBR %	Density t/m^3	Moisture %	Reactivity	LL %	PI %	%Pass 0.075mm	Swell %
10	Sandy CLAY	234-5625A	3.0	1.86	15.0	Low	29.0	17.0	55.0	0.5
11	Sandy CLAY FILL	234-5625B	10.0	1.89	12.0	Low	25.0	11.0	53.0	0.5
2	Silty CLAY with sand	234-5625C	-	-	-	-	38.0	25.0	60.0	-
6	Sandy CLAY	234-5625D	-	-	-	-	37.0	22.0	58.0	-
7	Silty CLAY with gravel	234-5625E	-	-	-	-	47.0	32.0	56.0	-
12	Sandy CLAY FILL	234-5625F	-	-	-	-	31.0	18.0	75.0	-

4. SITE CLASSIFICATION:

Based on the site investigation and the geology of the area, this site would be classified as CLASS P with respect to Australian Standard 2870-2011 (Residential Slabs and Footings), due to the depth FILL and the presence currently growing and/or to be removed trees. However, this classification is technically not correct for the proposed type of structure(s), therefore is given as a guide only.

It is anticipated that the normal seasonal surface movement at this site, without considering any abnormal moisture conditions, will not exceed 60mm. It must be emphasised that the seasonal surface movement mentioned, and recommendations referred to in this report do not take into account the effects of any abnormal moisture conditions that may develop after construction as defined in Clause 1.3.3 (A) (B) (C) (D) (E).

Trees in the vicinity of the proposed development will cause future abnormal moisture conditions, and consequently the footings will have a higher probability of damage than that given in Clause 1.3.1 of AS2870 – 2011. The designer of the footing system should take this into account.

The recommendations given in this report have been based largely on the soil conditions encountered at the time of the field investigation. Under inclement weather or prolonged wet weather conditions, the soil conditions noted and reported in this report could vary. It is advisable to undertake construction during and following good weather conditions - i.e., dry weather conditions - not during or following inclement weather or prolonged wet weather conditions.

5. RECOMMENDATIONS:

5.1 Building Foundations:

5.1.1 Pad Footings, Strip Footings, and Edge Beams:

Pad and strip footings or a stiffened raft slab are appropriate shallow foundation arrangements for the proposed development.

As this site has been classified as CLASS P, the footing system should be designed by a qualified Engineer as defined in AS2870-2011 following engineering principles.

The following allowable bearing pressures can be adopted for the design of shallow foundations, including edge beam for a stiffened raft slab:

Depth from Existing Ground Level (mm)*	Bore-hole No.	Consistency / Relative Density and Type of Anticipated Material	Allowable Bearing Capacity (kPa)	
			Pad Footings	Strip Footings or Edge Beams
700	2, 4, 8, 9, & 10	Natural sandy CLAY – Stiff	170	120
700	1 & 5	Extremely weathered ROCK (SCHIST) – Low strength	300	250
1000	2, 4, 8, 9 & 10	Natural sandy CLAY – Stiff	250	180
1000	5	Extremely weathered ROCK (Schist) – Low strength	360	300
1000	1	Distinctly weathered ROCK (SCHIST) – Low to medium strength	650	600
1500	2, 3, 4, 8, 9, 10 & 12	Natural sandy CLAY – Stiff	290	240
1500	1, 5	Distinctly weathered ROCK (SCHIST) – Low to medium strength	750	700

**Depth below the surface at the date of investigation.*

The founding material types and depths vary over the site. Deeper FILL may be encountered in some areas. The bearing guide above should be read in conjunction with the engineering logs attached.

The allowable bearing pressures provided in this report are the maximum values. The total and differential settlements under the abovementioned allowable bearing pressures would be less than 25mm and 15mm respectively. This does not consider seasonal surface movement or any abnormal moisture conditions. It is recommended that all load-bearing shallow foundations should be founded in the same type of founding material to minimise differential movements.

Trees in the vicinity of the proposed development will cause future abnormal moisture conditions, and consequently, the footings will have a higher probability of damage than that given in Clause 1.3.1 of AS2870 – 2011. The designer of the footing system should take this into account.

In accordance with Appendix D of AS2870 – 2011 the soil profile and site conditions should be inspected at the footing excavation stage by Civiltest Pty Ltd or by a Building Surveyor, to confirm the soil profile, allowable bearing capacities, and site classification.

5.1.2 Deep Foundations:

If deep foundations are required for the proposed development, bored piers or CFA piles would be a suitable option.

The following parameters can be adopted for the design of bored pier or piled foundations:

Depth from Existing Ground (mm)*	Bore-hole No.	Consistency / Relative Density and Type of Anticipated Material	Allowable End Bearing Capacity (kPa)	Allowable Skin Friction (kPa)
2000	2, 3, 4, 6, 7, 8, & 9	Natural sandy CLAY – Stiff	290	35
2000	1 & 5	Distinctly weathered ROCK (SCHIST) – Medium strength	1300	100
3000	2, 6, 7, 8, & 9	Natural sandy CLAY – Stiff	330	35
3000	-	Extremely weathered ROCK (SCHIST) – Low strength	900	90
3000	1, 3, 4, 5	Distinctly weathered ROCK (SCHIST) – Medium strength	1300	130
4500	2, 7, & 8	Natural sandy CLAY – Stiff to very stiff	350	35
4500	6	Extremely weathered ROCK (SCHIST) – Low strength	1000	100
4500	1, 3, 4 & 5	Distinctly weathered ROCK (SCHIST) – Medium strength	1400	150
6000	2, 7 & 8	Natural sandy CLAY – Stiff to hard	360	35
6000	6	Extremely weathered ROCK (SCHIST) – Low strength	1100	120
6000	1 & 4	Distinctly weathered ROCK (SCHIST) – Medium strength	1500	150
9000	7	Natural sandy CLAY – Stiff to hard	460	35
9000	6	Extremely weathered ROCK (SCHIST) – Low strength	1200	120
9000	4	Distinctly weathered ROCK (SCHIST) – Medium strength	1700	170

**Depth below the surface at the date of investigation.*

The founding material types and depths vary over the site. Deeper FILL may be encountered in some areas. The bearing guide above should be read in conjunction with the engineering logs attached.

In accordance with Appendix D of AS2870 – 2011 the soil profile and site conditions should be inspected at the footing excavation stage by Civiltest Pty Ltd or by a Building Surveyor, to confirm the soil profile and site classification.

5.1.3 Floor Slab:

The floor slab and any internal stiffening beams may be placed on or in the existing natural soils as described in the engineering logs. This is providing that any soft areas have been well compacted with a small vibratory roller or vibratory plate compactor, with the soil in a moist condition. This material will provide a subgrade for the slab and based on the field observations can be assumed to have a modulus of subgrade reaction of 35kPa/mm.

Where levelling fill is used the floor slab and any internal stiffening beams required may be placed on or in levelling fill provided that not more than 300mm of site derived clayey or 600mm of site-derived sandy or imported granular fill, including existing fill material excluding perishable and organic matter if any is used. Stripped or imported fill meeting the minimum suitability requirements of section 4 of AS3798 must be placed at a maximum of 200mm loose uncompacted layers. Each layer shall be compacted to a minimum 98% dry density ratio at a moisture content between 85% and 115% of the optimum moisture content. Following the above preparation, an allowable bearing pressure of 80kPa can be assumed at 200mm below the compacted surface. If significant amounts of fill are placed under the floor slab, then the above parameters and the site classification will need to be reviewed.

In accordance with Appendix D of AS2870 – 2011 the soil profile and site conditions should be inspected at the footing excavation stage by Civiltest Pty Ltd or by a Building Surveyor, to confirm the soil profile and site classification.

5.2 Retention System:

5.2.1 Design Parameters:

The following parameters can be used for WALLAP analysis in the design of a retention system. These values assume that the soil being retained/supported has a horizontal surface. The values are estimated based on in situ testing and our experience of similar types of soil or rock. Further testing may be required to verify the parameters.

			Parameters for Short Term Analysis						Parameters for Long Term Analysis					
Soil Strata description	**Unit Weight (kN/m^3) □**	**Poisson's Ratio ν**	**K_o**	**K_a**	**K_p**	**Cu (kPa)**	**ϕ_u (deg)**	**Eu (MPa)**	**K_o**	**K_a**	**K_p**	**c' (kPa)**	**ϕ' (deg)**	**E' (MPa)**
Sandy GRAVEL/Gravelly SAND FILL	19.0	0.34	0.40	0.25	4.02	0	37	45	0.29	0.17	5.83	0	45	40
Clayey GRAVEL FILL	20.0	0.35	0.38	0.24	4.20	2	38	45	0.28	0.16	6.13	1	46	40
Silty/sandy CLAY FILL	20.0	0.44	0.69	0.53	1.89	15	18	30	0.61	0.44	2.28	5	23	25
Clayey SAND FILL	19.0	0.38	0.47	0.31	3.25	5	32	35	0.43	0.27	3.69	2	35	30
Sandy CLAY – Natural	19.5	0.40	0.66	0.49	2.04	50	20	30	0.56	0.39	2.56	8	26	25
Extremely weathered ROCK (SCHIST) – Very low to low strength	21.0	0.12	-	-	-	-	-	50-200	-	-	-	-	-	30 - 150
Distinctly weathered ROCK (SCHIST) – Low to medium strength	22.5	0.09	-	-	-	-	-	500 – 10,000	-	-	-	-	-	400 – 8,000

Where:
- ϕ_u = Undrained angle of shearing resistance under current unsaturated moisture condition
- ϕ' = Effective angle of shearing resistance
- C_u = Undrained cohesion under current unsaturated moisture condition
- C' = Effective cohesion
- E_u = Undrained Elastic (Young's) modulus under current unsaturated moisture condition
- E' = Effective Elastic (Young's) modulus
- K_o = At-rest earth pressure coefficient
- K_a = Active earth pressure coefficient
- K_p = Passive earth pressure coefficient

Allowable bearing pressures given under 5.1.1 and 5.1.2 are relevant for foundation loading. The above parameters assume that the level of the water table is below the bottom of the excavation by the use of adequate drainage and that any adjacent surcharge loads are superimposed.

5.2.2 Site Excavations Less than 2.0 metres Deep:

The zone of influence that any excavation work would have on the surface of the excavation during construction is at an angle of 30 degrees from the vertical face of the excavation, or at a distance of 0.58H from the surface of the excavation, where H is the depth of the excavation.

It is recommended that where any footings are to be constructed next to existing underground services (sewers, etc.) and/or excavations, then these footings should be founded at a depth below the invert of the service at an angle of repose of 45° for CLAYS and 30° for SANDS, unless special consideration has been given to the founding material.

Footing or general site excavation may require the use of specialised techniques to excavate the site and ensure the excavation is stable during construction. Conventional excavation techniques can be used in unconsolidated FILL and natural SAND and CLAY soils.

Vertical face excavations above the groundwater level in clayey soils will remain stable for a period of a few days under reasonable weather conditions. Upper FILL layers should be temporarily retained or battered to not steeper than 35° with the horizontal. Any large volume of bulk excavation in clayey soils should be undertaken with batters made at a maximum angle of 45° (from the horizontal) all around the perimeter of the excavation.

In accordance with Appendix D of AS2870 – 2011 the soil profile and site conditions should be inspected at the footing excavation stage by Civiltest Pty Ltd or by a Building Surveyor, to confirm the soil profile and site classification.

5.3 Excavation and Fill Batters:

Unless retained by an engineer designed retaining or suitable temporary shoring site cuts and excavation batters to 3.0 metres height should be profiled to the following maximum slopes.

Material	Temporary Batter Profile	Permanent Batter Profile
Sandy GRAVEL/gravelly SAND	1V : 2H	1V : 3H
Clayey GRAVEL/clayey SAND	1V : 2H	1V : 3H
Silty/sandy CLAY FILL	1V : 1.5H	1V : 3H
Sandy CLAY	1V : 1H	1V : 2.5H
Extremely weathered ROCK (SCHIST) – Very low to low strength	1V : 0.6H	1V : 1.5H
Distinctly weathered ROCK (SCHIST) – Medium strength	1V : 0.3H	1V : 1H

Permanent batters in natural and FILL sandy CLAY soil should be revegetated with natural grasses or other suitable ground cover to minimise the effects of surface erosion and scouring from overland stormwater water flows. Suitable surface and subsurface drainage should also be provided to collect and divert excess surface stormwater to strategically located collection pits before discharging into the legal point od discharge.

Where the excavated batters reveal that the exposed ROCK face is severely fractured, then it will be necessary to place steel wire mesh over the ROCK face, pinned at suitable grid spacings, and then sprayed with a thin layer (say 50mm thick) of shotcrete. Consideration can also be given to the use of anchors or ROCKBOLTS to hold back the ROCK face. The rock anchors may be either grouted or of a mechanical nature. The anchors must extend into the distinctly weathered ROCK and can be designed on a grout or mechanical bond strength of 250kPa. A greater bond strength may be available, but it is recommended that 250kPa can only be exceeded if a pull-out test is carried out.

Civiltest Pty Ltd or another suitably qualified geotechnical engineer or engineering geologist should be requested to assess the stability of the excavated ROCK face, if there is any doubt.

5.4 Pavement Recommendations:

5.4.1 Subgrade Preparation:

In the areas proposed for pavement construction, the surface should be excavated to remove any organic and root matter to at least 150mm depth. The exposed surface should be compacted to a minimum of 98% of AS 1289 5.1.1 (Standard Compaction) and pass a proof roll inspection. Imported crushed ROCK material for pavement construction can be placed and compacted to a minimum of 98% of AS 1289 5.2.1 (Modified Compaction).

5.4.2 Recommended CBR Value for Pavement Design:

Subject to confirmation from the laboratory test results, preliminary pavement design of flexible and rigid pavements should adopt a maximum design CBR value of 3.0% for the onsite natural silty CLAYS and 4.5% for the extremely weathered ROCK.

5.4.3 Flexible Pavement Profile for General Parking and Access Roads Within the Site:

The following pavement profile can be adopted for general parking areas and access roads within the subject site. It is assumed that any parking areas and access roads within the subject site would mostly be used by Class 1 and Class 2 lightweight vehicles. The following traffic loading has been obtained from Table 12.2 of AGPT02 AUSTROADS (2012) 'Guide to Pavement Technology Part 2: Pavement Structural Design':

A maximum design loading of 8 x 10^4 Equivalent Standard Axles (ESA) has been adopted for a design life of twenty years. The receiver of the report should check if the assumption made in regard to the design traffic loading is correct. Civiltest Pty Ltd should be contacted if the design traffic loading differs, so that a review of the recommendations can be made.

		Depth 0mm
SURFACING (35mm thick)	DGA wearing course 10mm Stone	35mm
	PRIMER OR PRIMER SEAL	
BASE (150mm thick)	DGB20 Compacted to not less than 98% of AS 1289, 5.2.1 (Modified Compaction)	185mm
SUBBASE (250mm thick)	DGS40 or uncontaminated existing excavated stockpiled crushed ROCK Compacted to not less than 98% of AS 1289, 5.2.1 (Modified Compaction)	435mm
*SUBGRADE	Material as found Compacted to 98% of AS 1289 5.1.1 (Standard Compaction) at a moisture content between 90% and 120% of Optimum Moisture Content for a depth of 150mm and passing a proof roll inspection	

**Note: If soft clayey subgrade conditions and/or highly reactive soils are encountered during construction, the upper 300mm of subgrade material can be stabilised with 3% Lime and 2% Cement compacted to not less than 98% of AS 1289 5.1.1 (Standard Compaction). It is recommended that construction should be undertaken under dry weather conditions in drier seasons by an experienced contractor.*

6. EARTHQUAKE SITE SUBSOIL CLASS:

The earthquake site subsoil class as per Australian Standard (AS 1170.4-2007 AMD 2:2018) is taken as **Class = C_e –** Shallow Soil. A hazard factor of 0.08 can be adopted for this site.

7. GENERAL ENGINEERED FILL SPECIFICATION:

The following information is given to assist in the specification of materials and compaction that may be required for any filling required at this site. If engineered fill is introduced to the site, the site classification should be reviewed by Civiltest Pty Ltd after the completion of the filling works.

7.1 Recommendations For Materials, Stripping and Backfilling:

7.1.1 Unsuitable Materials:

The following materials are considered unsuitable:
(a) Organic soils, such as topsoils, severely root-affected subsoils, and peat
(b) Contaminated soils
(c) Silts or materials that have deleterious engineering properties of silt.
(d) Fill that contains wood, metal, plastic, boulders concrete or deleterious material.

And/or any other materials as described in AS3798 Section 4.2. They should be removed and not be incorporated into the fill.

7.1.2 Suitable Materials:

Site-derived silty/sandy CLAY or similar imported materials to the local geology should be used to fill the area (e.g., moderately plastic silty/sandy CLAY).

7.1.3 FILL Materials:

All fill material, whether site derived or imported, must comply with the following as a minimum:

7.1.3.1 Fill Material over CLAYS:

Maximum Plasticity Index (%)		45
Minimum Plasticity Index (%)		20
Maximum Particle Size After Compaction		50mm
Minimum Passing	4.75mm	90%
	0.075mm	45%

Low plasticity or non-plastic soils are not suitable as fill material over CLAYS unless the depth of filling is less than 400mm.

7.1.3.2 Fill Material over SANDS: (or where filling over CLAY does not exceed a depth of 400mm)

Maximum Plasticity Index (%)		15
Minimum Plasticity Index (%)		Non plastic
Maximum Particle Size		40mm
Maximum Passing	4.75mm	80%
	0.075mm	30%

7.1.4 Uncontrolled Materials:

A nominal uncontrolled fill layer not greater than 200mm thick may be placed over the finished surface level of the controlled fill to help protect the fill material from seasonal moisture changes. The topsoil layer may consist of topsoils or SILT soils.

7.2 Site Preparation:

7.2.1 Drainage:

Due to the nature and levels of the proposed works, it is imperative that, until the fill is at a level where it will self-drain, adequate drainage should be maintained to prevent water being retained at the base in the event of significant rainfall.

It is strongly advised that filling should be undertaken during and following relatively dry weather conditions.

7.2.2 Site Clearing and Stripping:

All trees (including root systems), stumps, debris and other materials determined by Civiltest Pty Ltd as unsuitable for incorporation into the filling should be removed and disposed of. Stripping and excavation should extend to natural CLAY or clayey SAND or extremely weathered ROCK soil.

7.2.3 Borrow Area(s):

Borrow areas should be cleared as in 7.2.2 above and then stripped of all vegetation, organic matter, and such topsoils as are deemed by Civiltest Pty Ltd as unsuitable for incorporation into the fill (refer Section 7.1.1).

7.2.4 Slope Preparation:

Where fill abuts sloping ground, it is desirable that the fill be benched into the slope. The cut benches should be shaped to provide free drainage.

7.2.5 Foundation Preparation:

The base of the proposed fill area should be completely stripped of all vegetation and debris and all soft/wet material removed to expose a firm base to be rolled and approved by Civiltest Pty Ltd prior to placement of any fill. Once approval is given, the fill can be placed directly over the compacted/approved surface.

7.3 Backfilling and Compaction:

7.3.1 Placement of Fill:

All fill should be placed in horizontal layers of not more than 200mm loose thickness and at a uniform moisture condition between 90% and 105% of optimum moisture content as determined by either AS1289 5.1.1 or 5.7.1, prior to compaction.

7.3.2 Compaction of Fill:

Fill shall be compacted to achieve a density ratio of not less than 98% Standard Compaction in all areas, as determined by either AS1289 5.1.1 or 5.7.1.

7.4 Inspection & Testing of Fill:

7.4.1 Level 1 inspections and testing shall be in accordance with AS3798-2007 Appendix B.

7.4.2 Frequency of field density testing shall be in accordance with AS3798-2007 using test method AS1289 5.8.1 (determination of field density using a nuclear gauge).

7.4.3 Placement of the subsequent layers of FILL shall not proceed until the previous layers have been approved by Civiltest Pty Ltd.

Upon completion of the filling works, a Level 1 report can be provided for an additional fee, detailing the filling procedures and compaction control works undertaken. The Level 1 report would include a summary of the test results.

8. CONDITIONS OF THE REPORT:

The recommendations made in this report may need to be reviewed should any site works disturb any soil 300mm below the founding depth of the structure.

Since the soil horizons and layers can vary in depth and thickness over the site, the depths and bearing pressure given above (i.e., in the report) are given as a guide only. If the footings are founded at the minimum depth as stated and are in the soil as described in the engineering logs for this site, then the requirements of this report have been met.

Where any filling is to be placed, the footing design parameters recommended in this report will need to be increased accordingly in relationship to the depth of that fill.

The descriptions of the soils found in the boreholes closely follow those outlined in AS1726-2017 (Geotechnical Site Investigations). Colour descriptions can vary with soil moisture content and exposure. It should be noted therefore, colour and shade descriptions mentioned in this report are made when the soil is in a moist condition.

This report has been compiled and recommendations made based on information supplied in the brief to Civiltest Pty Ltd and from the field investigation and observations made including the extent of, if any, site filling. Every care is taken within the terms of the brief to ensure that the field investigation is representative of the site. Therefore, once any remaining work has been completed and the report has been updated, the report and investigations conducted will be considered to be representative of the site.

If it is found that for any reason information received by Civiltest Pty Ltd is incorrect or conditions on site vary considerably during construction to those described in this report then the comments and recommendations made in this report may need to be amended.

The recommendations given in this report have been based largely on the soil conditions encountered at the time of the field investigation. Under inclement weather or prolonged wet weather conditions, the soil conditions noted and reported herein could vary. It is advisable to undertake construction during and following dry weather conditions (i.e., not during or following inclement weather or prolonged wet weather conditions).

Any levels referred to in Civiltest reports should be regarded as general and are not to be interpreted as surveyed confirmed levels. All levels should be checked and confirmed by a licensed surveying organisation or qualified personnel.

Finally, no responsibility will be taken for this report if it is altered in any way or is not reproduced in full.

This report consists of thirteen pages including a site plan. Appendix A (Engineering Logs) and Appendix B (Laboratory Test Results) are attached.

FADY FANOUS
GEOTECHNICAL ENGINEER
CIVILTEST PTY LTD

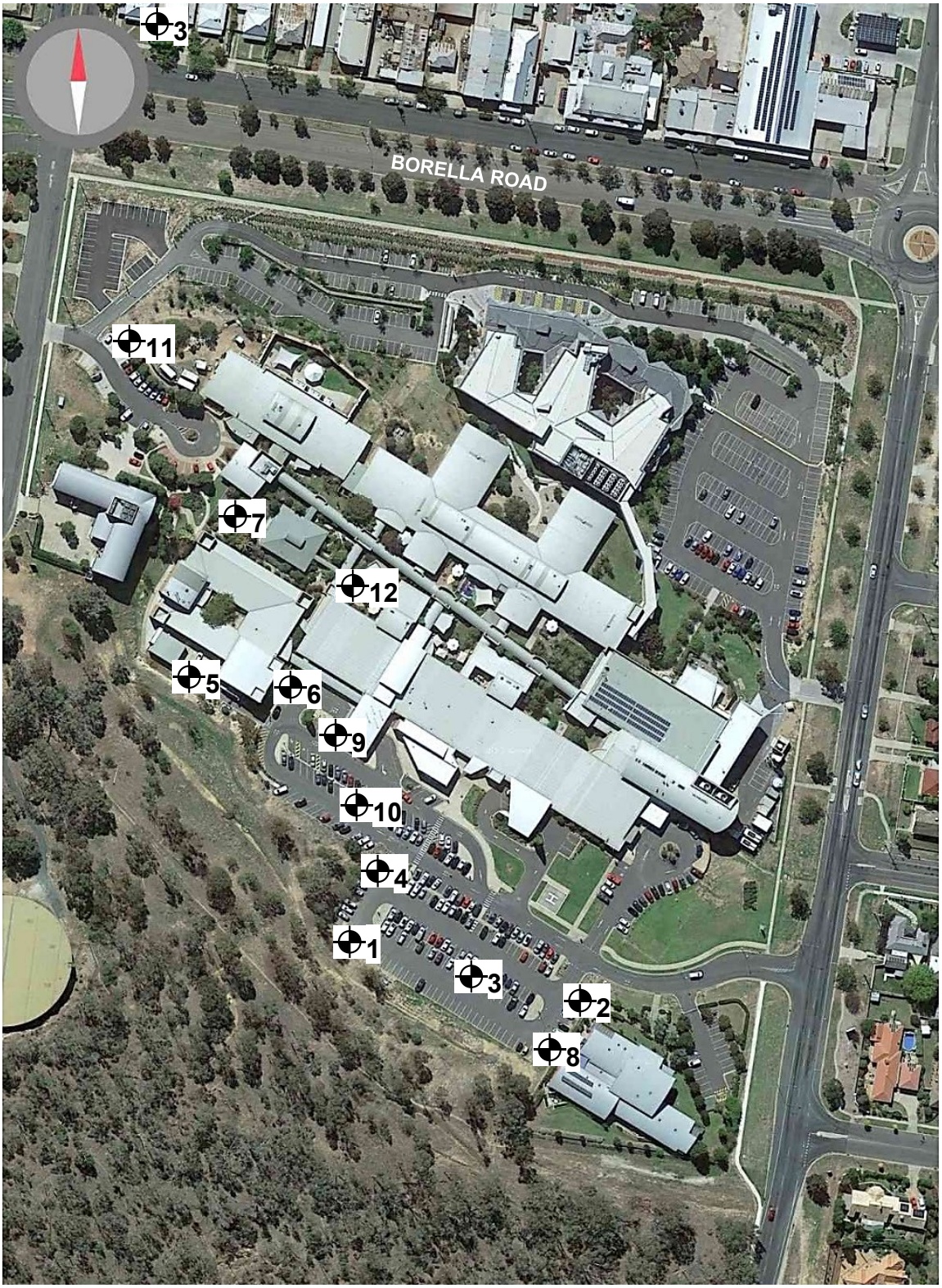
REF: tp/FF/po/jy/kg/hj/sb/*ms/kg*

4 March 2024

AMENDMENT: *This report was first issued on 22 December 2023. Sections of this report were amended on 4 March 2024 and consequently this revised report now takes precedence over any previously dated report.*

LOCATION OF TEST SITES

ALBURY HOSPITAL CAMPUS REDEVELOPMENT PROJECT
201 BORELLA ROAD EAST ALBURY



Denotes Boreholes

THIS PLAN IS NOT INTENDED TO PROVIDE AN ACCURATE DEPICTION OF THE NUMBER, SIZE OR LOCATION OF TREES AND/OR SHRUBS

NOT TO SCALE

APPENDIX A

ENGINEERING LOGS

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 1** **DATE: 12-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.05		ASPHALT							
0.2		**FILL,** GRAVEL, sandy trace silt Brown; Dry; Very dense							
0.5		**FILL,** SAND, gravelly with silt Brown; Dry; Very dense			0.4 0.5	50 50		22 32	
0.7		Extremely Weathered SCHIST Brown; Dry; Very low strength			0.6			Refusal	
1.0	Auger Drilling	Distinctly Weathered SCHIST Pale brown; Dry; Low strength to medium strength							
1.5	Coring 1ST RUN	Distinctly Weathered SCHIST Brown black; Dry; Medium strength	TCR:100% RQD:40% BP, JT 5-200mm 0-0mm 20° to 45° K V IR, UN RO						
3.0	Coring 2ND RUN	Distinctly Weathered SCHIST Pale brown grey black; Dry; Medium strength	TCR:100% RQD:95% BP, JT 5-1000mm 0-0mm 10° to 75° K, CL V IR RO						
	Coring 3RD RUN	Distinctly Weathered SCHIST Pale brown grey; Dry; Medium strength Continued on next page	TCR:100% RQD:90% BP, JT 5-1000mm 15° to 30° K, CL V IR RO						

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 1** **DATE: 12-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
4.5	Coring 4TH RUN	Distinctly Weathered , SCHIST Pale brown grey; Dry; Medium strength	TCR:100% RQD:100% BP, JT 0-500mm 0-0mm 5° to 10° K, CL V IR RO						
5.0		END OF BORE (12-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 2** **DATE: 13-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger	ASPHALT							
0.04	Drilling	Black;							
	Auger	**FILL,** GRAVEL, sandy			0.3			5	
0.4	Drilling	Dark grey; Moist; Medium dense			0.4			5	
	Auger	CL CLAY, silty			0.5			10	
	Drilling	Pale brown pale orange grey;			0.6			12	
		Moist(w≈PL); Stiff			0.7			11	
					0.8			10	
					0.9			10	
					1.0		6, 7, 7	11	
2.0									
	Auger	CL CLAY, silty, with sand			2.5		8, 11, 17		
	Drilling	Pale brown pale grey; Moist(w≈PL);			4.0		14, 15, 10/70mm, bouncing		
		Hard							
		Sand is sub-rounded to sub-angular,							
		medium to fine grained							
4.5									
	Auger	CL CLAY, silty			5.5		16, 10/70mm, bouncing		
	Drilling	Pale brown pale grey; Moist(w≈PL);							
7.0		Hard			7.0		17, 10/50mm, bouncing		
	Auger	CL CLAY, silty, with sand							
	Drilling	Pale brown pale orange pale grey;							
		Dry; Hard							
		Sand is sub-rounded to angular,							
8.5		medium to fine grained			8.5		10/40mm, bouncing		
	Auger	CL CLAY, silty, with sand							
	Drilling	Pale brown pale orange grey; Dry;							
		Sand is angular to sub-angular,							
10.0		medium to fine grained			10.0		12/75mm, bouncing		
		END OF BORE (13-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 3** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger	ASPHALT							
0.04	Drilling	Black;							
	Auger	**FILL,** GRAVEL, sandy							
0.2	Drilling	Brown; Moist; Medium dense to dense							
	Auger	**FILL,** GRAVEL, sandy with clay							
0.4	Drilling	Dark brown; Moist; Medium dense							
	Auger	**FILL,** CLAY, sandy trace gravel			0.5	24.5		11	
	Drilling	Brown; Moist; Very stiff			0.6	29.5		13	
		Becoming pale brown and dry of			0.7	37		16	
		plastic at 1.1m			0.8	45		19	
					0.9			Refusal	
1.4									
	Auger	CL CLAY, sandy, with silt			1.5		14, 18, 18		
	Drilling	Brown mottled grey; Moist(w≈PL); Hard							
		Sand is angular to sub-angular,							
		coarse to fine grained							
2.4									
	Auger	Extremely Weathered SCHIST							
2.7	Drilling	Brown; Dry; Very low strength							
	Auger	Distinctly Weathered SCHIST							
3.0	Drilling	Brown; Dry; Low strength							
		END OF BORE (14-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 4** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.04	Auger Drilling	ASPHALT Black;							
0.2	Auger Drilling	**FILL,** GRAVEL, sandy Pale brown grey; Dry; Medium dense							
0.4	Auger Drilling	**FILL,** SAND, gravelly Grey; Moist; Medium dense							
0.5	Auger Drilling	**FILL,** SAND, gravelly Pale brown; Dry; Medium dense							
1.0	Auger Drilling	CL CLAY, silty Pale brown; Dry; Hard to friable			1.0		13, 17, 10/50mm, bouncing		
2.0	Auger Drilling	CL CLAY, sandy Orange pale brown pale grey; Dry; Hard to friable Sand is rounded to sub-rounded, medium to fine grained							
2.5	Coring 1ST RUN	Distinctly Weathered SCHIST Pale brown; Dry; Low strength to medium strength Core loss from 2.0m to 2.5m	TCR:0% RQD:0% 2000-2500mm						
3.8	Coring 2ND RUN	Distinctly Weathered SCHIST Pale grey pale brown; Dry; Medium strength	TCR:100% RQD:40% JT, SH, FR 5-250mm RC 20mm PD RO, VR						
5.3	Coring 3RD RUN	Distinctly Weathered SCIST Pale brown pale grey pale orange; Dry; Medium strength	TCR:100% RQD:0% JT, SH, FR 5-50mm 0-0mm 5° to 75° RC V, 10mm PD, IR RO, VR						
	Coring 4TH RUN	Distinctly Weathered SCHIST Pale brown mottled brown; Dry; Medium strength	TCR:100% RQD:22% BP, JT, SM						

Continued on next page

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 4** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
			1-180mm RF 30mm PD, IR RO						
6.5									
	Coring 5TH RUN	Distinctly Weathered SCHIST Pale brown mottled orange grey; Dry; Medium strength	TCR:100% RQD:22% BP, JT, FR 40-110mm K V PD, IR RO, VR						
7.0									
	Coring 6TH RUN	Distinctly Weathered SCHIST Pale brown pale grey red orange; Dry; Medium strength	TCR:74% RQD:0% JT, CR, IF 5-20mm 8000-8350mm 10° to 80° RC V PD, IR RO						
8.35									
	Coring 7TH RUN	Distinctly Weathered SCHJST Pale brown grey pale red; Dry; Medium strength	TCR:28% RQD:0% JT, SH, CR 5-10mm 8750-9750mm 5° to 90° RF V IR RO, VR						
9.75									
	Coring 8TH RUN	Distinctly Weathered SANDSTONE Brown; Dry; Medium strength	TCR:100% RQD:100% JT 0-250mm 0-0mm 90° to 90°						

Continued on next page

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 4** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
			K						
			V						
10.0			IR						
			RO						
		END OF BORE (14-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 5** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.04	Auger Drilling	ASPHALT Black;							
0.5	Auger Drilling	**FILL,** GRAVEL, sandy Grey pale brown; Moist; Medium dense							
1.0	Auger Drilling	Extremely Weathered SCHIST Pale brown pale yellow; Dry; Very low strength to low strength							
1.5	Auger Drilling	Extremely Weathered SCHIST White pale grey; Dry; Very low strength	TCR:0% RQD:0% 1000-1500mm						
2.5	Auger Drilling	Distinctly Weathered SCHIST Pale brown pale orange grey white; Dry; Low strength to medium strength	TCR:80% RQD:0% BP 5-50mm 2300-2500mm 20° to 75° CL, RF V IR RO						
3.0	Auger Drilling	Distinctly Weathered SCHIST Pale brown grey pale orange; Dry; Medium strength	TCR:100% RQD:100% 0-1000mm 0-0mm						
3.9	Auger Drilling	Distinctly Weathered SCHIST Pale grey white pale brown pale; Dry; Medium strength	TCR:100% RQD:60% JT 5-50mm 30° to 75° CL IR VR						
	Auger Drilling	Distinctly Weathered SCHIST Pale brown pale yellow pale grey; Dry; Medium strength	TCR:100% RQD:72% BP, JT 10-50mm 20° to 50° K V PD, IR, UN						

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ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 5** **DATE: 14-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
5.0			RO, VR						
		END OF BORE (14-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 6** **DATE: 15-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.08	Auger Drilling	CONCRETE Black;							
0.13	Auger Drilling	**FILL,** SAND, gravelly Pale grey; Moist; Loose							
1.8	Auger Drilling	**FILL,** CLAY, sandy trace silt Brown mottled orange grey; Moist; Stiff to very stiff with gravel fine sub angular and very stiff at 0.8m			0.2	3.5		2	
					0.3	10		5	
					0.4	12.5		6	
					0.5	17		8	
					0.6	17		8	
					0.7	22		10	
					0.8	47.5		20	
					0.9			Refusal	
					1.0		9, 13, 15		
2.7	Auger Drilling	CL CLAY, sandy, trace gravel Brown mottled orange; Moist(w≈PL); Very stiff Sand is angular to sub-angular, coarse to fine grained Gravel is sub-angular, medium to fine grained			2.5		7, 13, 16		
3.3	Auger Drilling	CL CLAY, sandy, with silt Brown mottled grey; Moist(w≈PL); Very stiff Sand is angular, medium to fine grained							
4.5	Auger Drilling	CL CLAY, sandy Brown; Moist(w≈PL); Hard Sand is angular to sub-angular, coarse to fine grained			4.0		15/120mm, bouncing		
15.0	Auger Drilling	Extremely Weathered SCHIST Pale brown mottled orange; Moist; Very low strength to low strength Becoming brown at 8.0m			5.5		14, 13/90mm, bouncing		
					7.0		15/105mm, bouncing		
					8.5		10/50mm, bouncing		
					10.0		10/25mm, bouncing		
					11.5		10/55mm, bouncing		
					13.0		10/10mm, bouncing		
		END OF BORE (15-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 7** **DATE: 18-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Trailer Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger Drilling	**FILL,** GRAVEL, clayey Pale brown grey; Moist; Loose							
0.05									
	Auger Drilling	**FILL,** SAND, gravelly Pale brown; Dry; Medium dense			0.1			6	
					0.2			13	
0.3									
	Auger Drilling	**FILL,** CLAY, silty with gravel Brown; Moist; Firm to stiff							
0.6									
	Auger Drilling	**FILL,** CLAY, silty with gravel Brown; Dry; Hard to friable			0.9			12	
					1.0		11, 15/110mm, bouncing	Refusal	
1.8									
	Auger Drilling	CL CLAY, silty, with gravel Pale brown pale orange mottled grey; Dry; Hard to friable Gravel is sub-rounded to angular, medium to fine grained							
2.5					2.5		9, 16, 10/50mm, bouncing		
	Auger Drilling	CL CLAY, silty, with gravel Pale brown pale orange; Dry; Hard to friable Gravel is angular to sub-angular, coarse to medium grained			4.0		10/50mm, bouncing		
4.5									
	Auger Drilling	CL CLAY, silty, with gravel Pale brown pale orange mottled grey; Dry; Hard to friable Gravel is angular to sub-angular, coarse to medium grained			5.5		20, 10/50mm, bouncing		
					7.0		15, 10/60mm, bouncing		
					8.5		15/100mm, bouncing		
9.0									
	Auger Drilling	CL CLAY, silty Pale brown pale orange; Dry; Hard to friable			10.0		15, 15/100mm, bouncing		
					11.5		10/60mm, bouncing		
12.0									
	Auger Drilling	CL CLAY, silty Brown; Dry; Hard to friable			13.0		10/75mm, bouncing		
					14.5		10/50mm, bouncing		
15.0									
		END OF BORE (18-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 8** **DATE: 18-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : HiLux Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.05		ASPHALT Black;							
0.2		**FILL,** GRAVEL, sandy Pale brown grey; Dry; Loose to medium dense							
0.4		**FILL,** GRAVEL, sandy Dark grey; Dry; Loose to medium dense			0.3			8	
					0.4			9	
		CL CLAY, silty Pale brown pale yellow; Dry; Very stiff to hard			0.5			15	
					0.6			16	
2.0					0.7			Refusal	
					1.0		16, 15/100mm, bouncing		
	Auger Drilling	CL CLAY, sandy, with gravel Pale brown pale orange; Dry; Hard to friable Sand is angular to sub-angular, coarse to medium grained Gravel is angular to sub-angular, medium grained			2.5		10, 13, 17		
5.0					4.0		15, 15/100mm, bouncing		
		END OF BORE (18-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 9** **DATE: 19-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
0.06	Auger Drilling	ASPHALT Black;							
0.16	Auger Drilling	**FILL,** GRAVEL, sandy Brown; Moist; Dense							
0.4	Auger Drilling	**FILL,** CLAY, sandy trace gravel Brown; Moist; Stiff			0.4	8		4	
0.6	Auger Drilling	**FILL,** CLAY, sandy with gravel Brown; Moist; Very stiff			0.5 0.6	50		25 Refusal	
2.4	Auger Drilling	CL CLAY, sandy, trace gravel Brown; Moist(w≈PL); Very stiff Sand is angular to sub-angular, coarse to fine grained Gravel is sub-rounded to sub-angular, fine grained Becoming brown mottled orange at 1.3m			1.5		8, 11, 14		
3.45	Auger Drilling	CL CLAY, sandy, trace gravel Brown mottled grey; Moist(w≈PL); Very stiff Sand is angular to sub-angular, coarse to fine grained Gravel is sub-rounded to sub-angular, medium to fine grained			3.0		11, 10/90mm, bouncing		
		END OF BORE (19-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 10** **DATE: 19-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger	ASPHALT							
0.05	Drilling	Black;							
	Auger	**FILL,** GRAVEL, sandy							
0.35	Drilling	Brown; Moist; Dense							
	Auger	**FILL,** CLAY, sandy trace gravel			0.5	1.5		1	
	Drilling	Brown; Moist; Firm			0.6	1.5		1	
0.7					0.7	1.5		1	
	Auger	CL CLAY, sandy, trace gravel			0.8	5.5		3	
	Drilling	Brown mottled orange; Moist(w>PL);			0.9	8		4	
		Stiff			1.0	10		5	
		Sand is angular to sub-angular,			1.5		6, 13, 13		
		coarse to fine grained							
		Gravel is sub-rounded to sub-angular,							
		fine grained							
		Becoming brown mottled orange and							
		grey near plastic and very stiff at 1.1m							
1.85									
		END OF BORE (19-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 11** **DATE: 19-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: SFA : Land Cruiser Mounted Rig**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger Drilling	**FILL,** CLAY, sandy trace gravel Brown; Dry; Hard Becoming moist at 1.1m			0.4	22		10	
					0.5	32		14	
					0.6	37		16	
					0.7	42.5		18	
					0.8			Refusal	
					1.5		9, 10/70mm, bouncing		
1.85									
		END OF BORE (19-Dec-2023)							

ENGINEERING LOG

REPORT NO. 4230352-2 **BOREHOLE NO. 12** **DATE: 19-DEC-2023**
FIELD TECHNICIAN: TP/FF **DRILLING METHOD: : Hand Auger**
PROJECT LOCATION: Clinical Services Building Albury Campus Hospital Redevelopment ALBURY

DEPTH (m)	METHOD	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING				
					DEPTH (m)	RESULTS			
						Is(50) MPa	SPT	DCP Blows/100mm	PP (kg/cm^2)
	Auger	**FILL,** SAND, clayey trace gravel							
0.2	Drilling	Brown; Moist; Dense			0.2	10		5	
	Auger	**FILL,** CLAY, sandy trace gravel			0.3	5.5		3	
	Drilling	Brown mottled orange; Moist; Stiff			0.4	8		4	
					0.5	17		8	
					0.6	19.5		9	
					0.7	22		10	
					0.8	27		12	
					0.9	24.5		11	
1.5					1.0	27		12	
	Auger	CL CLAY, sandy, trace gravel							
	Drilling	Brown mottled orange grey;							
		Moist(w≈PL); Stiff							
		Sand is sub-rounded to angular,							
		coarse to fine grained							
		Gravel is sub-rounded to sub-angular,							
		fine grained							
		Gravel becoming fine to medium and							
2.3		very stiff at 1.8m							
		REFUSAL (19-Dec-2023)							

APPENDIX B

LABORATORY TEST RESULTS

Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625A
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 10/01/2024
Sample Location: **BH 10, Depth: 0.4 - 1.2**

Civiltest Pty Ltd
Albury Laboratory
886 Calimo Street Albury North NSW 2640
Phone: (02) 6024 4343
Email: simon@civiltest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

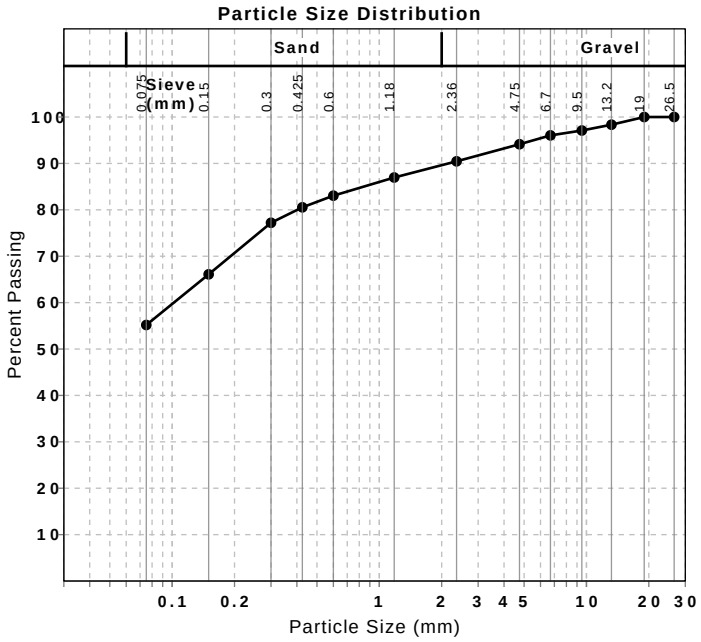
Approved Signatory: Simon Beggs
Senior Technician
NATA Accredited Laboratory Number: 19977

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**98**			2		
9.5 mm	**97**			1		
6.7 mm	**96**			1		
4.75 mm	**94**			2		
2.36 mm	**90**			4		
1.18 mm	**87**			3		
0.6 mm	**83**			4		
0.425 mm	**81**			3		
0.3 mm	**77**			3		
0.15 mm	**66**			11		
0.075 mm	**55**			11		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	15.5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	29		
Plastic Limit (%)	12		
Plasticity Index (%)	**17**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**7.0**		
Cracking Crumbling Curling	Curling		



California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**3.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.86		
Optimum Moisture Content (%)	15.0		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	101.5		
Dry Density after Soaking (t/m^3)	1.85		
Field Moisture Content (%)			
Moisture Content at Placement (%)	15.2		
Moisture Content Top 30mm (%)	18.4		
Moisture Content Rest of Sample (%)	15.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours (h)	357.2		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625B
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 10/01/2024
Sample Location: **BH 11, Depth: 0.0 - 1.0**

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Albury Laboratory
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Phone: (02) 6024 4343
Email: simon@civiltest.com.au

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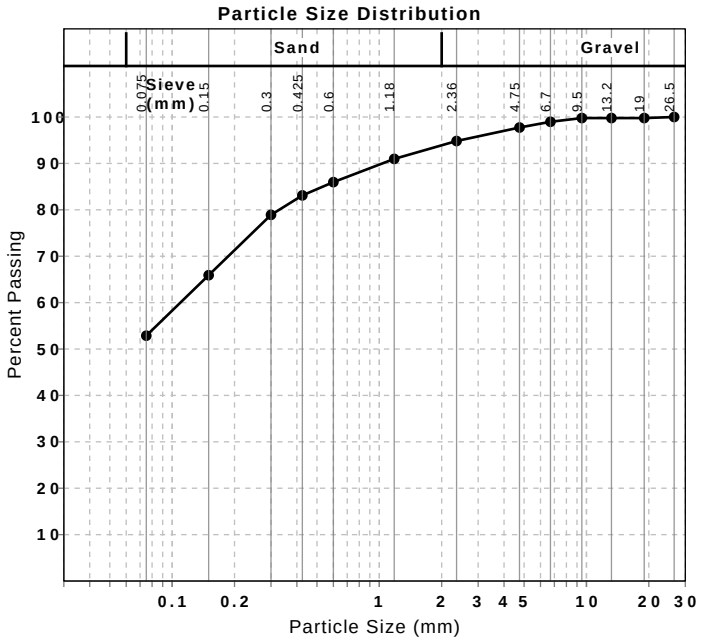
Senior Technician
NATA Accredited Laboratory Number: 19977

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			1		
4.75 mm	**98**			1		
2.36 mm	**95**			3		
1.18 mm	**91**			4		
0.6 mm	**86**			5		
0.425 mm	**83**			3		
0.3 mm	**79**			4		
0.15 mm	**66**			13		
0.075 mm	**53**			13		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	5.4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	25		
Plastic Limit (%)	14		
Plasticity Index (%)	**11**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**5.0**		
Cracking Crumbling Curling	Cracking & Curling		



California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**10**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.89		
Optimum Moisture Content (%)	12.0		
Laboratory Density Ratio (%)	100.5		
Laboratory Moisture Ratio (%)	96.5		
Dry Density after Soaking (t/m^3)	1.89		
Field Moisture Content (%)	5.6		
Moisture Content at Placement (%)	11.8		
Moisture Content Top 30mm (%)	15.8		
Moisture Content Rest of Sample (%)	13.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours (h)	71.2		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625C
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 03/01/2024
Sample Location: **BH 2, Depth: 2.5 - 3.5**

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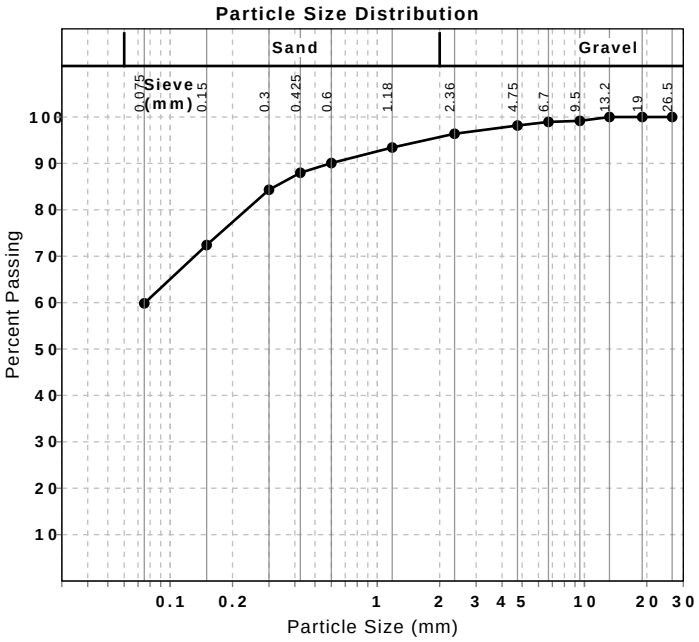
Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**99**			1		
6.7 mm	**99**			0		
4.75 mm	**98**			1		
2.36 mm	**96**			2		
1.18 mm	**93**			3		
0.6 mm	**90**			3		
0.425 mm	**88**			2		
0.3 mm	**84**			4		
0.15 mm	**72**			12		
0.075 mm	**60**			13		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	14.2		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	38		
Plastic Limit (%)	13		
Plasticity Index (%)	**25**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.5**		
Cracking Crumbling Curling	Curling		



Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625D
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 03/01/2024
Sample Location: **BH 6, Depth: 3.0 - 4.0**

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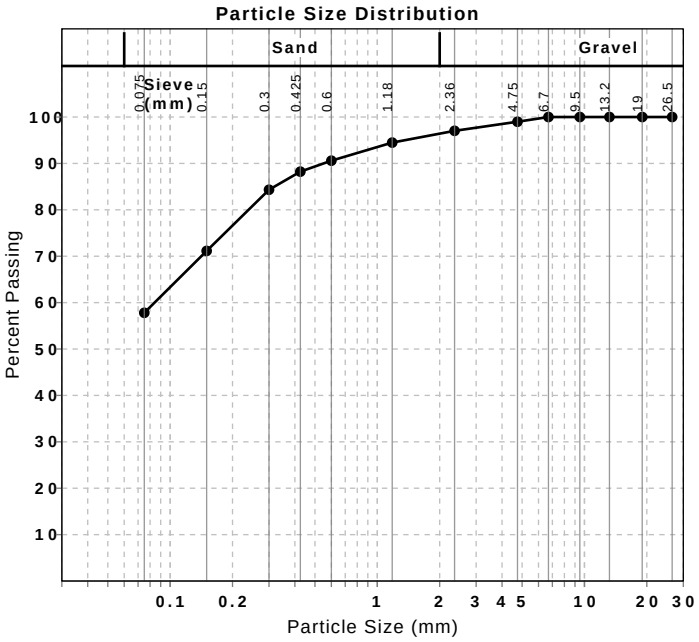
Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**97**			2		
1.18 mm	**94**			3		
0.6 mm	**91**			4		
0.425 mm	**88**			2		
0.3 mm	**84**			4		
0.15 mm	**71**			13		
0.075 mm	**58**			13		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	13.2		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	37		
Plastic Limit (%)	15		
Plasticity Index (%)	**22**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.5**		
Cracking Crumbling Curling	Curling		



Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625E
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 03/01/2024
Sample Location: **BH 7, Depth: 2.5 - 3.5**

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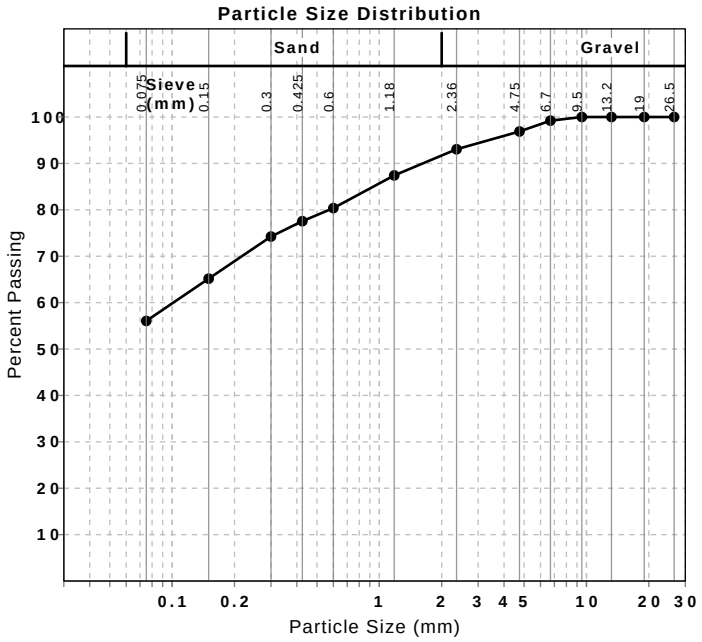
Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			1		
4.75 mm	**97**			2		
2.36 mm	**93**			4		
1.18 mm	**87**			6		
0.6 mm	**80**			7		
0.425 mm	**78**			3		
0.3 mm	**74**			3		
0.15 mm	**65**			9		
0.075 mm	**56**			9		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	14.2		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	47		
Plastic Limit (%)	15		
Plasticity Index (%)	**32**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**11.0**		
Cracking Crumbling Curling	Cracking & Curling		



Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Sample Number: 234-5625F
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 03/01/2024
Sample Location: **BH 12, Depth: 0.5 - 1.5**

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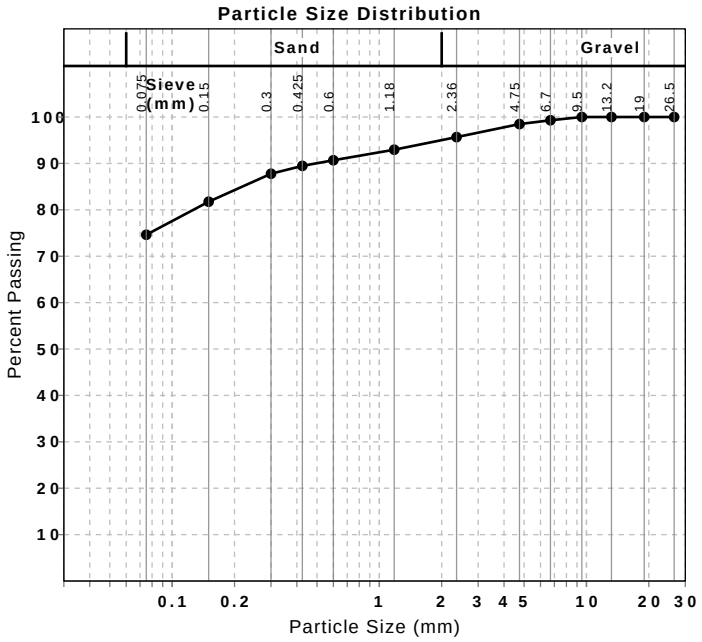
Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
26.5 mm	**100**			0		
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			1		
4.75 mm	**98**			1		
2.36 mm	**96**			3		
1.18 mm	**93**			3		
0.6 mm	**91**			2		
0.425 mm	**89**			1		
0.3 mm	**88**			2		
0.15 mm	**82**			6		
0.075 mm	**75**			7		

Moisture Content (AS1289.2.1.1)		Min	Max
Moisture Content (%)	14.7		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	13		
Plasticity Index (%)	**18**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**6.0**		
Cracking Crumbling Curling	Cracking & Curling		



Material Test Report

Report Number: **4230352-4**
Issue Number: 1
Date Issued: 16/01/2024
Client: Health Infrastructure
1 Reserve Road, ST LEONARDS NSW 2065
Contact: Steven Bird - CWPM
Project Number: 4230352
Project Name: Albury Hospital Campus Redevelopment Project ALBURY
Project Location: Albury Hospital Campus Redevelopment Project ALBURY
Work Request: 5625
Dates Tested: 11/12/2023 - 20/12/2023
Location: Albury Hospital Campus Redevelopment Project ALBURY

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Moisture Content AS 1289 2.1.1

Sample Number	Sample Location	Moisture Content (%)	Min	Max	Material
234-5625G	BH 1 , Depth: 0.4	9.9 %	**	**	**
234-5625H	BH 1 , Depth: 0.8	10.2 %	**	**	**
234-5625I	BH 2 , Depth: 0.4	18.1 %	**	**	**
234-5625J	BH 2 , Depth: 0.8	16.7 %	**	**	**
234-5625K	BH 3 , Depth: 0.4	6.9 %	**	**	**
234-5625L	BH 3 , Depth: 0.8	7.5 %	**	**	**
234-5625M	BH 6 , Depth: 0.4	13.1 %	**	**	**
234-5625N	BH 6 , Depth: 0.8	14.2 %	**	**	**
234-5625O	BH 7 , Depth: 0.4	7.8 %	**	**	**
234-5625P	BH 7 , Depth: 0.8	9.6 %	**	**	**
234-5625Q	BH 8 , Depth: 0.4	10.9 %	**	**	**
234-5625R	BH 8 , Depth: 0.8	13.5 %	**	**	**
234-5625S	BH 9 , Depth: 0.4	12.8 %	**	**	**
234-5625T	BH 9 , Depth: 0.8	14.7 %	**	**	**
234-5625U	BH 10 , Depth: 0.4	17.2 %	**	**	**
234-5625V	BH 10 , Depth: 0.8	17.0 %	**	**	**
234-5625W	BH 11 , Depth: 0.4	6.9 %	**	**	**
234-5625X	BH 11 , Depth: 0.8	4.5 %	**	**	**
234-5625Y	BH 12 , Depth: 0.4	9.1 %	**	**	**
234-5625Z	BH 12 , Depth: 0.8	9.1 %	**	**	**