GEOTECHNIQUE ®
PTY LTD

ABN 64 002 841 063

Job No: 20192/1
Our Ref: 20192/1-AA
6 July 2022

The Trustee for Mckay Moorebank
c/- QA Construct Pty Ltd
9 Saric Avenue
GEORGES HALL NSW 2198
Email: Kasem@qaconstruct.com.au

Attention: Mr K Zraika

Dear Sir

re: **Proposed Residential Development**
28-32 McKay Avenue, Moorebank/Liverpool
Geotechnical Investigation

This report provides the results of a geotechnical investigation carried out at 28-32 McKay Avenue, Moorebank/Liverpool, hereafter referred to as the site. This investigation was carried out in general accordance with Australian Standard 1726 (Reference 1).

We understand the following:

- The proposed development at the above site includes demolition of existing dwellings and construction of a new building residential building with six storeys above the ground and two levels of basement car park. The basement excavation is understood to be up to about 6.0m deep. Attached proposed development plan showing footprint of the proposed building was provided for preparation of this proposal.
- A geotechnical investigation was required to assess subsurface conditions across the site and provide geotechnical recommendations on design of basement excavation, retaining structures, floors slabs and footings.

Review of Available Information

Reference to the Geological Map of Penrith (scale 1:100,000) indicates that the bedrock at the site is Ashfield Shale, belonging to the Wianamatta Group of rocks and comprising dark grey to black shale and laminite.

Reference to the Soil Landscape Map of Penrith (scale 1:100,000) indicates that the landscape at the site belongs to Hornsby Group, which is characterised by gently undulating rises to steep low hills on deeply weathered basaltic breccia with relief to 70m and ground slopes of 3% to 65%. The subsurface soil in this landscape is likely to be deep (more than 2.0m), highly plastic and reactive. Locally this landscape has high mass movement and erosion hazards.

Reference to Map showing Salinity Potential in Western Sydney (Scale Approximate 1:143,000) prepared by Department of Infrastructures, Planning and Natural Resources (2002) indicates moderate salinity potential at the site.

Field Works

Field work for the geotechnical investigation was carried out on 20 June 2022 and included the following:

- Carrying out a walk over survey to assess existing site conditions and nominate borehole locations.
- Reviewing services plans obtained from “Dial Before You Dig” to determine locations of services across the site.
- Scanning proposed borehole locations for underground services to ensure that services were not damaged during field work. We engaged a specialist services locator for this purpose.
- Drilling two boreholes (BH1 and BH2) using a truck mounted drilling rig fully equipped for geotechnical investigation. Boreholes were uniformly distributed in accessible portions of the site and drilled to depths of 9.3m to 9.4m from existing ground surface. The approximate borehole locations are indicated on attached Drawing No 20192/1-AA1. Engineering borehole logs are also attached.
- Conducting Standard Penetration Tests (SPT) at regular depth intervals in the boreholes to assess strength of sub-surface soils.
- Recovering representative soil samples for visual assessment and laboratory tests.
- Measuring depths to groundwater level or seepage in the boreholes, where encountered.
- Backfilling boreholes with recovered materials after logging and sampling.

Field works were supervised by a Geotechnical Engineer from this company who was responsible for the walk over survey, nominating the borehole locations, supervision of drilling, SPT testing, sampling, and preparation of field logs.

Site Conditions

The proposed development site is of trapezoidal shape measuring approximately 38.0m by 37.0m in plan. The site is bound by McKay Avenue, Moorebank, to the south and existing residential properties in the three remaining sides.

There are two residential dwellings within the site, one each in two lots, vacant portions of the site are grass covered with scattered trees.

Ground surface across the site is almost levelled.

Sub-surface profiles encountered in the boreholes are detailed in the attached logs, and summarised below in Table 1.

Table 1 – Sub-surface Profiles encountered in Boreholes

Borehole No	Termination Depth (m)	Depth Range for Topsoil (m)	Depth Range for Residual Soil (m)	Depth to Groundwater Seepage (m)
BH1	9.4	0.0-0.1	0.1->9.4	4.0
BH3	9.3	0.0-0.1	0.1->9.3	-

Table 1 indicates that the sub-surface profile across the site comprises a sequence of fill and residual soils to depths exceeding 9.4m from the existing ground surface. No bedrock was encountered up to borehole termination depths.

The subsurface soils may in generally be described as follows.

Topsoil Silty CLAY, low to medium plasticity, red, brown, with traces of sand and roots

Residual Soils CLAY, Silty CLAY, medium to high plasticity, red, grey, brown, with moisture content equal to or higher than plastic limit, with trace of silt and sand, stiff to hard

Gravelly CLAY, low plasticity, grey, brown, moisture content higher than plastic limit, hard

Groundwater water seepage was encountered at depth of about 4.0m from existing ground surface in borehole BH1. However, no seepage was encountered in BH2 up to termination depth of 9.3m. Therefore, it is our assessment that the seepage encountered in BH1 does not represent regional groundwater. Possibly it is infiltrated surface water or localised perched water. Therefore, the depth to groundwater level is anticipated to be more than 9.3m under normal weather conditions. It should however be noted that fluctuations in the level of groundwater might occur due to variations in rainfall and/or other factors not evident during drilling.

Laboratory Testing

Representative soil samples recovered from the test pits were tested in the NATA accredited laboratories to determine chemical properties including Electrical Conductivity (EC), pH, sulphates, chloride and resistivity. Detailed laboratory test results are attached and summary is presented below in Table 2.

Table 2 – Results of Chemical Properties Tests

Borehole No	Depth (m)	EC (µS/cm)	pH	Chloride (ppm)	Sulphate (ppm)	Resistivity (ohm-cm)
BH1	0.5-0.95	150	4.6	43	98	5700
BH1	3.0-3.45	25	5.1	3.3	29	18000
BH1	6.0-6.45	95	5.3	38	73	5000
BH2	1.5-1.95	86	4.4	3.8	84	9600
BH2	4.5-4.95	17	5.4	1.7	19	28000
BH2	7.5-7.95	540	5.3	490	140	1200

DISCUSSION AND RECOMMENDATIONS

Soil Salinity

Salinity refers to the presence of excess salt in the environment, either in soil or water. Soil salinity is generally assessed by measuring Electrical Conductivity (EC) of a soil sample made up of 1:5 soil water suspension. Thus, determined Electrical Conductivity (EC) is multiplied by a factor varying from 6 to 23, based on the texture of the soil sample, to obtain Equivalent Electrical Conductivity designated as ECe (Reference 2). Alternatively, ECe may be directly measured in soil saturation extracts.

Soils are classified as saline if ECe of the saturated extracts exceed 4.0dS/m. The criteria for assessment of soil salinity classes are shown in the following Table 3 (Reference 2).

Table 3 – Criteria for Soil Salinity Classification

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

For clayey soils encountered across the site, multiplying factors of 8 to 10 are assessed to be appropriate. Even for a multiplying factor of 10, estimates of ECe values for samples presented in Table 2 vary from about 0.1dS/m to 5.4dS/m. However, only one samples recovered from depth of 7.5m shows ECe value of more than 4.0dS/m.

Therefore, it is our assessment that the soils likely to be disturbed or excavated during the proposed development works are non-saline and excavation and disturbance of soils for the proposed development can be carried out without need for a Saline Soil Management Plan.

Exposure Classification

Australian Standard AS2870 (Reference 3) provides guidelines to assess Exposure Classification for saline and sulphate soils. Table 4 below provides Exposure Classification based on Equivalent Electrical Conductivity (ECe) and Table 5 provides Exposure Classification for sulphate soils.

Table 4 – Exposure Classifications for Saline Soils

Electrical Conductivity, EC_e (dS/m)	Exposure Classification	Salinity Classification
<2	A1	Non-saline
2 – 4	A1	Slightly saline
4 – 8	A2	Moderately saline
8 – 16	B1	Very saline
>16	B2	Highly saline

Table 5 – Exposure Classifications for Sulphate Soils

Sulphate expressed as SO_3		pH	Exposure Classification*	
In Soil (ppm)	In Groundwater (ppm)		Soil Condition A	Soil Condition B
<5000	<1000	>5.5	A2	A1
5000-10000	1000-3000	4.5-5.5	B1	A2
10000-20000	3000-10000	4.0-4.5	B2	B1
>20000	>10000	<4.0	C2	B2

Approximately 100ppm of SO_4 = 80ppm of SO_3
*Soil Condition A = high permeability soils (e.g. sands and gravels) which are below groundwater
*Soil Condition B = low permeability soils (e.g. silts and clays) and all soils above groundwater

Appropriate Soil Condition for clayey soils is Condition B. Based on laboratory test results presented in Table 2 and guidelines on Exposure Classifications presented in Tables 4 and 5, the subsurface soils across the site is assessed to belong to Exposure Classes A1 to A2.

Therefore, for the proposed development we recommend use of construction methods and materials (concrete, brick etc) appropriate for site with Exposure Classification A2.

Aggressivity Classification

Aqueous solution of chlorides causes corrosion of iron/steel, including steel reinforcements in concrete. The Aggressivity Classification of soil and groundwater applicable to iron/steel piles, in accordance with Australian Standard AS2159 (Reference 4), are given below in Table 6.

Table 6 – Aggressivity Classification for Steel/Iron Piles

Chloride		pH	Resistivity (ohm cm)	Soil Condition A*	Soil Condition B#
In Soil (ppm)	In Water (ppm)				
<5000	<1000	>5.0	>5000	Non-aggressive	Non-aggressive
5000-20000	1000-10000	4.0-5.0	2000-5000	Mild	Non-aggressive
20000-50000	10000-20000	3.0-4.0	1000-2000	Moderate	Mild
>50000	>20000	<3.0	<1000	Severe	Moderate

*Soil Condition A = high permeability soils (e.g. sands and gravels) which are below groundwater
#Soil Condition B = low permeability soils (e.g. silts and clays) and all soils above groundwater

The Aggressivity Classification of soil and groundwater applicable to concrete piles, in accordance with Australian Standard AS2159 (Reference 4), are given below in Table 7.

Table 7 – Aggressivity Classification for Concrete Piles

Sulphate expressed as SO_4		pH	Chloride in Water (ppm)	Soil Condition A	Soil Condition B
In Soil (ppm)	In Groundwater (ppm)				
<5000	<1000	>5.5	<6000	Mild	Non-aggressive
5000-10000	1000-3000	4.5-5.5	6000-12000	Moderate	Mild
10000-20000	3000-1000	4.0-4.5	12000-30000	Severe	Moderate
>20000	>10000	<4.0	>30000	Very Severe	Severe

For clayey soils Soil Condition B is appropriate. Therefore, based on laboratory test results presented in Table 2 and guidelines on Aggressivity Classification presented in Tables 6 and 7, the subsurface soils across the proposed development site is assessed to be Non-aggressive to steel piles and Mildly aggressive to concrete piles.

Therefore, we recommend use of steel piles that are appropriate for Non-aggressive sites and concrete piles that are appropriate for Mildly aggressive sites.

Excavation Conditions

Proposed development is understood to involve up to about 6.0m deep basement excavation. Therefore, materials to be excavated will include topsoil and residual soils. No rock excavation is anticipated. It is our assessment that the excavation of topsoil and residual soils can be achieved using conventional earthmoving equipment such as excavators and dozers.

Observations during borehole drilling indicated that the depth to regional groundwater level is likely to be more than 9.3m from existing ground surface under normal weather conditions. Therefore, we do not anticipate significant groundwater inflow during the proposed excavation works. However, seepage was noted at depth of 4.0m in one of the boreholes (BH1). Therefore, minor groundwater inflow may be encountered during excavation to depth of 6.0m. However, it is our assessment that such minor groundwater inflow, if any, could be managed by a conventional sump and pump method.

We anticipate ground vibrations during excavation of fill and residual soils will be within tolerable limits for stability of existing structures in the vicinity of the site.

Fill Placement

We anticipate need for placement of controlled fill during site preparation works for proposed development. We recommend the following procedures for placement of controlled fill:

- Strip existing topsoil and stockpile separately for possible future uses or dispose off the site. Topsoils may be reused for landscaping purposes.
- Undertake proof rolling (using an 8 to 10 tonnes roller) of the exposed residual soils to detect potentially weak spots (ground heave). Excavate areas of localised heaving to a depth of about 300mm and replace with granular fill or crushed sandstone and then compact as described below.
- Undertake proof rolling of soft spots backfilled with granular fill, as described above. If the backfilled area shows further movement during proof rolling, this office should be contacted for further recommendations.
- Place suitable fill materials on proof rolled surface of residual soils. Controlled fill should preferably comprise non-reactive materials e.g. crushed sandstone with a maximum particle size not exceeding 75mm or low plasticity clay. The residual sols obtained from excavations within the site may be selectively used in controlled fill after removal of unsuitable materials, if any, and moisture conditioning. The fill should be placed in horizontal layers of 200mm to 250mm maximum loose thickness and compacted to a Minimum Dry Density Ratio (MDDR) of 98% Standard, at moisture content within 2% of Optimum Moisture Content (OMC). The upper two layers (at least 400mm thick) of controlled fill forming subgrade for driveway/car park should be compacted to a MDDR of 100% Standard, at moisture content within 2% of OMC.
- Fill placement should be supervised to ensure that material quality, layer thickness, testing frequency and compaction criteria conform to the specifications. We recommend "Level 2" or better supervision, in accordance with AS3798 (Reference 5). It should be noted that a Geotechnical Inspection and Testing Authority will generally provide certification on the quality of the entire compacted fill only if Level 1 supervision and testing is carried out.

Batter Slopes and Retaining Structures

Proposed development works will include up to about 6.0m deep basement excavation and some fill placement. Cut and fill slopes during and after site preparation works should be battered for stability or retained by engineered retaining structures. As heights of cut and fill slopes is likely to be about 6.0m, we do not anticipate battering of cut and fill slopes to be appropriate for long term stability. However, some portions of cut and fill slope may need to be battered for short term stability. Recommend batter slopes for stability of cut and fill slopes are presented below:

- For short term stability (during construction stage) = 1 vertical to 1 horizontal
- For long term stability (permanent slopes) = 1 vertical to 2.5 horizontal

However, if cut and fill slopes steeper than those recommended above are required for whatever reason, these slopes should be retained by engineered retaining structures. Appropriate retaining structures for the proposed basement excavation are anticipated to include gravity walls, cantilever walls or bored pier walls. The pressure distribution on such walls is assumed to be triangular in shape and estimated as follows:

$$p_h = \gamma k H$$

Where,

p_h = Horizontal pressure (kN/m^2)
γ = Total unit weights of retained materials (kN/m^3)
k = Coefficient of earth pressure (k_a or k_o)
H = Retained height (m)

For design of flexible retaining structures where some lateral movement is acceptable, an active earth pressure coefficient (k_a) is recommended. However, if it is critical to limit the horizontal deformation, use of an earth pressure coefficient at rest (k_0) is recommended. Recommended earth pressure coefficients for the design of retaining structures are presented in the following Table 8.

Table 8: Recommended Earth Pressure Coefficients

Retained Material	Unit Weight (kN/m^3)	Active Earth Pressure Coefficient, K_a	At Rest Earth Pressure Coefficient, K_0	Ultimate Passive Earth Pressure (kPa)
Controlled Fill and Residual Soil up to depth of 3.0m	18.5	0.35	0.55	Ignore
Residual Soil at depth exceeding 3.0m	19.0	0.30	0.50	300.0

The above coefficients are based on the assumption that ground level behind the retaining structure is horizontal and the retained material is effectively drained. Additional earth pressures resulting from surcharge load (buildings, infrastructures, etc) on retained materials and groundwater pressure, if any should also be allowed for in design of retaining structures. The design of any retaining structure should also be checked for bearing capacity, overturning, sliding and overall stability of the slope.

Floor Slabs and Footings

Material at the base of 6.0m deep basement excavation where ground floor slabs will be founded is anticipated to be residual soil. Therefore, floor slabs for the proposed building may be constructed as ground bearing slabs or suspended slabs supported by footings designed in accordance with recommendations provided in this report.

We recommend a Modulus of Subgrade Reaction Value of 30kPa/mm for design of floor slabs bearing on residual soils at depth of 6.0m from existing ground surface.

Loading conditions from the proposed building are not known at this stage. However, we consider that the appropriate footings for the proposed building would comprise shallow footings (pad and strip) founded on residual soils at the base of basement excavation and/or deep footings (bored piers or screw piles) socketed into residual soils below the basement level. Deep footings might be required if footings are to support significant lateral and/or uplift pressures. Some footings may also be required to support ancillary structures. The recommended allowable bearing pressures for design of shallow and deep footings are presented below in Table 9.

Table 9 – Recommended Allowable Bearing Pressures

Founding Material	Founding Depth from Ground Surface (m)	Allowable Bearing Pressure (kPa)	Allowable Shaft Adhesion (kPa)
Residual Soil	0.0-6.0	150.0	Ignore
Residual Soil	6.5-8.0	300.0	5.0
Residual Soil	>8.0	600.0	50.0

Recommended allowable bearing pressure for footings founded at depth of 0.0-6.0m is based on the assumption that the footings are founded outside the zone of influence of basement excavation, which is defined by a line drawn at 1 vertical to 1 horizontal from the toe of excavation.

The recommended allowable shaft adhesions against uplift pressures are halves the shaft adhesions for compressive loads presented in Table 9.

For footings founded in controlled fill and residual soils the total settlements under the recommended allowable bearing pressures are estimated to be about 2.0% of minimum footing dimension. Differential settlements are estimated to be about half the estimated total settlements.

As depths to residual soils with the recommended allowable bearing pressures could vary across the site the founding depths of footings to be constructed will also vary. The depth ranges presented in Table 9 are measured from existing ground surface at borehole locations and are indicative only. Therefore, an experienced Geotechnical Engineer on the basis of assessment made during footing excavation or pier hole drilling should confirm founding levels during construction. The engineer should ensure that the design strength of bedrock is achieved.

General

This geotechnical investigation is carried out in general accordance with Australian Standard AS 1726 (Reference 1). The site is underlain by residual soil to depth exceeding 9.0m from existing ground surface. It is our assessment that the geotechnical conditions across the site do not impose any limitation on construction of proposed building provided design and construction of building are carried out in accordance with geotechnical recommendations provided in this report.

Assessments and recommendations presented in this report are based on site observation and information from only two boreholes. Although we believe that the sub-surface profile presented in this report is indicative of the general profile across the site, it is possible that the sub-surface profile across the site could differ from that encountered in the boreholes. Likewise, comments on depth to groundwater level are based on observation during field work. We recommend that this company is contacted for further advice if soils and groundwater level encountered during construction stage differ from those presented in this report.

If you have any questions, please do not hesitate to contact the undersigned.

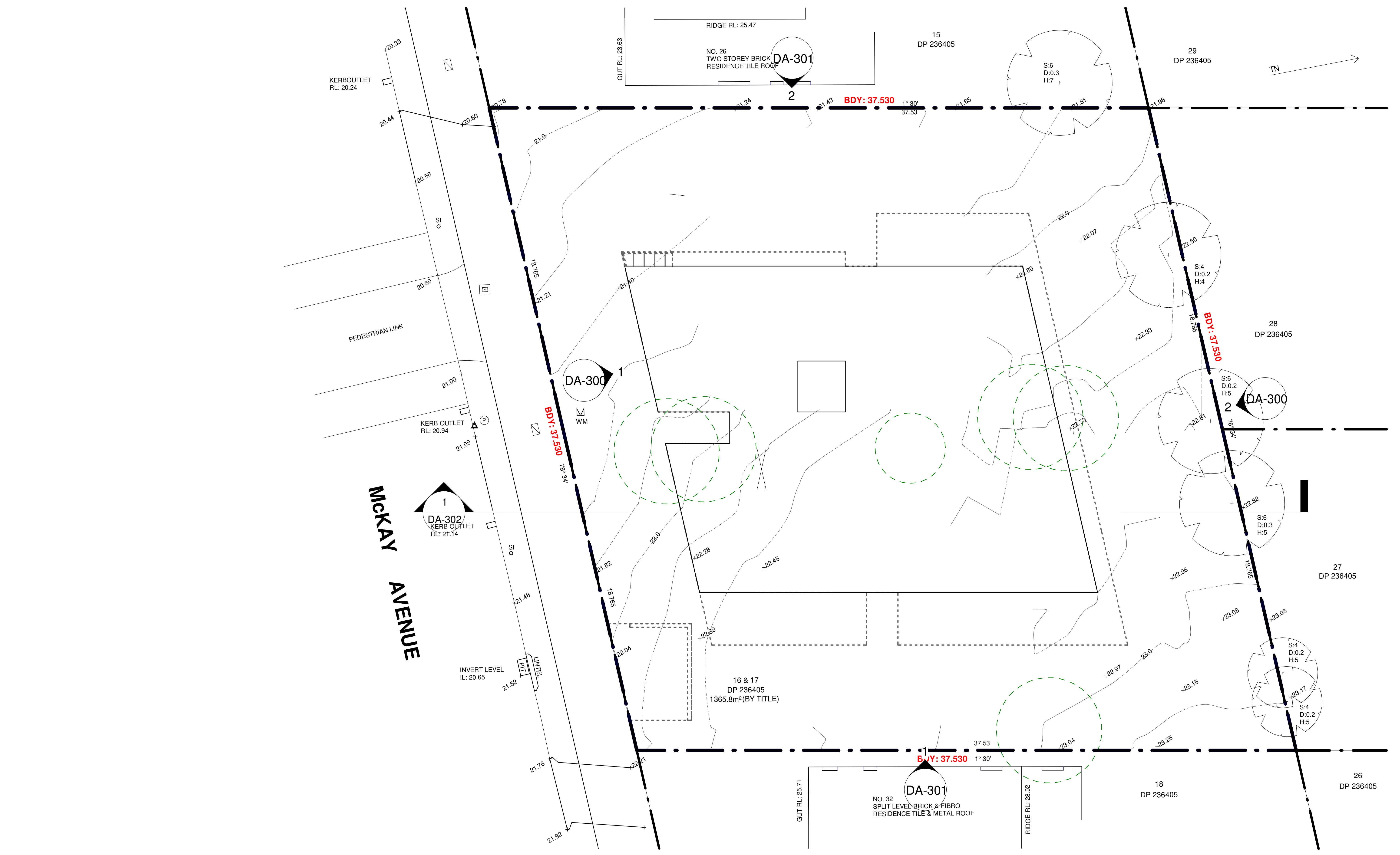
Yours faithfully
GEOTECHNIQUE PTY LTD

INDRA JWORCHAN
Principal Geotechnical Engineer

Attached
Proposed Development Plan
Drawing No 20192/1-AA1 Borehole Location Plan
Engineering Borehole Logs & Explanatory Notes
Laboratory Test Results

References

1. Australian Standard AS1726-2017, Geotechnical Site Investigation 2017.
2. Lillicrap, A and McGhie, S., Site Investigation for Urban Salinity, Department of Land and Water Conservation, 2002.
3. Australian Standard AS2870-2011, Residential Slabs and Footings, 2011.
4. Australian Standard AS2159-2009, Piling – Design and Installation, 2009.
5. Australian Standard AS3798-2007, Guidelines on Earthworks for Commercial and Residential Developments, 2007.



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NOM ARCH J LIGADU NSW ARB NO 8549

GENERAL NOTES

1. ALL DIMENSIONS AND FLOOR AREAS TO BE VERIFIED BUILDIER PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORK.
2. ANY DESCREPANCIESW ARE TO BE CONFIRMED BY THE DESIGNER.
3. LEVELS SHOWN ARE APPROXIMATE UNLESS ACCOMPANIED BY REDUCED LEVELS BY A REGISTERED SURVEYOR.
4. FIGURED DIMENSIONS ARE TO BE TAKEN IN PREFERENCE TO SCALING.
5. ALL BOUNDARY CLEARANCE MUST BE VERIFIED BY THE SURVEYOR PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORK.
6. WHERE ENGINEERING OR HYDRAULIC DRAWINGS ARE REQUIRED , SUCH MUST TAKE PREFERENCE TO THIS DRAWING.
7. STORMWATER TO BE CONNECTED AND DISCHARGED TO COUNCIL'S REQUIREMENTS AND TO AS 3500.3
8. ALL SERVICES TO BE LOCATED AND VERIFIED BY THE BUILDER WITH THE RELEVANT AUTHORITIES PRIOR TO THE COMMENCEMNET OF ANY BUILDING.

ISSUE	AMENDMENTS	DATE
P2	PRELIMINARY	-
P1	PRELIMINARY	-

ISSUE
P2

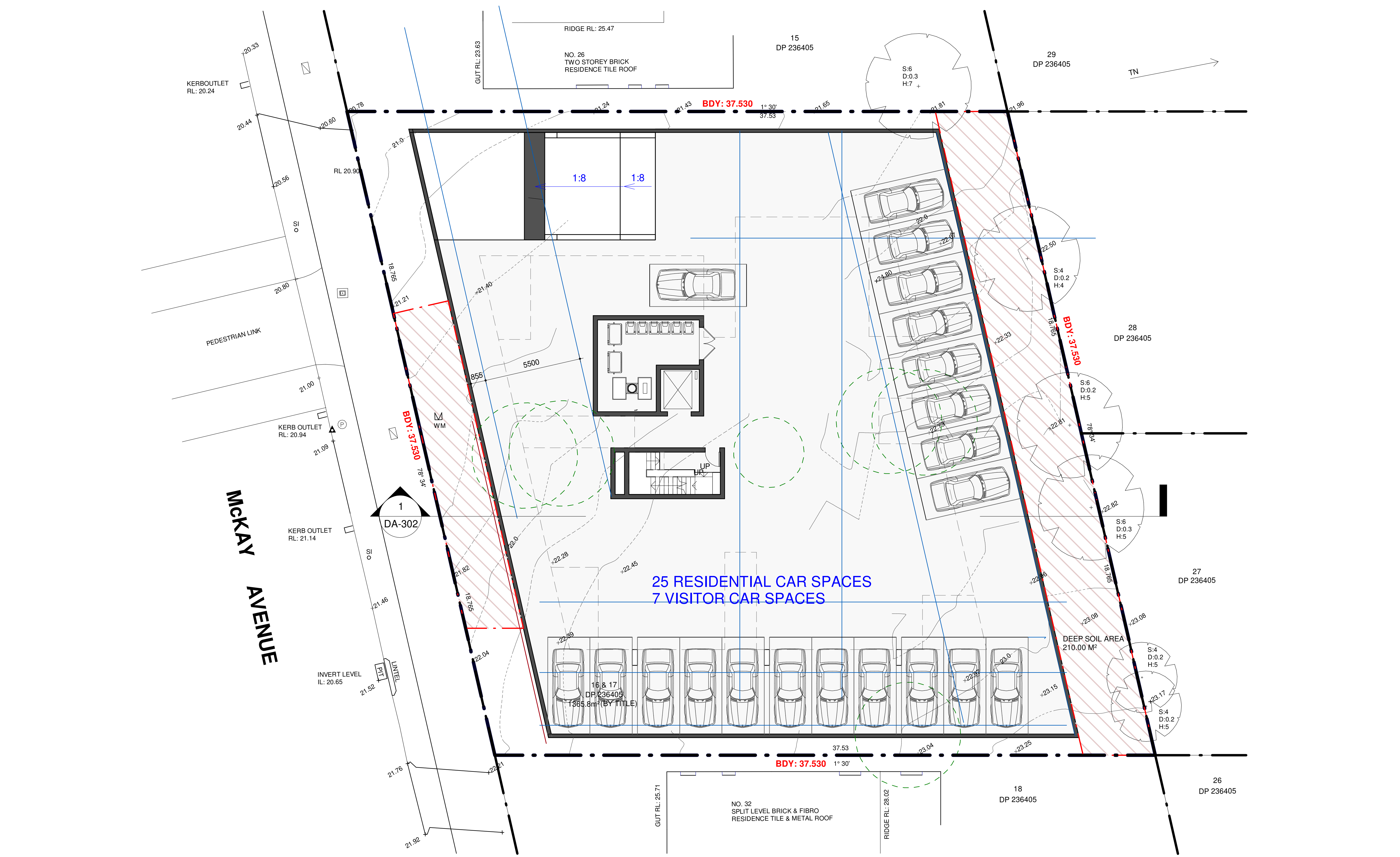
CLIENT
MCKAY
MOOREBANK

DRAWING NUMBER:
DA-200

DRAWING TITLE:
SITE-ROOF PLAN

SCALE
1 : 200 @ A3

PROJECT
RESIDENTIAL FLAT BUILDING DEVELOPMENT AT 28 & 30 MCKAY AVENUE MOOREBANK



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ISSUE	AMENDMENTS	DATE
P2	PRELIMINARY	-
P1	PRELIMINARY	-

ISSUE
P2

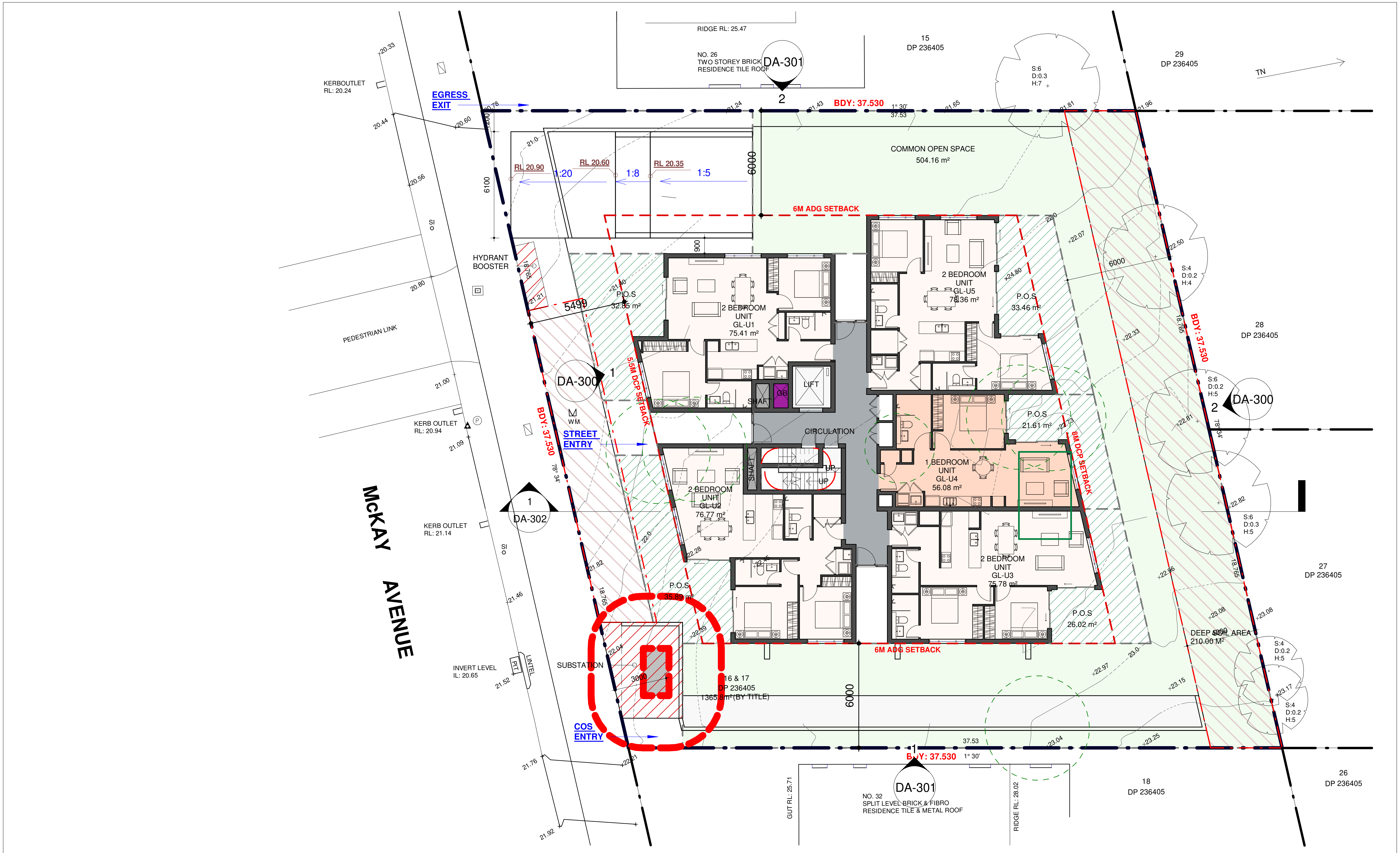
CLIENT
MCKAY
MOOREBANK

DRAWING NUMBER:
DA-201

DRAWING TITLE:
BASEMENT LEVEL 01 PLAN

SCALE
1 : 200 @ A3

PROJECT
RESIDENTIAL FLAT BUILDING DEVELOPMENT AT 28 & 30 MCKAY AVENUE MOOREBANK



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P2	PRELIMINARY	-
P1	PRELIMINARY	-

ISSUE

P2

CLIENT

MCKAY
MOOREBANK

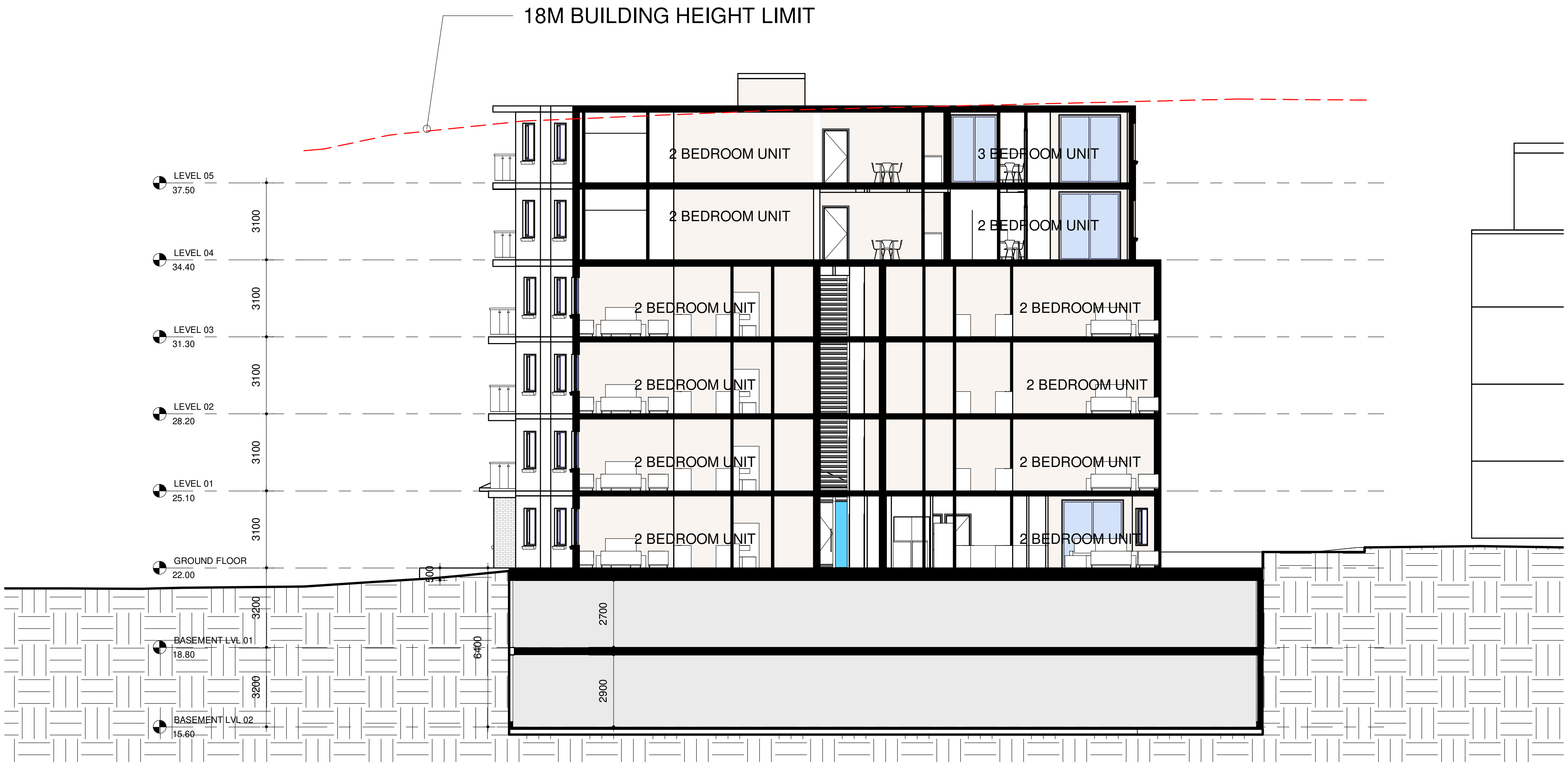
DRAWING NUMBER:
DA-203

DRAWING TITLE:
GROUND FLOOR PLAN

SCALE
1 : 200 @ A3

PROJECT

RESIDENTIAL FLAT BUILDING DEVELOPMENT AT 28 & 30 MCKAY AVENUE MOOREBANK



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DA-302

Section 1

1 : 200

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P2	PRELIMINARY	-
P1	PRELIMINARY	-

ISSUE
P2

CLIENT
MCKAY MOOREBANK

DRAWING NUMBER:
DA-302

DRAWING TITLE:
SECTION

SCALE
1 : 200 @ A3

PROJECT
RESIDENTIAL FLAT BUILDING DEVELOPMENT AT 28 & 30 MCKAY AVENUE MOOREBANK

N

LEGEND

- Borehole

Imagery ©2022 NearMap.com

0 4 8 12 16 20m

Scale 1:400

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

The Trustee for McKay Moorebank
Proposed Residential Development
28-30 McKay Avenue
Moorebank

Borehole Locations

Drawing No: 20192/1-AA1
Job No: 20192/1
Drawn By: MH
Date: 24 June 2022
Checked By: PP/IJ

File No: 20192-1
Layers: 0, AA1

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : The Trustee for McKay Moorebank
Project : Proposed Residential Development
Location : 28-30 McKay Avenue, Moorebank

Job No. : 20192/1
Borehole No. : BH1
Date : 20/06/2022
Logged/Checked by: PP/IJ

drill model and mounting : Edson 100 Truck Mounted **slope :** deg. **R.L. surface :**
hole diameter : 125 mm **bearing :** deg. **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			TOPSOIL: Silty Clay, low to medium plasticity, red brown, traces of fine grain sand and root fibres	M≈PL	S		
					N=12 4,6,6			CH	CLAY, high plasticity, red, traces of silt	M≈PL	St		Residual
					N=29 15.14.15	1		CI-CH	CLAY, medium to high plasticity, red mottled grey, traces of silt and sub-rounded fine to medium coarse gravel	M≈PL	VSt		
						2		CL-CI	Silty CLAY, low to medium plasticity, red	M≈PL			
								CL-CI	Silty CLAY, low to medium plasticity, red, traces of sand	M≈PL			
					N=26 8,13,13	3		CI-CH	Silty CLAY, medium to high plasticity, grey mottled red-brown, traces of sand	M≈PL	VSt-H		
	▶					4		CI-CH	Silty CLAY, medium to high plasticity, light brown mottled grey	M>PL			Seepage at 4.0m
					N=42 19,20,22			CL	Gravelly CLAY, low plasticity, red, fine grained, sub-angular/sub-rounded ironstone	M≈PL			
						5		CI-CH	CLAY, medium to high plasticity, red, traces of fine grained sub-angular/sub- rounded ironstone	M>PL			
					N= 9,16,10/ 35	6		CI-CH	Silty CLAY, low to medium plasticity, grey	M>PL			
						7		CI-CH	Silty CLAY, medium to high plasticity, reddish brown	M>PL			
					N= 15,9/50			CL	Silty CLAY, low plasticity, brown mottled grey	M<PL	H		
						8		CI-CH	Silty CLAY, medium to high plasticity, brown	M≈PL	H		
					N= 20,14/75	9		CI-CH	Silty CLAY, medium to high plasticity, brown, trace of sub-angular gravel	M>PL	H		
									Borehole BH1 terminated at 9.4m				

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : The Trustee for McKay Moorebank
Project : Proposed Residential Development
Location : 28-30 McKay Avenue, Moorebank

Job No. : 20192/1
Borehole No. : BH2
Date : 20/06/2022
Logged/Checked by: PP/IJ

drill model and mounting : Edson 100 Truck Mounted **slope :** deg. **R.L. surface :**
hole diameter : 125 mm **bearing :** deg. **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			TOPSOIL: Silty Clay, low to medium plasticity, black, with root fibres	M>PL	F		
					N=13 4,6,7			CH	Silty CLAY, high plasticity, brown mottled grey	M≈PL	St		Residual
								CH	Silty CLAY, high plasticity, red-yellow- brown	M≈PL	St		
						1		CH	Silty CLAY, high plasticity, red	M≈PL	VSt		
					N=32 6,15,17			CL-CI	CLAY, low to medium plasticity, grey mottled brown	M≈PL	H		
						2		CL-CI	CLAY, low to medium plasticity, brown mottled grey, traces of fine grained ironstone	M≈PL	VSt		
					N=24 6,9,15	3							
						4		CH	Silty CLAY, high plasticity, red-brown	M>PL			
					N= 14,16/ 110			CL-CI	Silty CLAY, low to medium plasticity, white-grey mottled brown	M<PL	VSt-H		
						5		CL-CI	Silty CLAY, medium to high plasticity, red-brown, traces of fine to medium grained sub-angular ironstone	M>PL			
					N=44 10,20,24	6		CL	Silty CLAY, low plasticity, grey-white mottled brown	M<PL			
								CI-CH	Silty CLAY, medium to high plasticity, brown mottled grey, traces of fine grained sub-angular gravel	M>PL			
					N=51 10,26,25	7		CL	Silty CLAY, low plasticity, mottled grey and yellow	M<PL			
						8		CH	Silty CLAY, high plasticity, light brown	M>PL			
								CI-CH	Silty CLAY, medium to high plasticity, light brown, traces of fine grained gravel	M≈PL			
	DRY				N= 17/90	9		CL	Silty CLAY, low plasticity, brown, traces of fine to coarse gravel	M<PL			
									Borehole BH2 terminated at 9.3m				

Log Symbols & Abbreviations (Non-cored Borehole Log)

<table>
<tr><th>Log Column</th><th colspan="2">Symbol/Value</th><th colspan="3">Description</th></tr>
<tr><td>Drilling Method</td><td colspan="2">V-bit
TC-bit
RR
DB
BB</td><td colspan="3">Hardened steel ‘V’ shaped bit attached to auger
Tungsten Carbide bit attached to auger
Tricone (Rock Roller) bit
Drag bit
Blade bit</td></tr>
<tr><td>Groundwater</td><td colspan="2">Dry
▼
▶</td><td colspan="3">Groundwater not encountered to the drilled or auger refusal depth
Groundwater level at depths shown on log
Groundwater seepage at depths shown on log</td></tr>
<tr><td>Environment Sample</td><td colspan="2">GP
G
P</td><td colspan="3">Glass bottle and plastic bag sample over depths shown on log
Glass bottle sample over depths shown on log
Plastic bag sample over depths shown on log</td></tr>
<tr><td>PID Reading</td><td colspan="2">100</td><td colspan="3">PID reading in ppm</td></tr>
<tr><td>Geotechnical Sample</td><td colspan="2">DS
DB
U_{50}</td><td colspan="3">Disturbed Small bag sample over depths shown on log
Disturbed Bulk sample over depths shown on log
Undisturbed 50mm tube sample over depths shown on log</td></tr>
<tr><td rowspan="2">Field Test</td><td colspan="2">N=10
3,5,5

N=R
10,15/100</td><td colspan="3">Standard Penetration Test (SPT) ‘N’ value. Individual numbers indicate blows per 150mm penetration.

‘R’ represents refusal to penetration in hard/very dense soils or in cobbles or boulders.
The first number represents10 blows for 150mm penetration whereas the second number represents 15 blows for 100mm penetration where SPT met refusal</td></tr>
<tr><td>DCP/PSP</td><td>5
6
R/10</td><td colspan="3">Dynamic Cone Penetration (DCP) or Perth Sand Penetrometer (PSP). Each number represents blows per 100mm penetration. ‘R/10’ represents refusal after 10mm penetration in hard/very dense soils or in gravels or boulders.</td></tr>
<tr><td>Classification</td><td colspan="2">GP
GW
GM
GC
SP
SW
SM
SC
ML
MI
MH
CL
CI
CH</td><td colspan="3">Poorly Graded GRAVEL
Well graded GRAVEL
Silty GRAVEL
Clayey GRAVEL
Poorly graded SAND
Well graded SAND
Silty SAND
Clayey SAND
SILT / Sandy SILT / clayey SILT, low plasticity
SILT / Sandy SILT / clayey SILT, medium plasticity
SILT / Sandy SILT / clayey SILT, high plasticity
CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, low plasticity
CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, medium plasticity
CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, high plasticity</td></tr>
<tr><td>Moisture Condition
Cohesive soils

Cohesionless soils</td><td colspan="2">
M<PL
M=PL
M>PL

D
M
W</td><td colspan="3">
Moisture content less than Plastic Limit
Moisture content equal to Plastic Limit
Moisture content to be greater than Plastic Limit

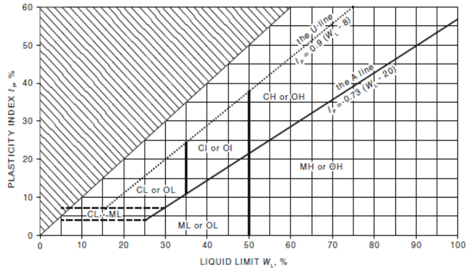
Dry - Runs freely through hand
Moist - Tends to cohere
Wet - Tends to cohere</td></tr>
<tr><td>Consistency
Cohesive soils</td><td colspan="2">
VS
S
F
St
VSt
H</td><td>Term

Very Soft
Soft
Firm
Stiff
Very Stiff
Hard</td><td>Undrained shear strength, C_u (kPa)
≤12
>12 & ≤25
>25 & ≤50
>50 & ≤100
>100 & ≤200
>200</td><td>Hand Penetrometer (Qu)
<25
25 – 50
50 – 100
100 – 200
200 – 400
>400</td></tr>
<tr><td>Density Index
Cohesionless soils</td><td colspan="2">
VL
L
M
D
VD</td><td>Term
Very Loose
Loose
Medium Dense
Dense
Very Dense</td><td>Density Index, I_D (%)
≤15
>15 & ≤35
>35 & ≤65
>65 & ≤85
>85</td><td>SPT ‘N’ (blows/300mm)
≤5
>5 & ≤10
>10 & ≤30
>30 & ≤50
>50</td></tr>
<tr><td>Hand Penetrometer</td><td colspan="2">100
200</td><td colspan="3">Unconfined compressive strength (q_u) in kPa determined using pocket penetrometer, at depths shown on log</td></tr>
<tr><td>Remarks</td><td colspan="2">
Residual
Alluvium
Colluvial
Aeolian
Marine</td><td colspan="3">Geological origin of soils
Residual soils above bedrock
River deposited Alluvial soils
Gravity deposited Colluvial soils
Wind deposited Aeolian soils
Marine Soils</td></tr>
</table>

AS1726 : 2017– Unified Soil Classification System

Major Divisions		Particle size (mm)	Group Symbol	Typical Names	Field Identifications Sand and Gravels	Laboratory classification					
						Use the gradation of material passing 63mm for classification of fractions according to the criteria given in 'Major Divisions'	% Fines (2)	Plasticity of Fine Fraction	$C_u = D_{60}/D_{10}$	$C_c = (D_{30})^2/(D_{10}D_{60})$	Notes
OVERSIZE	BOULDERS	>200									
	COBBLES	63									
COARSE GRAINED SOIL (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	Coarse 19	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength		≤5	-	>4	between 1 and 3	1. Identify lines by the method given for fine grained soils 2. Borderline classifications occur when the percentage of fines (fraction smaller than 0.075mm size) is greater than 5% and less than 12%. Borderline classifications require the use of dual symbols e.g. SP-SM, GW-GC
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength		≤5	-	Fails to comply with above		
		Medium 6.7	GM	Silty gravels, gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength		≥12	Below 'A' line or I_p<4	-	-	
		Fine 2.36	GC	Clayey gravels, gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength		≥12	Above 'A' line or I_p>7	-	-	
	SAND (more than half of coarse fraction is smaller than 2.36mm)	Coarse 0.6	SW	Well-graded sands, gravelly sands, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength		≤5	-	>6	between 1 and 3	
		Medium 0.21	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength		≤5	-	Fails to comply with above		
			SM	Silty sands, sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength		≥12	Below 'A' line or I_p<4	-	-	
		Fine 0.075	SC	Clayey sand, sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength		≥12	Above 'A' line of I_p>7	-	-	

Major Divisions		Group Symbol	Typical Names	Dry Strength	Dilatancy	Toughness		Plasticity of Fine Fraction
FINE GRAINED SOIL (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit<50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	None to low	Slow to rapid	Low	More than 35% passing 0.075mm	Below 'A' line
		CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium to high	None to very slow	Medium		Above 'A' line
		OL	Organic silts and organic silty clays of low plasticity	Low to medium	Slow	Low		Below 'A' line
	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit>50%	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Low to medium	None to slow	Low to medium		Below 'A' line
		CH	Inorganic clays of medium to high plasticity, fat clays	High to very high	None	High		Above 'A' line
		OH (1)	Organic clays of medium to high plasticity, organic silts	Medium to high	None to very slow	Low to medium		Below 'A' line
	HIGHLY ORGANIC SOILS	Pt (1)	Peat and highly organic soils	Identified by colour, odour, spongy feel and generally by fibrous texture			Effervesces with H_2O_2	



Log Symbols & Abbreviations (Cored Borehole Log)

Log Column	Symbol / Abbreviation	Description	
Core Size		Nominal Core Size (mm)	
	NQ	47	
	NMLC	52	
	HQ	63	
Water Loss	——◀	Complete water loss	
	——◁	Partial water loss	
Weathering (AS1726:2017)	RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported
	XW	Extremely Weathered	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
	HW	Highly Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
	MW	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock
	SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change in strength from fresh rock
	FR	Fresh	Rock shows no sign of decomposition of individual minerals or colour changes
		Note : Where it is not possible to distinguish between HW and MW rock the term Distinctly Weathered (DW) may be used. DW is defined as 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased by deposition of weathering products in pores'	
Strength (AS1726:2017)		**Term**	**Point Load Strength Index (I_{s50}, MPa)**
	VL	Very Low	≥0.03 ≤0.1
	L	Low	>0.1 ≤0.3
	M	Medium	>0.3 ≤1
	H	High	>1 ≤3
	VH	Very High	>3 ≤10
	EH	Extremely High	>10
Defect Spacing		**Description**	**Spacing (mm)**
		Extremely closely spaced	<20
		Very closely spaced	20 to 60
		Closely spaced	60 to 200
		Medium spaced	200 to 600
		Widely spaced	600 to 2000
		Very widely spaced	2000 to 6000
		Extremely widely spaced	>6000
Defect Description (AS1726:2017) Type			
	Pt	Parting	
	Jo	Joint	
	Sh	Sheared Surface	
	Sz	Sheared Zone	
	Ss	Sheared Seam	
	Cs	Crushed Seam	
	Is	Infilled Seam	
	Ews	Extremely Weathered Seam	
Macro-surface geometry	St	Stepped	
	Cu	Curved	
	Un	Undulating	
	Ir	Irregular	
	Pl	Planar	
Micro-surface geometry	Vro	Very Rough	
	Ro	Rough	
	Sm	Smooth	
	Po	Polished	
	Sl	Slickensided	
Coating or infilling	cn	clean	
	sn	stained	
	vn	veneer	
	cg	coating	

AS1726 – Identification of Sedimentary Rocks for Engineering Purposes

Grain Size mm		Bedded rocks (mostly sedimentary)						
More than 20	20	Grain Size Description			At least 50% of grains are of carbonate		At least 50% of grains are of fine-grained volcanic rock	
	6 2	RUDACEOUS		CONGLOMERATE Rounded boulders, cobbles and gravel cemented in a finer matrix Breccia Irregular rock fragments in a finer matrix	LIMESTONE and DOLOMITE (undifferentiated)	Calcirudite	Fragments of volcanic ejecta in a finer matrix Rounded grains AGGLOMERATE Angular grains VOLCANIC BRECCIA	SALINE ROCKS Halite Anhydrite
	0.6	ARENACEOUS	Coarse	SANDSTONE Angular or rounded grains, commonly cemented by clay, calcite or iron minerals		Calcarenite	Cemented volcanic ash TUFF	Gypsum
	0.2		Medium	Quartzite Quartz grains and siliceous cement				
	0.06		Fine	Arkose Many feldspar grains Greywacke Many rock chips				
	0.002	ARGILLACEOUS		MUDSTONE | SILTSTONE Mostly silt	Calcareous Mudstone	Calcisiltite (CHALK)	Fine-grained TUFF	
	Less than 0.002			SHALE Fissile | CLAYSTONE Mostly clay		Calcilutite (CHALK)	Very fine-grained TUFF	
Amorphous or crypto-crystalline				Flint: occurs as hands of nodules in the chalk Chert: occurs as nodules and beds in limestone and calcareous sandstone				COAL LIGNITE
				Granular cemented – except amorphous rocks				
				SILICEOUS	CALCAREOUS		SILICEOUS	CARBONACEOUS
				SEDIMENTARY ROCKS Granular cemented rocks vary greatly in strength, some sandstones are stronger than many Igneous rocks. Bedding may not show in hand specimens and is best seen in outcrop. Only sedimentary rocks, and some metamorphic rocks derived from them, contain fossils Calcareous rocks contain calcite (calcium carbonate) which effervesces with dilute hydrochloric acid				

AS1726 – Identification of Metamorphic and Igneous Rocks for Engineering Purposes

Obviously foliated rocks (mostly metamorphic)		Rocks with massive structure and crystalline texture (mostly igneous)						Grain size (mm)
Grain size description			Grain size description	Pegmatite			Pyrosenite	More than 20 20
COARSE	GNEISS Well developed but often widely spaced foliation sometimes with schistose bands Migmatite Irregularly foliated: mixed schists and gneisses	MARBLE QUARTZITE Granulite HORNFELS	COARSE	GRANITE These rocks are sometimes phorphyritic and are then described, for example, as porphyritic granite	Diorite	GABBRO	Peridorite	6 2
MEDIUM	SCHIST Well developed undulose foliation; generally much mica	Amphibolite Serpentine	MEDIUM	Micorgranite These rocks are sometimes phorphyritic and are then described as porphyries	Microdiorite	Dolerite		0.6 0.2 0.06
FINE	PHYLLITE Slightly undulose foliation; sometimes 'spotted' SLATE Well developed plane cleavage (foliation)		FINE	RHYOLITE These rocks are sometimes phorphyritic and are then described as porphyries	ANDESITE	BASALT		0.002 Less than 0.002
	Mylonite Found in fault zones, mainly in igneous and metamorphic areas			Obsidian	Volcanic glass			Amorphous or cryptocrystallin e
CRYSTALLINE				Pale<--->Dark				
SILICEOUS		Mainly SILICEOUS		ACID Much quartz	INTERMEDIATE Some quartz	BASIC Little or no quartz	ULTRA BASIC	
METAMORPHIC ROCKS Most metamorphic rocks are distinguished by foliation which may impart fissility. Foliation in gneisses is best observed in outcrop. Non-foliated metamorphics are difficult to recognize except by association. Any rock baked by contact metamorphism is described as 'hornfels' and is generally somewhat stronger than the parent rock Most fresh metamorphic rocks are strong although perhaps fissile			IGNEOUS ROCKS Composed of closely interlocking mineral grains. Strong when fresh; not porous Mode of occurrence : 1 Batholith; 2 Laccoliths; 3 Sills; 4 Dykes; 5 Lava Flows; 6 Veins					

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Indra Jworchan	Manager	Huong Crawford
Client	Geotechnique	Laboratory	SGS Alexandria Environmental
Address	P.O. Box 880 NSW 2751	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
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Email	indra.jworchan@geotech.com.au	Email	au.environmental.sydney@sgs.com
Project	**20192/1 McKay Ave Moorebank/Liverpool**	SGS Reference	**SE233384 R0**
Order Number	**20192/1**	Date Received	22/6/2022
Samples	6	Date Reported	29/6/2022

COMMENTS

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

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Shane MCDERMOTT
Inorganic/Metals Chemist

Conductivity and TDS by Calculation - Soil [AN106] Tested: 28/6/2022

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.95 21/6/2022 SE233384.001	BH1 SOIL 3.0-3.45 21/6/2022 SE233384.002	BH1 SOIL 6.0-6.45 21/6/2022 SE233384.003	BH2 SOIL 1.5-1.95 21/6/2022 SE233384.004	BH2 SOIL 4.5-4.95 21/6/2022 SE233384.005
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	150	25	95	86	17

PARAMETER	UOM	LOR	BH2 SOIL 7.5-7.95 21/6/2022 SE233384.006
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	540

pH in soil (1:2) [AN101] Tested: 28/6/2022

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.95 21/6/2022 SE233384.001	BH1 SOIL 3.0-3.45 21/6/2022 SE233384.002	BH1 SOIL 6.0-6.45 21/6/2022 SE233384.003	BH2 SOIL 1.5-1.95 21/6/2022 SE233384.004	BH2 SOIL 4.5-4.95 21/6/2022 SE233384.005
pH (1:2)	pH Units	-	4.6	5.1	5.3	4.4	5.4

PARAMETER	UOM	LOR	BH2 SOIL 7.5-7.95 21/6/2022 SE233384.006
pH (1:2)	pH Units	-	5.3

Conductivity (1:2) in soil [AN106] Tested: 28/6/2022

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.95 21/6/2022 SE233384.001	BH1 SOIL 3.0-3.45 21/6/2022 SE233384.002	BH1 SOIL 6.0-6.45 21/6/2022 SE233384.003	BH2 SOIL 1.5-1.95 21/6/2022 SE233384.004	BH2 SOIL 4.5-4.95 21/6/2022 SE233384.005
Conductivity (1:2) @25 C*	µS/cm	1	180	55	200	100	36
Resistivity (1:2)*	ohm cm	-	5700	18000	5000	9600	28000

PARAMETER	UOM	LOR	BH2 SOIL 7.5-7.95 21/6/2022 SE233384.006
Conductivity (1:2) @25 C*	µS/cm	1	820
Resistivity (1:2)*	ohm cm	-	1200

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography [AN245] Tested: 28/6/2022

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.95 21/6/2022 SE233384.001	BH1 SOIL 3.0-3.45 21/6/2022 SE233384.002	BH1 SOIL 6.0-6.45 21/6/2022 SE233384.003	BH2 SOIL 1.5-1.95 21/6/2022 SE233384.004	BH2 SOIL 4.5-4.95 21/6/2022 SE233384.005
Chloride	mg/kg	0.25	43	3.3	38	3.8	1.7
Sulfate	mg/kg	0.5	98	29	73	84	19

PARAMETER	UOM	LOR	BH2 SOIL 7.5-7.95 21/6/2022 SE233384.006
Chloride	mg/kg	0.25	490
Sulfate	mg/kg	0.5	140

Moisture Content [AN002] Tested: 27/6/2022

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.95 21/6/2022 SE233384.001	BH1 SOIL 3.0-3.45 21/6/2022 SE233384.002	BH1 SOIL 6.0-6.45 21/6/2022 SE233384.003	BH2 SOIL 1.5-1.95 21/6/2022 SE233384.004	BH2 SOIL 4.5-4.95 21/6/2022 SE233384.005
% Moisture	%w/w	1	17.5	13.7	14.1	16.3	12.8

PARAMETER	UOM	LOR	BH2 SOIL 7.5-7.95 21/6/2022 SE233384.006
% Moisture	%w/w	1	14.9

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:2 and the pH determined and reported on the extract after 1 hour extraction (pH 1:2) or after 1 hour extraction and overnight aging (pH (1:2) aged). Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN106	Resistivity of the extract is reported on the extract basis and is the reciprocal of conductivity. Salinity and TDS can be calculated from the extract conductivity and is reported back to the soil basis.
AN245	Anions by Ion Chromatography: A water sample or extract is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

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

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

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

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

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

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

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

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

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

STATEMENT OF QA/QC PERFORMANCE

SE233384 R0

CLIENT DETAILS

Contact	Indra Jworchan	Manager	Huong Crawford
Client	Geotechnique	Laboratory	SGS Alexandria Environmental
Address	P.O. Box 880 NSW 2751	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
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Facsimile	02 4722 6161	Facsimile	+61 2 8594 0499
Email	indra.jworchan@geotech.com.au	Email	au.environmental.sydney@sgs.com

LABORATORY DETAILS

Project	**20192/1 McKay Ave Moorebank/Liverpool**	SGS Reference	**SE233384 R0**
Order Number	**20192/1**	Date Received	22 Jun 2022
Samples	6	Date Reported	29 Jun 2022

COMMENTS

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

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

All Data Quality Objectives were met with the exception of the following:

Analysis Date	Conductivity and TDS by Calculation - Soil	6 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	6 Soil
Date documentation received	22/6/2022	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	16°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

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

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

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE233384.001	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022
BH1	SE233384.002	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022
BH1	SE233384.003	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022
BH2	SE233384.004	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022
BH2	SE233384.005	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022
BH2	SE233384.006	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE233384.001	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†
BH1	SE233384.002	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†
BH1	SE233384.003	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†
BH2	SE233384.004	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†
BH2	SE233384.005	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†
BH2	SE233384.006	LB252036	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022†

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE233384.001	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022
BH1	SE233384.002	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022
BH1	SE233384.003	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022
BH2	SE233384.004	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022
BH2	SE233384.005	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022
BH2	SE233384.006	LB251937	21 Jun 2022	22 Jun 2022	05 Jul 2022	27 Jun 2022	02 Jul 2022	29 Jun 2022

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE233384.001	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022
BH1	SE233384.002	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022
BH1	SE233384.003	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022
BH2	SE233384.004	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022
BH2	SE233384.005	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022
BH2	SE233384.006	LB252020	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	29 Jun 2022	28 Jun 2022

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE233384.001	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022
BH1	SE233384.002	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022
BH1	SE233384.003	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022
BH2	SE233384.004	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022
BH2	SE233384.005	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022
BH2	SE233384.006	LB252023	21 Jun 2022	22 Jun 2022	28 Jun 2022	28 Jun 2022	26 Jul 2022	29 Jun 2022

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

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

No surrogates were required for this job.

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

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

Conductivity (1:2) in soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB252020.001	Conductivity (1:2) @25 C*	µS/cm	1	<1

Conductivity and TDS by Calculation - Soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB252036.001	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	0.14

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography — Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB252023.001	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	0.5	<0.5

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

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

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

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

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

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE233384.001	LB252020.022	Conductivity (1:2) @25 C*	µS/cm	1	180	180	31	2
		Resistivity (1:2)*	ohm cm	-	5700	5600	30	2
SE233384.006	LB252020.021	Conductivity (1:2) @25 C*	µS/cm	1	820	920	30	12
		Resistivity (1:2)*	ohm cm	-	1200	1100	31	12

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE233404.001	LB251937.011	% Moisture	%w/w	1	12.9	12.2	38	6

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE233384.001	LB252020.022	pH (1:2)	pH Units	-	4.6	4.5	32	0
SE233384.006	LB252020.021	pH (1:2)	pH Units	-	5.3	5.4	32	2

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE233384.001	LB252023.022	Chloride	mg/kg	0.25	43	40	31	5
		Sulfate	mg/kg	0.5	98	110	32	8
SE233384.006	LB252023.021	Chloride	mg/kg	0.25	490	550	30	12
		Sulfate	mg/kg	0.5	140	140	31	3

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

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

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB252020.002	Conductivity (1:2) @25 C*	µS/cm	1	290	303	70 - 130	97

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB252036.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	97

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB252020.003	pH (1:2)	pH Units	-	7.4	7.415	98 - 102	100

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB252023.002	Chloride	mg/kg	0.25	38	40	70 - 130	95
	Sulfate	mg/kg	0.5	38	40	70 - 130	96

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

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

No matrix spikes were required for this job.

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499
ATTN: Ms Emily Yin

Sampling By: pp
Job No 20192/1
Project: Proposed Residential Development
Project Manager: IJ
Location: 28-30 McKay Avenue, Moorebank/liverpool

	Sampling details					Results required by:							
	Location	Depth	Soil	Water	EC (1:5)	Aggressivity						Notes	Keep Sample
1	BH1	0.5-0.95	DSP		✓	✓							✓
2	BH1	3.0-3.45	DSP		✓	✓						Aggressivity Test includes	✓
3	BH1	6.0-6.45	DSP		✓	✓						pH, chloride, sulphate and resistivity	✓
4	BH2	1.5-1.95	DSP		✓	✓							✓
5	BH2	4.5-495	DSP		✓	✓							✓
6	BH2	7.5-7.95	DSP		✓	✓							✓

SGS EHS Sydney COC
SE233384

Full Excel Output File Required

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	
Indra Jworchan		21/06/2022	M.Baslin		22-6-22 9:00

Legend:

WG	USG Undisturbed soil sample (glass j	DSP Disturbed soil sample (small plastic bag)	* Purge & Trap
WP	DSG Disturbed soil sample (glass jar)	✓ Test required	# Geotechnique Screen

SAMPLE RECEIPT ADVICE

SE233384

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**20192/1 McKay Ave Moorebank/Liverpool**
Order Number	**20192/1**
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 22/6/2022
Report Due	Wed 29/6/2022
SGS Reference	**SE233384**

SUBMISSION DETAILS

This is to confirm that 6 samples were received on Wednesday 22/6/2022. Results are expected to be ready by COB Wednesday 29/6/2022. Please quote SGS reference SE233384 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	6 Soil
Date documentation received	22/6/2022	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	16°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

COMMENTS

CLIENT DETAILS

Client Geotechnique

Project 20192/1 McKay Ave Moorebank/Liverpool

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity (1:2) in soil	Conductivity and TDS by Calculation - Soil	Moisture Content	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion
001	BH1 0.5-0.95	2	1	1	1	2
002	BH1 3.0-3.45	2	1	1	1	2
003	BH1 6.0-6.45	2	1	1	1	2
004	BH2 1.5-1.95	2	1	1	1	2
005	BH2 4.5-4.95	2	1	1	1	2
006	BH2 7.5-7.95	2	1	1	1	2

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