PROVINCIAL GEOTECHNICAL PTY. LTD.

CONSULTING GEOLOGISTS

A.B.N. 88 090 400 114

GEOTECHNICAL SITE INVESTIGATION REPORT

Site Address: Rockbank School,
Innovation Avenue,
ROCKBANK, VICTORIA

Client: ROCKBANK SCHOOL C/- LAW ARCHITECTS
THE OLD DAIRY
2/45 WATKINS STREET
FITZROY NORTH VIC 3068

Date: 2nd February 2023

File No: 20870A

Author: Andrew P Redman

Contact: Provincial Geotechnical Pty Ltd
E: admin@pgvic.com.au
T: 03 5223 1566

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LIST OF APPENDICES

1. INTRODUCTION

Provincial Geotechnical Pty Ltd has been commissioned to provide a Geotechnical Site Investigation report for the nominated address. We understand that construction of a new school campus is proposed.

The Property Report and Masterplan are appended (Appendices i & ii).

The site investigation hereby reported has been carried out with regard to the information supplied to us by our client or client's agents at the date of our commission. Should the client or his agent have omitted to supply us with relevant information or make significant changes to the building type, building envelope, or site our report may be irrelevant and/or inappropriate. No responsibility will be accepted by us for the consequences of such action. The client should acknowledge that this is a Geotechnical Site Investigation report specifically prepared for the proposed building development at the identified location and does not extend beyond that brief.

All site works related to the building project must be undertaken to comply with the relevant Codes and Standards and must not potentially adversely impact upon the building envelope. Provincial Geotechnical Pty Ltd accepts no liability or responsibility for any site works outside of our specific commission.

2. EXECUTIVE SUMMARY

As a result of our field investigation we can confirm that apart from the Western allotment, that contains an excavated dam, with the spoil used as dam banks the remainder of the site is considered 'greenfield'.

Therefore, both civil and structural design and construction should be conventional in its execution.

Regarding the existing dam site, this will naturally require backfilling and reinstatement and any construction in this area will require the use of a piled footing penetrating all fill and softened ground to be founded in verified stiff clay or on Basalt bedrock.

Any civil works within this dam location will require special treatment to ensure that the subgrade is brought up to a standard that will allow long term effectiveness of any proposed pavements.

3. SITE CLASSIFICATION

The scope of AS2870-2011 allows for the classification of sites for some nonresidential infrastructure. However, the proposed development appears to fall outside the scope of the code and the design should be based on engineering principles.

This site would normally be classified as CLASS P (PROBLEM SITE) as it is a developed site, noting the underlying soil profile is very highly reactive CLASS H2 (Highly Reactive Clay).

Site Classification is based upon Section 2 Clauses 2.2 of AS2870 - 2011. The method adopted for clay sites primarily includes 2.2.1 (a). Clause 2.2.1 (b) can be adopted under instruction from the client.

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3. SITE CLASSIFICATION CONTINUED

Classification of the site has taken into account the following:

- Identification of the sub soil profile.
- Field classification of the soil type and plasticity.

4. SITE SOIL CHARACTERISTICS SUMMARY

SITE FILLING:
Up to 100mm of fill encountered at Test Sites 25 and 26 (dam banks). The fill is directly the material that has been excavated from the dam and there is no evidence that it has been sourced from an off-site location.

UNSUITABLE FOUNDATION CONDITIONS:
The fill present is not considered a suitable foundation material.
Top soil at time of testing was in a satisfactory condition for proposed footing system.
Beam deepening to the underlying clay may be required if the integrity of these soils cannot be maintained.

PERCHED WATER:
The installation of suitable site drainage should ensure that destablisation of the foundation soils does not occur.

GROUND WATER:
None encountered.

BEDROCK:
Encountered at depth. Refer to borelogs.

FLOATERS:
Encountered at depth. Refer to borelogs.

ABNORMAL MOISTURE CONDITIONS:
No vegetation or infrastructure on site. Minor future abnormal moisture conditions possible from street trees.

GEOLOGY:
Quaternary Volcanics (Mapcode Qno1).
Identification assisted by reference to appropriate geological survey map. This report contains a geology map obtained from the Department of Natural Resources Geovic website including the site under investigation. It is provided as a guide to mapping of the local geology only and not to be used as a basis for design (Appendix iii).

SOIL TYPES:
NATURAL:
Silty clay topsoils overlying clays, typical of area's geology. Clays of the above volcanic origin are generally considered highly-very highly reactive.

FILL:
Silty clay/clay mix.

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5. TERRAIN EVALUATION SUMMARY

CLIMATIC ZONE: CZ 3

SITE LOCATION: West side of Innovation Drive and North side of Fuchsia Drive.

SLOPE: Virtually flat over greenfield section of site. Excavated dam requires reinstatement.

DRAINAGE: SURFACE: Fair/Poor.
SUB-SURFACE: Fair/Poor. Installation of cut off drains may be required.

EARTHQUAKE CLASS: Australian Standard AS1170.4-2007, 'Minimum Design Loads on Structures, Part 4: 'Site Sub-Soil Class' outlines the methods for assigning the site's Sub-soil Class. Based on the anticipated stratigraphy, Table 4.1 'Maximum Depth Limits for Sub-Soil Class C' and Table 3.2 'Hazard Factor (Z) For Specific Australian Locations' of the standard, we recommend the following Hazard Factor and Sub-Soil Class are adopted:
SUB-SOIL CLASS: Class C_e – Shallow soil site
HAZARD FACTOR (Z): 0.10

PROXIMATE VEGETATION:

GRASSES: Present. Thick.
SHRUBS: None present.
TREES: None present.

INFRASTRUCTURE WITHIN OR IN PROXIMITY TO BUILDING ENVELOPE: No: predominantly greenfield site apart from existing dam on Western Section.

NOTE: The designing engineer should review available aerial mapping data and/or available site context information to assess the current or pre-existing conditions in respect to design considerations for Abnormal Moisture Conditions.

This report provides photographic evidence of either existing or pre-existing site context (Refer to Appendix iv).

6. TESTING PROGRAMME

Twenty-six (26) test sites were established and excavated using a 100mm hydraulic earth auger at the approximate location shown on the appended Test Site Location Plan (Appendix v).

Where soil conditions dictated, investigation was assisted by the use of a penetrometer to confirm profile depth and condition. Where penetrometer testing is not undertaken the soil profile depths and conditions may be extrapolated from our knowledge of the geology and soils in this area.

Disturbed samples were collected and hand classified.

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6. TESTING PROGRAMME CONTINUED

A vane shear apparatus was used to determine the strength of all cohesive soils in conjunction with tactile assessment.

Site history: The client is advised that site classification can be altered by past activities on this site not known at the time of our site investigation and report preparation. The client is advised that failure to investigate and report past history may invalidate the report.

7. FINDINGS

The soil profile encountered is shown on the appended borelog sheet (Appendix vi).

The cohesion value obtained is quoted on the log sheet.

The volcanic nature of the Quaternary aged soils indicates a high-very high seasonal heave potential.

The client should recognise that the soil profiles encountered during our testing are deemed representative of the building envelope for the purpose of classifications. The client should be aware however that in some cases soil conditions can change dramatically over short distances and although all effort is made to determine possible soil profile variations, no responsibility is taken for any undetected variations.

The most careful exploration programme may not locate all soil profile variations due to time and economic restraints.

If footing excavations reveal soil conditions differing from those shown on the log sheet in this report, we recommend that Provincial Geotechnical be contacted immediately to carry out further testing to confirm or revise our conclusions and recommendations.

The following table provides relevant soil properties of the clays encountered on site.

SOIL DATA:

		CLAY
1	**Friction angle of soil Φ**	26° – 38°
2	**Cohesion of soil C**	250kPa
3	**kA**	0.3
4	**kO**	0.6
5	**Density**	1900kg/m^3
6	**Unit Weight**	18kN/m^3

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8. CONCLUSIONS AND RECOMMENDATIONS

1. STRUCTURAL RECOMMENDATIONS:

1.1 CONCRETE SLAB FLOOR – RESIDENTIAL STYLE STRUCTURES:

The use of stiffened raft slab construction is recommended for residential proportioned buildings constructed on a residual clay profile. An Allowable Bearing Pressure of 100kPa may be considered for preliminary proportioning of stiffened raft slab edge beams and internal load bearing ribs a minimum of 100mm into natural stiff clay.

Minimum dimensions and reinforcement of footings will need to meet the minimum requirements of Australian Standard AS2870-2011, 'Residential Slabs and Footings – Construction' for a CLASS H2 site classification.

Where the depth of fill exceeds 0.3 metres it will be necessary to adopt suspended raft slab construction. All edge beams and internal ribs will need to be founded in stiff clay at the base of any fill and topsoils, and the slab panels will need to be designed as fully suspended.

A suspended concrete slab on piles may use an Allowable Bearing Pressure of 250kPa at a depth of 300mm into natural stiff clay and an ultimate pile depth of 1500mm below finished ground level.

Considerable attention to site drainage and proposed trees will be required to ensure adequate performance of structures. Failure to take these factors into account will result in poor footing performance.

1.2 LOW RISE STRUCTURES:

Strip and pad footings founded within residual clay are routinely adopted for flexible commercial style structures constructed on a clay foundation. The use of pad and strip footings founded on clay may be considered for any proposed low rise structures subject to:

- The superstructures being flexible and well-articulated. Steel portal framed construction and precast concrete panel construction normally satisfies this criteria.
- The superstructures not being sensitive to footing movements associated with seasonal volume changes within the clay.
- The moisture content regime of the clay beneath the structures being maintained as uniform as possible. The clays must not be subject to extremes in moisture conditions resulting from poor site drainage and/or the drying effects of trees.

If the proposed structures are not flexible and/or well-articulated, or the structures are sensitive to footing movements associated with seasonal volume changes within the highly plastic residual clay, it will be necessary to deepen the footings to a depth of negligible seasonal soil moisture variation.

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1.2 LOW RISE STRUCTURES CONTINUED:

Minimum dimensions and reinforcement of footings founded on clay should meet the minimum requirements of Australian Standard AS2870-2011, 'Residential Slabs and Footings – Construction' for a CLASS H2 site classification.

An Allowable Bearing Pressures of 250kPa may be considered for preliminary proportioning of strip and pad footings respectively where founded a minimum of 500mm into stiff clay, subject to a minimum founding depth of 1000mm. It is recommended that a uniform founding stratum be provided throughout any structure to minimize differential movements.

NOTE:

The site derived clays are not recommended for use as structural fill. Highly plastic clays are generally difficult to compact and are potentially subject to appreciable volume changes if they are not properly moisture conditioned. Use of a suitable imported granular or low plasticity clay fill will assist in assuring efficient placement and present less risk with respect to long term performance of structures and pavements based on soil reactivity.

Structural fill must be placed in uniform layers no exceeding a loose thickness of 200mm and compacted to at least 98% of the standard maximum dry density value as determined in accordance with Australian Standard AS1289 5.1.1-1993.

Australian Standard AS3798, 'Guidelines on Earthworks for Commercial and Residential Developments' provides guidance on the specification, execution and control of earthworks relevant to the subject site. Level 1 supervision in accordance with Australian Standard AS3798 is recommended for all proposed earthworks at the site.

1.3 RETENTION OF SITE EXCAVATIONS:

a. Retention Systems

If safe batters can be accommodated behind a proposed retention system, the use of conventional precast concrete panel or reinforced blockwork retaining walls will be suitable. Safe batters of approximately 30° in fill and silty topsoils and 40° in stiff clay are anticipated under favourably dry conditions.

Where safe batters cannot be accommodated or are not preferred, the use of a soldier pile retention system with infill panels is recommended. A soldier pile retention system is recommended where bulk excavation is proposed adjacent to an existing structure.

If a retained height of more than approximately 3.0 metres is proposed it may be necessary to progressively prop or anchor retention systems as excavation proceeds.

In any case, walls should be designed for the minimum requirements of the appropriate Codes of Practice, e.g. Civil Engineering Code of Practice No. 2, Earth Retaining Structures. The effects of surcharge behind the wall should be calculated using the methods presented in the Code of Practice CP2.

b. Lateral Earth Pressures

Permanently cantilevered retaining walls may be considered where deformation and movement behind the walls can be tolerated, such as for garden or grassed areas. A triangular lateral earth pressure distribution and an active earth pressure coefficient (Ka) of approximately 0.3 could be adopted for preliminary design. The active earth pressure coefficient should be used to calculate lateral earth pressures generated by surcharge loads.

For minimal deflection of progressively propped walls where there are movement sensitive structures or buried services within the zone of influence of the excavation, a uniform earth pressure distribution of 8HkPa, where H is the total retained height in metres, could be adopted for preliminary design. An at rest earth pressure coeffient (Ko) of 0.6 could be used to calculate lateral earth pressures generated by surcharge loads.

1.3 RETENTION OF SITE EXCAVATIONS CONTINUED:

b. Lateral Earth Pressures

A preliminary unit weight of 19 kN/m^3 may be adopted for clay soil.

Sloping backfill should be incorporated as surcharge loading. Any temporary or permanent surcharge loads such as nearby high level footings, traffic loading and compaction stresses, will also need to be included in the design of retention structures.

Retention structures must be designed such that the soil behind the wall is completely and permanently drained. If this cannot be ensured, then hydrostatic pressure must be superimposed on the lateral earth pressure distributions.

Conservatively, the ultimate lateral toe resistance of retaining walls in clay may be estimated based on the following soil parameters:

Angle of internal friction:	Ø = 0° (short term)
Undrained cohesion:	Very stiff clay C_u = 80kPa (short term)
Effective angle of internal friction:	Ø'= 23° (long term)
Effective cohesion:	C'= 0kPa (long term)

2. CIVIL RECOMMENDATIONS:

Construction of pavements is likely to be problematic during the wetter months of the year. The native silty clay topsoils are highly susceptible to softening and instability under wet conditions. Pavement construction should be undertaken during the drier months of the year to avoid the need for additional subgrade improvement and delays in construction.

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2.1 NATURAL SUBGRADE: NATURAL STIFF CLAY

In conjunction with any excavation required to achieve design grade levels, stripping of rubble, vegetation and root zone material should be carried out across areas of the site to be occupied by pavements. The grade surface should be brought to suitable moisture conditions, proof rolled using tracked excavation equipment or roller compactor (minimum 8 tonne static weight). Material responding poorly to compaction should be excavated to achieve a competent base and excavations backfilled using aggregate (i.e. approved NDCR or Class 4:40mm) compacted to at least 98% Standard Compaction Density (per, AS1289, 5.1.1).

Pavement design can be based on the C.B.R. value of **2.5%** which was determined by site soil identification.

This value assume that drainage is suitably detailed to prevent any saturation of subgrade or pavement materials.

2.2 FILL SUBGRADE

Flexible and Rigid Pavements Constructed on a Fill Subgrade

Where the vehicle pavements cannot be constructed on a natural stiff clay subgrade a flexible pavement constructed on a fill subgrade, subject to the subgrade preparation outlined below, may represent an alternative. A design CBR value of **2.0%** may be adopted. Rigid pavements constructed on a fill subgrade may be designed using long and short term moduli of 18 and 23 MPa respectively. Some allowance for ongoing maintenance of pavements should be made.

Preparation of Subgrade

Performance of the proposed pavement will be highly dependent on the level of subgrade preparation. The following levels of preparation and associated pavement performance may be considered.

Minimum Subgrade Preparation

Proof rolling of the exposed subgrade prior to placement of the pavement subbase course should be closely inspected. Any soft or heaving areas should be stripped and re-instated using structural fill.

If the subgrade has been exposed to significant rainfall it may be unworkable and proof rolling may not be possible. Under such circumstances further advice on subgrade preparation should be sought from this office.

Pavement and Subgrade Drainage

Effective surface and perimeter cut-off drainage must be provided and maintained to ensure that the pavement layers and subgrade cannot become saturated. Premature pavement failure is highly likely where drainage is poor.

It is recommended that pavements be constructed with cross fall in excess of minimum requirements to allow for possible irregular settlement of pavements.

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2.2 FILL SUBGRADE CONTINUED

The designing engineer may need to consider the use of stabilization techniques and/or geofabrics in conjunction with site drainage should the fill and/or silty clay topsoil lose form due to inundation.

Reference to C.R.B. Technical Bulletin No. 31 September, 1908 "The Design of Flexible Pavements" and Australian Road Research Board Special Report No. 41 "Into a New Age of Pavement Design" is recommended for design purposes.

Inspection of Subgrade

The exposed pavement subgrades should be inspected by a qualified engineer during proof rolling to ensure that a suitable level of subgrade preparation has been achieved. The presence of any unusual features or conditions should be brought to the attention of this office before construction proceeds.

SITE MAINTENANCE REQUIREMENTS

It is essential that surface sealing and gradients through pavement areas be detailed so as to minimise moisture ingress into the foundation zone and subgrade soils.

Apart from the inherent risk of constructing a pavement on fill, the influence of any proposed proximate vegetation also poses a substantial risk to pavement failure.

The effect of tree root systems on the proposed pavement in respect to both physical movement and soil moisture influence must also be a major factor in the pavement design. The effect of proximate and future vegetation is a consideration on this site. Future landscaping must also address this.

This report contains a standard Pavement Appendix of which a number of points are applicable to this site (Appendix vii).

SITE CLASSIFICATION (AS2870-2011)

Where the use of a concrete slab similar to a domestic style construction is considered as a pavement the designing engineer should note that the background natural classification of this site is CLASS H2 (Highly Reactive Clay).

CLASS H2 classifications assume a minimum characteristic surface movement of 60mm.

9. SITE CONSTRAINTS

EXCAVATION/CONSTRUCTION DIFFICULTIES

SITE VEHICLE ACCESS: Good.

SITE VEHICLE MANEUVERABILITY: Good to Fair. Site may become slippery. During summer and early autumn when evaporation rates are typically high and rainfall levels low, the trafficability of the stripped ground surface is anticipated to be quite good. Other than dust suppression, no significant difficulties are anticipated. During winter and spring it is probably that only tracked machinery will be able to access the site once the surface has been stripped and is exposed to rain.

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EXCAVATION/CONSTRUCTION DIFFICULTIES CONTINUED

EXCAVATION CONDTIONS: The fill soils and clays should be readily excavated using a 20 tonne capacity hydraulic excavator.

If site access is to be provided for trucks once the ground surface is saturated it will be necessary to construct access tracks formed using non-descript crushed rock (75mm minus), recycled brick and concreter rubble or equivalent. Under extreme conditions, it will necessary to incorporate a layer of geogrid or geotextile fabric at the base of the crushed rock.

EXISTING STRUCTURES AROUND CONSTRUCTION AREA: No.

VEGETATION AROUND CONSTRUCTION AREA: No. Grassed only.

WET WEATHER IMPACT: Possible.

Sites without good natural or installed drainage can be adversely impacted upon during construction. The client should be aware that the following impacts can occur after wet weather.

* Site may become slippery and boggy.
* Foundation soils may become inundated and unworkable.
* Site drainage may need to be installed.
* Site may need to be abandoned for a period.
* Deeper footings or additional earthworks may be required.

10. CONSTRUCTION REQUIREMENTS

1. CONSTRUCTION ADJACENT TO EASEMENTS, EXCAVATIONS AND SERVICE PIPE TRENCHES

Buried services should be located adjacent to footings. Where this cannot be avoided, the trench should be backfilled in such a way as to prevent moisture ingress. Any footings located adjacent to easements, excavations or backfilled service trenches should be founded below a line drawn up at 40° above horizontal from the base of the easement or excavation. If the angle of repose is to be intersected, a piled footing will be required.

2. SITE DRAINAGE AND MAINTENANCE OF FOOTINGS

Effective drainage of the site should be maintained at all times. Water run-off should be collected and diverted away from all structures during construction. Water should not be allowed to pond against footings during or after construction. The ground adjacent to footings should be graded to provide a permanent fall of 1(V):50(H) away from the footings over the first two metres. Water supply and drainage infrastructure should be maintained so that no leakage occurs.

3. INSPECTION OF FOOTING EXCAVATIONS

All footing excavations should be inspected by a suitably qualified geotechnical consultant to ensure that the required founding stratum has been achieved. The presence of any unusual features or conditions should be brought to the attention of this office before construction proceeds.

For shallow footing and trench excavations, based on the ground conditions information obtained, it appears excavations will be predominantly in natural clays. Personnel should not be permitted to enter confined excavations in excess of 1.5 metres deep unless such excavations are appropriately battered or shored. Shallower excavations, particularly in loosely compacted fill, may also need to be battered or shored and will need to be assessed at the time of construction.

4. BATTER SLOPES

It is recommended that temporary batter slopes should not be steeper than 1H:1V, but flatter slopes may need to be considered within topsoil or fill materials. Permanent batter slopes should not be steeper than 2H:1V and should be protected from erosion by vegetation or proprietary protection systems. Drainage should be provided at the top of batter slopes to divert run-off away from the slope face. The above recommendations are provided for batter slopes up to 3 metres in height. Further geotechnical advice should be sought where higher batter slopes are proposed.

11. REPORT LIMITATIONS

This report is for the use of the party to whom it is addressed only and has been produced for the proposed development as described and for no other purpose. It has been assumed that the conditions encountered are representative of the site in general. Some variation from the conditions encountered at the borehole is expected over the site.

ANDREW REDMAN BSc.
GEOLOGIST.
AR: KT

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APPENDICES

i. Property Report
ii. Masterplan
iii. Geovic Map
iv. Photographic Evidence
v. Test Site Location Plan
vi. Borelog Descriptions
vii. Pavement Design and Construction Notes

PROPERTY REPORT

VICTORIA State Government — Environment, Land, Water and Planning

From www.planning.vic.gov.au at 02 February 2023 10:12 AM

PROPERTY DETAILS

Lot and Plan Number:	**Lot AA PS811312**
Address:	**26 INNOVATION AVENUE ROCKBANK 3335**
Standard Parcel Identifier (SPI):	**AA\PS811312**
Local Government Area (Council):	**MELTON** www.melton.vic.gov.au
Council Property Number:	**603648**
Directory Reference:	**Melway 344 K12**

SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.

Area: 13855 sq. m (1.39 ha)
Perimeter: 565 m
For this property:
— Site boundaries
— Road frontages

Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

Overlapping dimension label is not being displayed

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions get copy of plan at Title and Property Certificates

UTILITIES

Rural Water Corporation:	**Southern Rural Water**
Melbourne Water Retailer:	**Greater Western Water**
Melbourne Water:	**Inside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**WESTERN METROPOLITAN**
Legislative Assembly:	**KOROROIT**

PLANNING INFORMATION

Property Planning details have been removed from the Property Reports to address duplication with the Planning Property Reports which are DELWP's authoritative source for all Property Planning information.

The Planning Property Report for this parcel can found here - Planning Property Report

Planning Property Reports can be found via these two links
Vicplan https://mapshare.vic.gov.au/vicplan/
Property and parcel search https://www.land.vic.gov.au/property-and-parcel-search

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PROPERTY REPORT APPENDIX i

PROPERTY REPORT

VICTORIA State Government — Environment, Land, Water and Planning

Area Map

ADVERTISED PLAN

PROPERTY REPORT

VICTORIA Environment, Land, Water and Planning

From www.planning.vic.gov.au at 02 February 2023 10:12 AM

PROPERTY DETAILS

Address:	**77 VIOLA DRIVE ROCKBANK 3335**
Lot and Plan Number:	**Lot A PS828055**
Standard Parcel Identifier (SPI):	**A\PS828055**
Local Government Area (Council):	**MELTON** www.melton.vic.gov.au
Council Property Number:	**13151**
Directory Reference:	**Melway 344 J12**

SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.

Area: 6078 sq. m
Perimeter: 368 m
For this property:
— Site boundaries
— Road frontages

Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

2 overlapping dimension labels are not being displayed

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions, get copy of plan at Title and Property Certificates

UTILITIES

Rural Water Corporation:	**Southern Rural Water**
Melbourne Water Retailer:	**Greater Western Water**
Melbourne Water:	**Inside drainage boundary**
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Property and parcel search https://www.land.vic.gov.au/property-and-parcel-search

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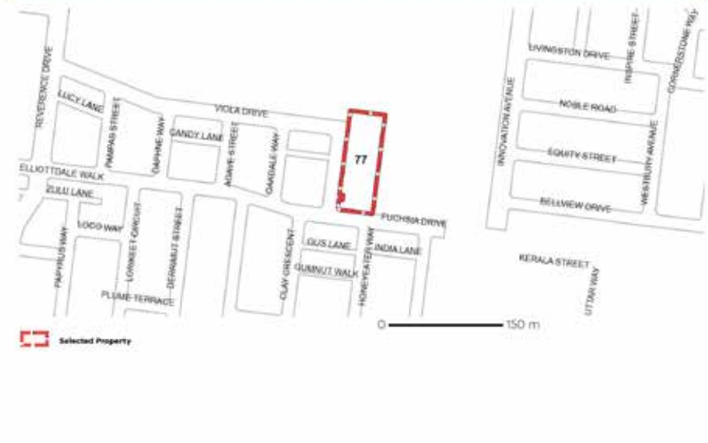
PROPERTY REPORT APPENDIX i

PROPERTY REPORT

VICTORIA Environment, Land, Water and Planning

Area Map



ADVERTISED
PLAN

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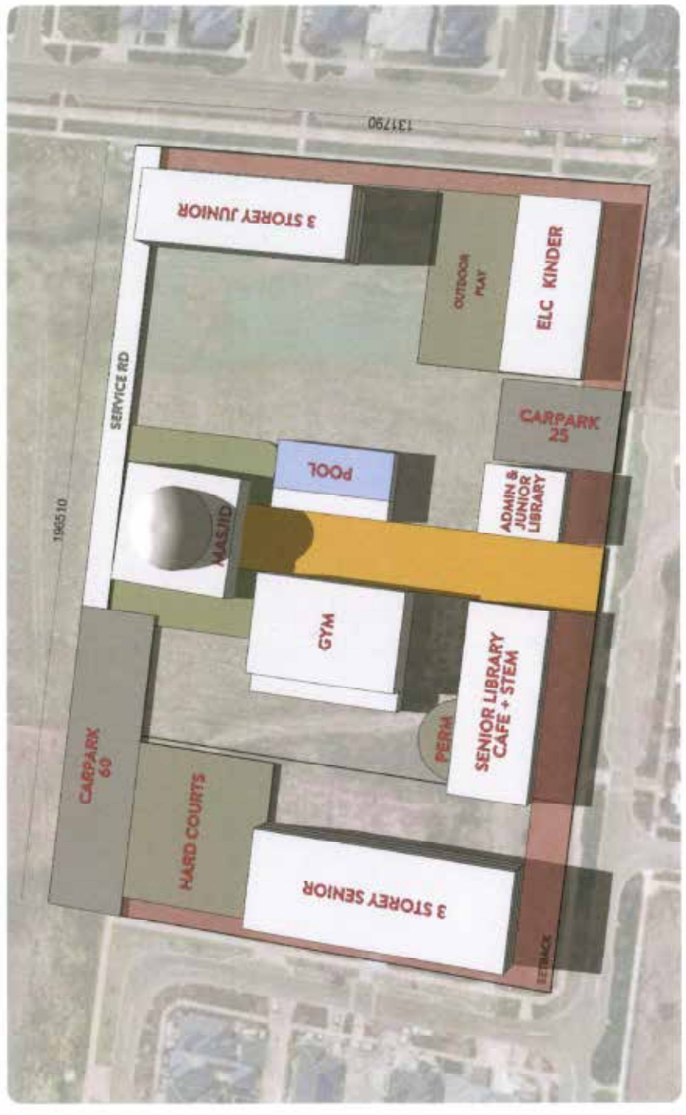
MASTERPLAN APPENDIX ii



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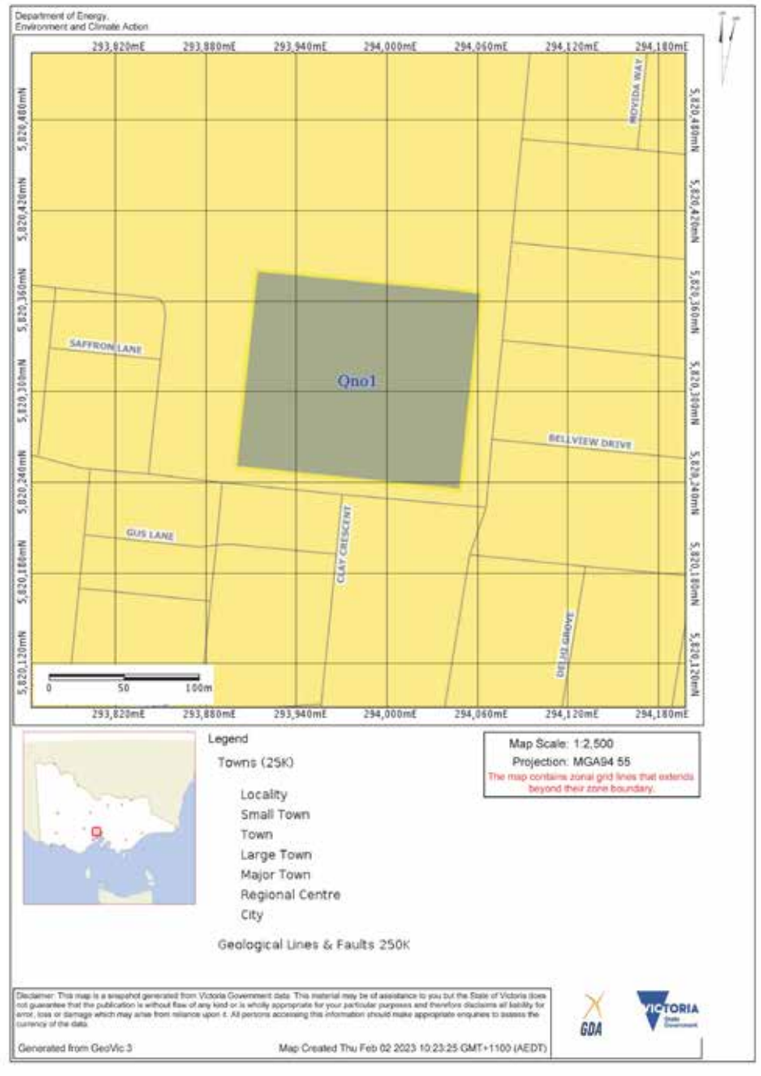
GEOVIC MAP APPENDIX iii



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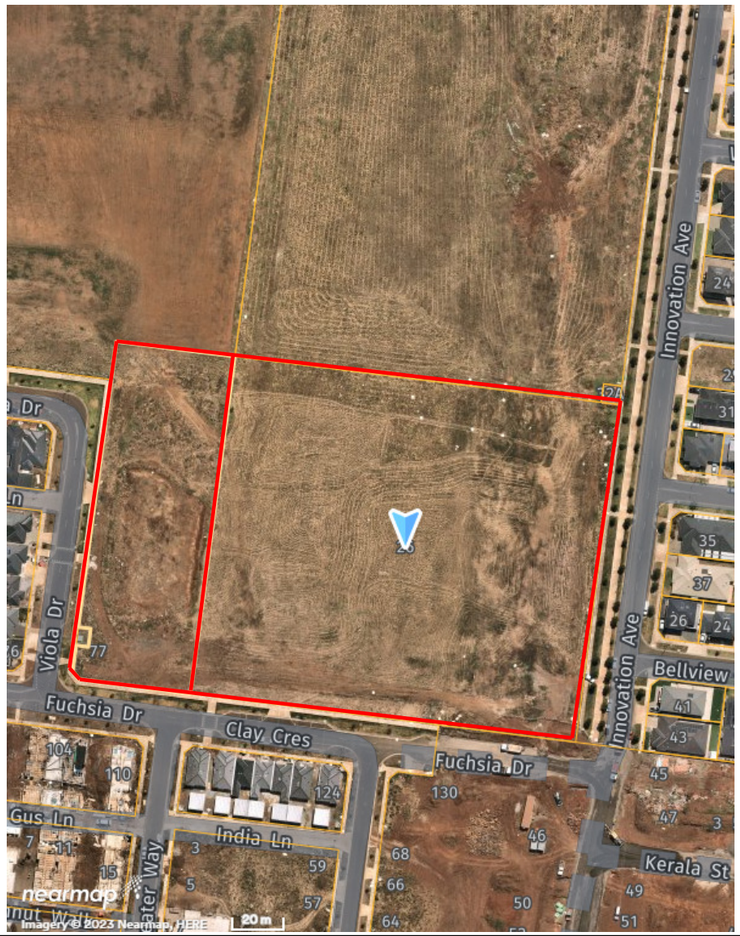
APPENDIX iv

AERIAL PHOTOGRAPH
(Approximate Location)

Client: ROCKBANK SCHOOL C/- LAW ARCHITECTS
Ref. Number: 20870A
Date: 24/01/2023
Site: Rockbank School, Innovation Avenue, ROCKBANK, VICTORIA



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SITE PHOTOGRAPHS APPENDIX iv

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SITE PHOTOGRAPHS APPENDIX iv

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SITE PHOTOGRAPHS APPENDIX iv

PROVINCIAL GEOTECHNICAL PTY. LTD.
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SITE PHOTOGRAPHS APPENDIX iv

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APPENDIX v

TEST SITE LOCATION PLAN

◯-Approximate borehole locations

Client: ROCKBANK SCHOOL C/- LAW ARCHITECTS
Ref. Number: 20870A
Date: 24/01/2023
Site: Rockbank School, Innovation Avenue, ROCKBANK, VICTORIA

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TEST SITE 1 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 2 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: CRUSHED ROCK/CLAY MIX**			100		**FILL: CRUSHED ROCK/CLAY MIX**		
200		**CLAY**			200		**CLAY**		
300		**brown grey brown**			300		**brown grey brown**		
400		**moist; very stiff**	**130+**		400		**moist; very stiff**	**130+**	
500					500				
600					600				
700					700				
800					800				
900		**END BORE HOLE**			900		**END BORE HOLE**		
1000		**UNABLE TO**			1000		**UNABLE TO**		
1100		**PENETRATE BASALT**			1100		**PENETRATE BASALT**		
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900					1900				
2000					2000				
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3000					3000				
3100					3100				
3200					3200				
3300					3300				
3400					3400				
3500					3500				
3600					3600				
3700					3700				
3800					3800				
3900					3900				
4000					4000				

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TEST SITE 3 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 4 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**CLAY**			100		**FILL: CLAY MIX**		
200		**brown grey brown**			200		**CLAY**		
300		**moist; very stiff**	**130+**		300		**brown grey brown**		
400					400		**moist; very stiff**	**130+**	
500					500				
600		**END BORE HOLE**			600				
700		**UNABLE TO**			700				
800		**PENETRATE BASALT**			800				
900					900				
1000					1000				
1100					1100		**grey**		
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900					1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
3000					3000				
3100					3100				
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3300					3300				
3400					3400				
3500					3500				
3600					3600				
3700					3700				
3800					3800				
3900					3900				
4000					4000				

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TEST SITE 5 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 6 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**CLAY**			100		**FILL: CLAY/ CRUSHED ROCK MIX**		
200		**brown**			200		**CLAY**		
300		**dry; very stiff**			300		**brown**		
400		**slightly moist;**	**130+**		400		**dry; very stiff**	**130+**	
500		**very stiff**			500		**slightly moist;**		
600					600		**very stiff**		
700					700				
800					800				
900					900		**grey**		
1000					1000				
1100		**grey**			1100				
1200		**moist; stiff**			1200		**with carbonates and**		
1300					1300		**weathered Basalt**		
1400					1400				
1500					1500				
1600					1600		**END BORE HOLE**		
1700					1700		**UNABLE TO**		
1800					1800		**PENETRATE BASALT**		
1900		**END BORE HOLE**			1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
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3100					3100				
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3400					3400				
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3800					3800				
3900					3900				
4000					4000				

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TEST SITE 7 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 8 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: CLAY/ CRUSHED ROCK MIX**			100		**FILL: CLAY/ CRUSHED ROCK MIX**		
200		**CLAY**			200		**CLAY**		
300		**brown**			300		**brown**		
400		**dry; stiff**	**130+**		400		**dry; stiff**	**130+**	
500		**grey brown**			500		**grey brown**		
600					600				
700					700				
800					800				
900		**grey**			900		**grey**		
1000					1000				
1100		**with carbonates and**			1100		**with carbonates and**		
1200		**weathered Basalt**			1200		**weathered Basalt**		
1300					1300				
1400					1400				
1500					1500				
1600		**END BORE HOLE**			1600		**END BORE HOLE**		
1700		**UNABLE TO**			1700		**UNABLE TO**		
1800		**PENETRATE**			1800		**PENETRATE**		
1900		**SLIGHTLY**			1900		**SLIGHTLY**		
2000		**WEATHERED**			2000		**WEATHERED**		
2100		**BASALT**			2100		**BASALT**		
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
3000					3000				
3100					3100				
3200					3200				
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3900					3900				
4000					4000				

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TEST SITE 9 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 10 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: CLAY/ CRUSHED ROCK MIX**			100		**FILL: SILTY CLAY MIX**		
200		**CLAY**			200		**CLAY**		
300		**brown**			300		**brown**		
400		**dry; stiff**	**130+**		400		**slightly moist;**	**130+**	
500		**grey brown**			500		**very stiff**		
600					600		**grey brown**		
700					700		**moist; very stiff**		
800					800		**grey**		
900		**grey**			900				
1000					1000				
1100					1100				
1200					1200				
1300					1300		**END BORE HOLE UNABLE TO PENETRATE POSSIBLE BASALT FLOATER**		
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
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4000					4000				

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TEST SITE 11 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 12 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: SILTY CLAY MIX**			100		**FILL: SILTY CLAY MIX**		
200		**SILTY CLAY**		**100**	200		**CLAY**		
300		**CLAY**			300		**brown**		
400		**brown**			400		**slightly moist;**	**130+**	
500		**slightly moist;**	**130+**		500		**very stiff**		
600		**very stiff**			600		**grey brown**		
700		**grey brown**			700		**moist; very stiff**		
800		**moist; very stiff**			800		**grey**		
900		**grey**			900				
1000					1000				
1100					1100		**END BORE HOLE UNABLE TO PENETRATE WEATHERED BASALT**		
1200					1200				
1300		**with carbonates and**			1300				
1400		**weathered rock**			1400				
1500					1500				
1600		**END BORE HOLE UNABLE TO PENETRATE WEATHERED BASALT**			1600				
1700					1700				
1800					1800				
1900					1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
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4000					4000				

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TEST SITE 13 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 14 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**SILTY CLAY**		**100**	100		**FILL: CLAY MIX**		
200		**CLAY**			200		**SILTY CLAY**		**100**
300		**brown**			300		**CLAY**		
400		**slightly moist; stiff**	**130+**		400		**brown**		
500		**grey brown**			500		**slightly moist; stiff**	**130+**	
600					600		**grey brown**		
700					700				
800					800				
900		**grey**			900				
1000					1000		**grey**		
1100					1100				
1200					1200				
1300		**with carbonates**			1300				
1400					1400		**with carbonates**		
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
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4000					4000				

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TEST SITE 15 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 16 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**SILTY CLAY**		**100**	100		**SILTY CAY**		**100**
200		**CLAY**			200		**dry; very stiff**		
300		**brown**			300		**CLAY**		
400		**slightly moist; stiff**	**130+**		400		**brown**		
500		**grey brown**			500		**slightly moist;**	**130+**	
600					600		**very stiff**		
700					700		**grey brown**		
800					800				
900		**grey**			900		**grey**		
1000					1000				
1100					1100				
1200					1200		**with carbonates**		
1300		**with carbonates**			1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
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2500					2500				
2600					2600				
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2900					2900				
3000					3000				
3100					3100				
3200					3200				
3300					3300				
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3600					3600				
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4000					4000				

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TEST SITE 17 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 18 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**SILTY CLAY**		**100**	100		**SILTY CLAY**		**100**
200		**CLAY**			200		**CLAY**		
300		**brown**			300		**brown**		
400		**slightly moist;**	**130+**		400		**slightly moist;**	**130+**	
500		**very stiff**			500		**very stiff**		
600		**grey brown**			600		**grey brown**		
700					700				
800					800		**grey**		
900		**grey**			900		**BASALT**		
1000					1000		**slightly weathered**		
1100					1100				
1200		**with carbonates**			1200		**END BORE HOLE**		
1300					1300		**UNABLE TO**		
1400					1400		**PENETRATE BASALT**		
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900				
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
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3000					3000				
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TEST SITE 19 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 20 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**SILTY CLAY**		**100**	100		**SILTY CLAY**		**100**
200		**CLAY**			200		**CLAY**		
300		**brown**			300		**brown**		
400		**slightly moist;**	**130+**		400		**slightly moist;**	**130+**	
500		**very stiff**			500		**very stiff**		
600		**grey brown**			600		**grey brown**		
700					700				
800					800				
900		**with carbonates and**			900		**with carbonates and**		
1000		**weathered Basalt**			1000		**weathered Basalt**		
1100					1100		**grey**		
1200		**BASALT**			1200				
1300		**slightly weathered**			1300				
1400					1400				
1500		**END BORE HOLE**			1500				
1600		**UNABLE TO**			1600				
1700		**PENETRATE BASALT**			1700				
1800					1800				
1900					1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
3000					3000				
3100					3100				
3200					3200				
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3600					3600				
3700					3700				
3800					3800				
3900					3900				
4000					4000				

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TEST SITE 21 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 22 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**SILTY CLAY**		**100**	100		**SILTY CLAY**		**100**
200		**CLAY**			200		**CLAY**		
300		**brown**			300		**brown**		
400		**slightly moist;**	**130+**		400		**slightly moist;**	**130+**	
500		**very stiff**			500		**very stiff**		
600		**grey brown**			600		**grey brown**		
700					700				
800					800		**grey**		
900		**with carbonates and**			900				
1000		**weathered Basalt**			1000				
1100		**grey**			1100		**with carbonates**		
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
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TEST SITE 23 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 24 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: CLAY MIX**			100		**FILL: CLAY MIX**		
200		**SILTY CLAY**		**100**	200		**CLAY**		
300		**CLAY**			300		**brown**		
400		**brown**			400		**slightly moist;**	**130+**	
500		**slightly moist;**	**130+**		500		**very stiff**		
600		**very stiff**			600		**grey brown**		
700		**grey brown**			700		**grey**		
800		**grey**			800				
900					900				
1000					1000				
1100					1100				
1200					1200				
1300					1300				
1400					1400				
1500					1500				
1600					1600				
1700					1700				
1800					1800				
1900		**END BORE HOLE**			1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
3000					3000				
3100					3100				
3200					3200				
3300					3300				
3400					3400				
3500					3500				
3600					3600				
3700					3700				
3800					3800				
3900					3900				
4000					4000				

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Date: 24/01/2023
Site: Rockbank School, Innovation Avenue, ROCKBANK, VICTORIA

TEST SITE 25 EXCAVATION METHOD: HYDRAULIC DRILLING RIG					TEST SITE 26 EXCAVATION METHOD: HYDRAULIC DRILLING RIG				
Depth mm	FILL	SOIL PROFILE	"C"	ABP	Depth mm	FILL	SOIL PROFILE	"C"	ABP
100		**FILL: CLAY MIX**			100		**FILL: CLAY MIX**		
200		**well compacted**			200		**well compacted**		
300		**grey brown**			300		**grey brown**		
400		**moist; stiff**			400		**moist; stiff**		
500					500				
600					600				
700					700				
800		**CLAY**			800				
900		**brown**			900				
1000		**moist; stiff**	**130+**		1000				
1100		**grey brown**			1100		**SILTY CLAY**		**100**
1200					1200		**slightly moist; stiff**		
1300					1300		**CLAY**		
1400		**grey**			1400		**brown**		
1500					1500		**moist; stiff**	**130+**	
1600					1600		**grey brown**		
1700					1700				
1800					1800		**grey**		
1900		**END BORE HOLE**			1900		**END BORE HOLE**		
2000					2000				
2100					2100				
2200					2200				
2300					2300				
2400					2400				
2500					2500				
2600					2600				
2700					2700				
2800					2800				
2900					2900				
3000					3000				
3100					3100				
3200					3200				
3300					3300				
3400					3400				
3500					3500				
3600					3600				
3700					3700				
3800					3800				
3900					3900				
4000					4000				

PROVINCIAL GEOTECHNICAL PTY. LTD.
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PAVEMENT DESIGN AND CONSTRUCTION NOTES APPENDIX vii

PAVEMENT DESIGN & CONSTRUCTION NOTES

i. All pavement should be designed by a suitably qualified engineer.

ii. All works should be undertaken to the designing engineer's specifications and satisfaction.

iii. Attention should be given to the following:

a) Excavation and pavement installation near trees
b) Grubbing and clearing where necessary
c) Sub-grade compaction and treatment of rock, soft spots and fill where present
d) Installation of proper site drainage to ensure the long term integrity of the sub-grade
e) The use of approved crushed rock material placed and compacted under proper supervision to the engineer's approval.

iv. The client should address performance tolerances expected.

v. Soil conditions: Where soil conditions encountered during preparation are found to differ from those described during our investigation, further immediate investigation is recommended. Any concern by any person involved in the proposed project concerning the soil conditions described and/or report supplied by Provincial Geotechnical Pty. Ltd. should be addressed to ourselves for further consultation.

vi. Reference has been made to C.R.B. Technical bulletin No. 31 September, 1980 " The Design of Flexible Pavements" and Australian Road Research Board special Report No. 41 "into a New Age of Pavement Design".

vii. As instructed, the C.B.R. evaluation of this site is based upon a site assessment of the soil geology correlated with typical design C.B.R.'s reported in C.R.B. Technical Bulletin No. 31, 1980 and A.R.R.B. Special Report No. 41.

The values supplied are therefore conservative being based upon soil profile correlation only and may yield a standard deviation of + or - 2% C.B.R. value from more accurate laboratory assessments.

The client and designing engineer should recognise the above and, dependent upon other factors, may request more accurate analysis.