



19/10/2016

CLIENT: Summit Group

JOB DESCRIPTION: Provide limited site investigation & site classification for the allotment.

PROJECT: Lot 12 Baltimore Avenue, Hamilton Valley

JOB NO.: 43455-7

REPORT SUMMARY:

The site classification is '**M-D' Moderately Reactive in the Dry Temperate Zone.**

1.0 SITE DESCRIPTION:

1.1 The allotment is part of the "Sienna Ridge Estate" Hamilton Valley, Stages 1 and 2. At the time of the investigation there was a patchy cover of vegetation across the surface and a newly planted tree (approx. 1.0m to 2.5m in height) growing in the front nature strip along the southern and eastern boundary. The area allocated for the house has good fall across the block, sloping towards the rear boundary. The land slope of the building footprint is the order of 1 in 40. To provide a level building pad, cut and fill earthworks may have to be undertaken. Site drainage should be further enhanced with landscaping works at the completion of construction.



Existing site conditions for proposed dwelling.



1.2 Geological Survey Maps for Victoria and New South Wales (Sheet SJ 55-2) of 1:250,000 scale shows that the area is within Recent Quaternary fine grained alluvium of the Shepparton Formation. These are deposits of varying clay, silt, gravel and sand content laid down in discontinuous lens-like structures. There can be varying combinations and layer thicknesses of these soil types across small areas.

2.0 SITE INVESTIGATION:

2.1 Boreholes of 3000mm and 2000mm were mechanically drilled using 100mm diameter continuous flight auger at two locations across the site. Their locations and logs are shown on the attached borehole log sheet.

2.2 **Borehole Description:** The soil properties established in each borehole were very similar if not identical. At the surface brown sand to a depth down to 300mm. After the top layer, there is light brown sand continuing to 500mm and orange brown silty clay extending down to 1200mm. Silty clay soils varying in colour follow to the end of the boreholes. Soils were observed in the field to be uniform over the depth of the profile. Soils were slightly moist in the upper layers and become dry in the lower layers. Ground water was not encountered in the boreholes.

2.3 Selected filling has been spread over the site as part of the subdivisional earthworks across part of the allotment located towards the eastern boundary. Testing for density and moisture content during construction has been performed across random layers of the allotments.

The surface filling is not considered as controlled fill and has been assessed as rolled fill in accordance with AS 2870 - 2011. Load bearing elements of the footing systems must be founded through this filling and into undisturbed natural soils.

2.3 The underlying soils are of low to medium plasticity and there is potential for seasonal ground movement between 20mm and 40mm. Consideration should be given to clause 3.6 of this report when positioning the house due to the proximity of the trees in the front nature strip along the southern and eastern boundaries.

2.4 The natural soils, located immediately below the disturbed surface soils (i.e. 100mm below the surface), have an estimated bearing capacity of at least **100kpa**. Soil bearing capacities have been estimated for the underlying soils and these values are listed below:

Depth	Allowable Bearing Capacity
500mm	120 kPa
1000mm	150 kPa

2.5 The site classification is ‘**M-D**’ in accordance with AS 2870 - 2011.

3.0 FOOTING DESIGN RECOMMENDATIONS:

3.1 The recommendation is for the footing system to be designed to meet the requirements of at least a Class ‘**M-D**’ site. Design and construction should comply with AS 2870 and AS 3600. A waffle slab may be setup on the stripped and proof rolled surface with edge beams founded a minimum of 200mm below the stripped surface. The edge beams of a conventional raft slab are recommended to be founded at least 200mm below the stripped surface. Where there is fill created by cut and filling of the site, it is recommended that the footing system be extended through the imported “uncontrolled fill” and into the underlying natural ground. This may be

achieved by deepening the ribs of the raft slab or supporting the slab on concrete piers that are drilled and socketed into the underlying natural soils.

3.2 The construction envelope is to have the surface stripped and cleared nominally 50mm to 100mm of all grass, vegetation and any top soil across the surface. Proof roll prior to construction and prepare the site as per section 6 of AS 2870 – 2011. (Proof rolling refers to thorough trafficking of the area by the earthmoving equipment until there are no indentations left by the wheel tracks)

3.3 Provision for additional footing requirements will need to be considered if construction is within the area of selected filling that had been spread over the site as part of the subdivisional earthworks located towards the eastern boundary. The depth and extent of the backfilled hole may require further verification to enable the footing system to be designed. If edge beams or internal beams are to be located within this backfilled area then they will be required to be extended to found into natural ground. This may be achieved by the use of blinding in over- excavated areas increasing the depth of beams or supporting beams on concrete piers. It is recommended the design engineer be contacted should soft spots or areas of undetected fill be encountered during footing excavation. If site conditions are altered in the course of construction then this report may require review.

3.4 The use of brickwork articulation joints to TN61 is recommended throughout.

3.5 The following are recommended founding levels for articulated masonry veneer construction below cleared surface:

<u>Stiffened Raft Load Bearing Beams:</u>	Nominally 200mm below stripped surface i.e. Through disturbed ground and into light brown sand. (Unless clause 3.3 applies)
<u>Internal Beams:</u>	Maybe founded on stripped surface or the compacted sand fill. (Unless clause 3.3 applies)
<u>Waffle Raft:</u>	Waffle slab to be setup on the 50mm to 100mm stripped and proof rolled surface. Edge beams founded a minimum of 200mm . (Unless clause 3.3 applies)
<u>Strip Footings:</u>	650mm minimum and at least 300mm into natural underlying soils.
<u>Stump - Pad Footings:</u>	800mm minimum and at least 200mm into natural underlying soils.
<i>Note:</i>	<i>Where cut/fill earthworks are carried out to form a level platform, extend beams through filling and found in natural ground or support beams in filled zone on bored concrete piers, founded through the imported filling and extending a minimum depth of 400mm into natural ground.</i>

3.6 The planting of trees close to the building should be avoided. Minimum distance from the building should be at least three quarters of the mature height. Where the building is to be positioned such that trees are planted or any existing trees located at an offset distance that is less than three quarters of the mature height, the design engineer will need to consider additional measures to protect the footing system from trees impacting the stability of the soils within the zone of influence.



Existing trees along eastern boundary.

4.0 LIMITATIONS OF REPORT:

The frequency of borehole sites and the intensity of the testing program have been formulated to reflect the significance of the proposed structure. The testing and reporting is considered reasonable and comprehensive for this project and results correlate to other testing carried out by this company in the region. It is possible that there may be variations in the geotechnical conditions from those described in this report, as no geotechnical investigation can be considered exhaustive. The results and recommendations are therefore a reasonable platform upon which to base subsequent design decisions with flexibility to change course should there be variations in the conditions at the time of construction.

5.0 SITE MAINTENANCE:

In addition to the following, reference should be made to the CSIRO information sheet “Guide to Home Owners On Foundation Maintenance and Performance.”

5.1 During the works, provide a drainage system as soon as the footings are constructed. It must prevent ponding against, near or beneath the footings in order to maintain stable moisture content within the foundation. Grading the surfaces (1 in 20 for at least 2.0 metres) away from footings and their excavations to collection points will be necessary.

At the completion of the construction the drainage system must also prevent ponding against, near or beneath the finished building. Interception of moisture flow paths toward and under the building is critical.

5.2 Preferably pave or grade the natural surface away from the building at a slope of 50mm in 1.0m.

5.3 Plumbing trenches should be sloped away from the buildings. The first 1.5m of trench from the building should be backfilled with clay in the top 300mm.

5.4 Subsurface drains near footings should be avoided. If they are necessary, the trench must be capable of providing drainage if blockage occurs.

5.5 Plumbing problems that could cause changes to foundation's moisture content should be rectified immediately.

A handwritten signature in black ink, consisting of a stylized 'A' followed by a horizontal line and a small flourish.

Anthony Kruse



B.M. CIVIL ENGINEERS

Date: 19/10/2016

Location: Lot 12 Baltimore Avenue, Hamilton Valley

Client: Summit Group

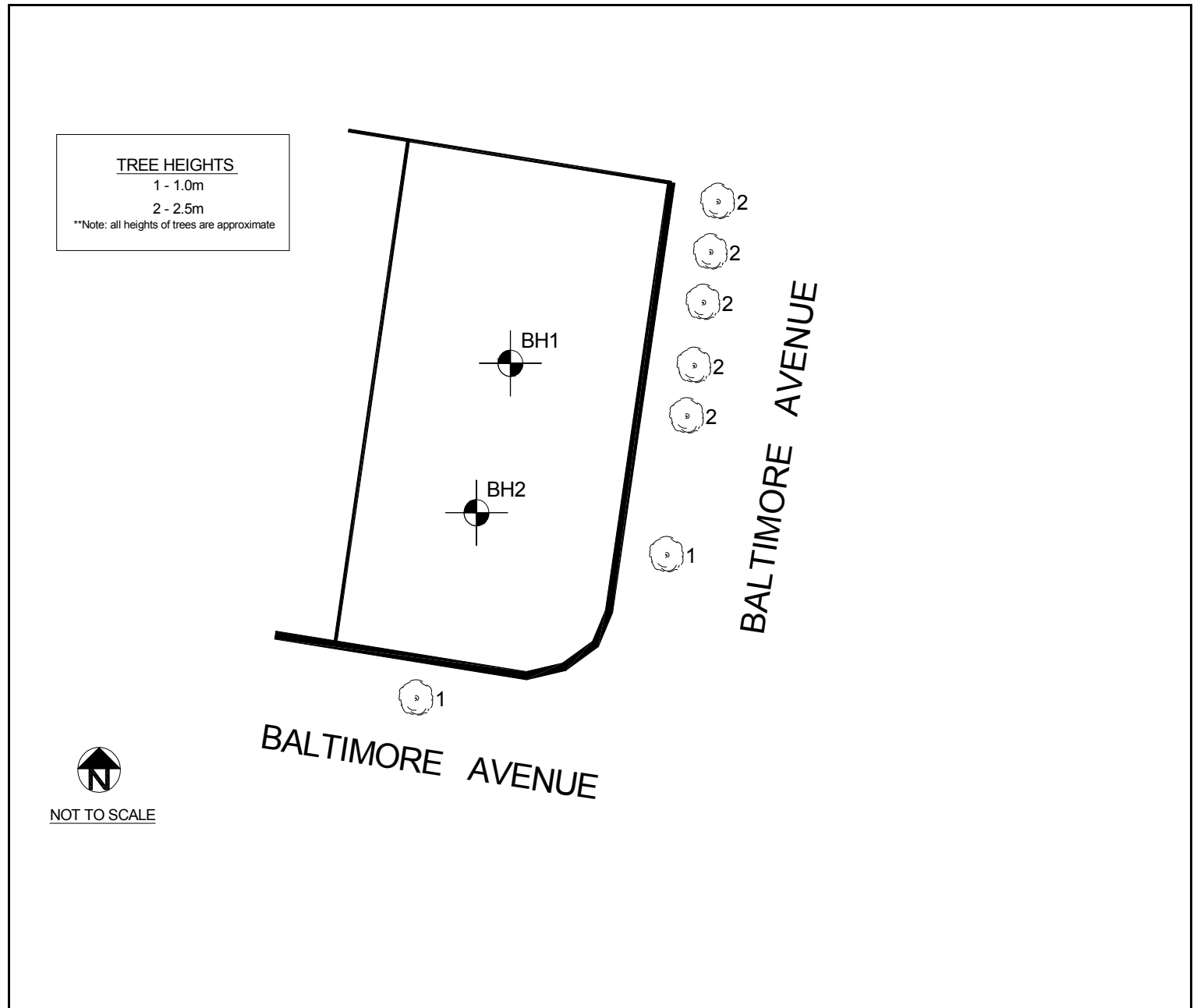
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SITE
INVESTIGATION
BORELOG
LOCATION
PLAN

TREE HEIGHTS
1 - 1.0m
2 - 2.5m
**Note: all heights of trees are approximate



NOT TO SCALE





Job No.: 43455-7
Location: Lot 12 Baltimore Avenue, Hamilton Valley
Client: Summit Group

Date: 19/10/2016
Borehole No.: **1**

Depth	Description	Plasticity	Cohesion Density	Moisture
100	brown SAND	LP	MD	D - M
200				
300				
400	light brown SAND	LP	MD	D - M
500				
600	orange brown silty CLAY	MP	F	D - M
700				
800				
900				
1000				
1100				
1200	brown yellow silty CLAY	MP	ST	D - M
1300				
1400				
1500				
1600				
1700				
1800	brown silty CLAY	MP	F	D
1900				
2000				
2100				
2200				
2300				
2400	EOB			
2500				
2600				
2700				
2800				
2900				
3000	EOB			
3100				
3200				

PLASTICITY	LP- LOW	MP- MEDIUM	HP- HIGH
CONSISTENCY	COHESIVE SOILS VS- very soft S-soft F-firm ST - stiff VST - very stiff H-hard		
	NON COHESIVE SOILS VL very loose L- loose MD-medium dense DS-dense VD-very dense		
MOISTURE CONDITION	D-dry M- moist W-wet SA-saturated		
DRILLING METHOD	continuous flight auger	<input checked="" type="checkbox"/>	hand auger <input type="checkbox"/>



Job No.: 43455-7
Location: Lot 12 Baltimore Avenue, Hamilton Valley
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Date: 19/10/2016
Borehole No.: **2**

Depth	Description	Plasticity	Cohesion Density	Moisture	
100	brown SAND	LP	MD	D - M	
200					
300					
400	light brown SAND	LP	MD	D - M	
500					
600	orange brown silty CLAY	MP	F	D - M	
700					
800					
900					
1000					
1100					
1200	light brown sandy CLAY	LP - MP	F	D - M	
1300					
1400					
1500					
1600					
1700					
1800					
1900					
2000	EOB				
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
PLASTICITY		LP- LOW	MP- MEDIUM	HP- HIGH	
CONSISTENCY		COHESIVE SOILS VS- very soft S-soft F-firm ST - stiff VST - very stiff H-hard			
		NON COHESIVE SOILS VL very loose L- loose MD-medium dense DS-dense VD-very dense			
MOISTURE CONDITION		D-dry M- moist W-wet SA-saturated			
DRILLING METHOD		continuous flight auger	<input checked="" type="checkbox"/>	hand auger	<input type="checkbox"/>