

GEOTECHNICAL SITE INVESTIGATION FOR RESIDENTIAL SLABS AND FOOTINGS

REPORT NUMBER: 4230411-4

CLIENT: Greater Hume Council
39 Young Street
HOLBROOK NSW 3466

SITE ADDRESS: Lot 87 Jacob Wenke Drive
WALLA WALLA NSW

PROPOSED STRUCTURE: Single and/or double storey articulated masonry veneer and/or clad dwelling

SITE GEOLOGY: Quaternary Alluvium - SANDS, SILTS and CLAYS

SITE CLASSIFICATION: CLASS H1-D

SUMMARY OF FOUNDING DEPTHS:

FOUNDATION DETAILS	Type	Bearing Capacity	Actual Founding depth*
Slab (Stiffened)	Class H1-D	80 kPa	300mm
Slab (Waffle)	Class H1-D	50 kPa	On natural ground and/or Controlled Fill

*Actual founding depths from the existing surface level at the time of the geotechnical site investigation.

Note:

This summary should be read in conjunction with the full report.

1. COMMISSION:

Investigation for site classification in accordance with Section 2 Clause 2.2.2 (a) of Australian Standard 2870-2011 - Residential Slabs and Footings with reference to Clause 2.2.2 (b) and 2.3.2 (c) iii, recommend a founding depth and / or foundation treatment if appropriate, as per Clause 1.3.1 – Performance of Footing Systems (AS2870–2011).

2. SITE GEOLOGY:

The field investigation suggests that the site is in a geological area of Quaternary Alluvium - SANDS, SILTS and CLAYS. Geological maps of the area confirmed this.

3. SITE TOPOGRAPHY:

The site is relatively level. The ground cover comprises of natural grasses.

4. INVESTIGATION:

Three boreholes were drilled by mechanical auger at the approximate locations shown on the attached plan.

The logs of each borehole are attached showing the soil descriptions and depths along with any cohesive strengths measured and observed densities on non-cohesive soils.

5. FINDINGS:

The boreholes revealed that the natural soil profile consisted of silty SAND overlying silty CLAY.

6. SITE CLASSIFICATION:

After considering the area geology, the soil profile encountered in the boreholes, the proposed superstructure and the climatic zone of the area, this site has been classified as CLASS H1-D with respect to foundation construction (Australian Standard 2870-2011 Residential Slabs and Footings). It is anticipated that the seasonal surface movement at this site will not exceed 60mm.

Due to the nature and composition of the soil profile found in the site, construction during or after wet weather may be difficult. Therefore, it is recommended that an open cut drain be constructed around the proposed site to a depth of not less than 300mm below the site foundation material, or CLAY, whichever occurs first to intercept any ground water. There is no need to maintain this drain after construction to ground level has been reached. At this stage the drain should be backfilled, failure to do so may have detrimental effects.

It must be emphasised that the heave mentioned and recommendations referred to in this report are based solely on the observed soil profile at the time of the investigation for this report without taking into account the effects of any abnormal moisture conditions that may develop after construction as defined in Clause 1.3.3 (A) (B) (C) (D) (E).

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

The recommendations in the following sections assume that no footings for the proposed structures will be located within 1.5 times the mature height of any currently growing trees. If this is not the case, the site will be classified as CLASS P due to the close proximity of currently growing trees to the proposed structure, and the footing system must be designed by a qualified structural engineer, as defined in AS2870-2011.

7. RECOMMENDED FOUNDATION FOR SLABS:

The recommendations below assume that no footings for the proposed structures will be located within 1.5 times the mature height of any currently growing trees. If this is not the case, the site will be classified as CLASS P due to the close proximity of currently growing trees to the proposed structure, and the footing system must be designed by a qualified structural engineer, as defined in AS2870-2011.

7.1 Stiffened Raft Slab:

7.1.1 Edge Beams:

It is recommended that a CLASS H1-D (Refer AS2870 – 2011) slab on ground should be used at this site with edge beams founded not less than 300mm below the finished surface level surrounding the structure.

However, the founding depth must be at least 100mm into any of the naturally occurring soils as described in the logs of boring which from the site investigation can be assumed to have an allowable bearing capacity of 80kPa at this depth.

As a guide to the actual site founding depths with regard to the above along with information obtained from the bores, the actual founding depth at this site will be 300mm in relationship to the existing surface where this surface is to be the finished surface level.

7.1.2 Slab and or Stiffening Beams:

Any organic and deleterious matter should be removed from under the proposed slab area to a depth of not less than 50mm and replaced where necessary with levelling fill (See 7.1.3 below) under the slab and internal beams. This excavated surface can be assumed to have an allowable bearing pressure of at least 50kPa.

7.1.3 Levelling Fill:

Up to 300mm of CLAY FILL or 600mm of SAND FILL, imported or site derived, including existing FILL material, if any, may be placed under the slab and internal beams providing that this filling is placed in 150mm thick layers and compacted in a moist condition using a light weight vibratory roller or vibratory plate tamper or similar to form a dense layer. Based on the likely condition of this levelling fill, an allowable bearing pressure of at least 50kPa can be assumed to exist beneath the slab and any internal beams founded in or on this filling.

If more than 300mm of CLAY FILL or 600mm of SAND FILL, imported or site derived, including existing FILL material, is required, then the slab must be designed as a suspended slab and supported by a grid of beams founded through any fill material in accordance with the above edge beam recommendations (or see 10.4 below).

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

7.2 Waffle Raft Slab:

Waffle raft slabs for this site can be designed for a CLASS H1-D following AS2870 and detailed as per Clauses 6.4 (in particular Clause 6.4.3) of Section 6 of AS2870. For the purposes of design, the surface of the natural soils at this site as described in the engineering logs will have an allowable bearing pressure of at least 50kPa. Alternatively, fill placed in accordance with clause 10.4.2 of this report can be used as a foundation with a bearing pressure of at least 50kPa.

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

8. RECOMMENDED FOUNDATION STRIP FOOTINGS AND / OR STUMPS:

The recommendations below assume that no footings for the proposed structures will be located within 1.5 times the mature height of any currently growing trees. If this is not the case, the site will be classified as CLASS P due to the close proximity of currently growing trees to the proposed structure, and the footing system must be designed by a qualified structural engineer, as defined in AS2870-2011.

8.1 Isolated Footings:

This site has been classified as CLASS H1-D (AS2870-2011) therefore if strip footings and stumps, and/or pad footings are required in the proposed building for this site then these will need to be designed by a qualified engineer (as defined in AS2870) using engineering principles following AS2870-2011.

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

9. BEARING PRESSURE GUIDE FOR THE DESIGN OF LOAD BEARING FOUNDATIONS:

The following allowable bearing pressures may be used as a guide if any load bearing foundations are required for the proposed building at this site:

Depth from Existing Ground Level (mm)	Allowable Bearing Capacity (kPa)
500	160
1000	200
1500	240
2000	260
3000	280

If bored piers are required, allowable bearing capacity values above can be adopted as the allowable end bearing capacity. A maximum allowable skin friction of 30kPa can be assumed to exist between piers and any of the naturally occurring silty CLAY soils. No skin friction should be adopted for FILL soils or soils within 3000mm of the surface level.

All load bearing foundations should be founded in the same type of material as much as practicable, to minimise differential movement.

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

10. CONDITIONS OF THE RECOMMENDATIONS:

10.1 Foundations Adjacent to Easements:

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

10.2 Review of the recommendations:

The recommendations made in this report may need to be reviewed by Civiltest Pty Ltd should any of the following occur:

- 10.2.1 Where any site works disturb any soil 300mm below the founding depth of any footing system as defined in AS2870 Clause 1.8.25.
- 10.2.2 Where any individual foundation depth exceeds the investigation depth.
- 10.2.3 Where any earthworks lower the building area by 0.5 metres or more.

10.3 Founding soils and depths:

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

10.4 Use of FILL materials:

Where any filling is to be placed (other than under the floor slab, refer to 7.1.3 above), the footing founding depths recommended in this report will need to be increased accordingly by the depth of that fill unless one of the following occurs:

10.4.1 The base of the footing is founded in the founding soil recommended in 7.1.1.

10.4.2 The fill has been placed under controlled conditions and compacted to a minimum of 95% of AS1289, 5.1.1 (Standard Compaction) throughout. In this case, the footings may be placed in this fill depending on the findings of further site investigations and the revision of the recommendations made in this report.

10.5 Soil descriptions:

The descriptions of the soils found in the boreholes closely follow those outlined in AS 1726:2017 (Geotechnical Site Investigations). Colour descriptions can vary with soil moisture content. It should be noted therefore, colour and shade descriptions mentioned in this report are made when the soil is in a moist condition.

10.6 Amendment of the report:

This report has been compiled and recommendations made based on information supplied in the brief to Civiltest Pty Ltd and from the field investigations and observations made including the extent of, if any, site filling. Every care has been taken within the terms of the brief to ensure that the field investigation is representative of the site. Therefore, if it is found that for any reason information received by Civiltest Pty Ltd is incorrect, or conditions on site vary considerably during construction to those described in this report, then the comments and recommendations made in this report may need to be amended by Civiltest Pty Ltd.

10.7 Foundation design:

The recommendations in this report are not based on a design by engineering principles as defined in Section 4, AS2870 – 2011.

10.8 Long term maintenance and performance:

To ensure acceptable long term performance of the footing systems recommended in this report, care should be taken that the fundamental building, landscaping and long term maintenance procedures are adhered to as set out in the CSIRO Division of Building, Construction and Engineering: Building Technology File 18-2011, "Foundation Maintenance and Footing Performance: A homeowners guide" which is available on the CSIRO website <http://www.publish.csiro.au/home.htm>. This information sheet forms an integral part of this report.

10.9 Abnormal moisture conditions:

The recommendations made in this report are based on current findings and investigations. Civiltest Pty Ltd cannot be held responsible for any financial loss and / or hardship in relation to the construction of the structure and future performance of the footing system if relevant historical information has not been supplied in writing by the client to Civiltest Pty Ltd. (For example, the recent removal of trees or buildings or any other activity that is likely to have created abnormal moisture conditions as defined in AS2870 prior to Civiltest being commissioned for the investigation reported herein.)

10.10 Building cost estimation:

The limitations of this report should be closely observed when carrying out detailed costings of the proposed structure.

10.11 The information and any recommendations given in this report are limited to the client named herein.

- 10.12** Whilst Civiltest Pty Ltd has accepted the commission for the work reported herein, the ownership of the report and any liabilities associated with it, remain with Civiltest Pty Ltd until all relevant accounts have been paid.
- 10.13** Any levels referred to in Civiltest Pty Ltd reports should be regarded as general and are not to be interpreted as surveyed confirmed levels. All levels should be checked and confirmed by a licensed surveying organisation or qualified personnel.
- 10.14** Finally, no responsibility will be taken for this report if it is altered in any way, or not reproduced in full.

This report consists of eight pages including one site plan. Appendix A (Engineering Logs) is attached.

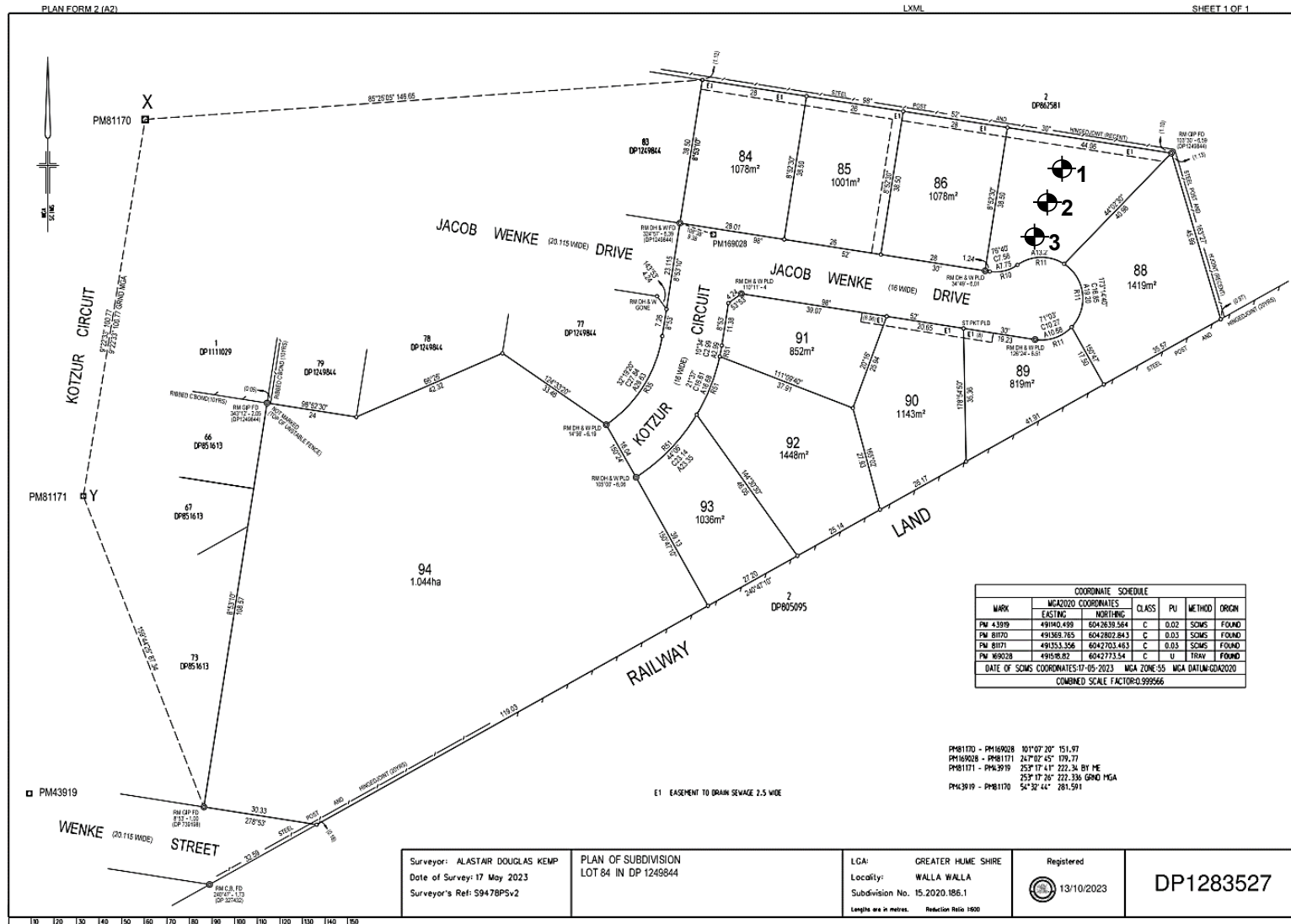


**FADY FANOUS
GEOTECHNICAL ENGINEER
CIVILTEST PTY LTD**

REF: jk/FF/jy/kg

5 December 2023

LOCATION OF TEST SITES: LOT 87 JACOB WENKE DRIVE WALLA WALLA NSW



Denotes Boreholes

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

NOT TO SCALE

APPENDIX A

ENGINEERING LOGS

ENGINEERING LOG

REPORT NO. 4230411-4


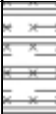

BOREHOLE NO. 1

DATE: 22-NOV-2023

FIELD TECHNICIAN: Jk

DRILLING METHOD: : Trailer Rig

PROJECT LOCATION: Jacob Wenke Drive WALLA WALLA NSW

DEPTH (m) NOT TO SCALE	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	TESTING					
				DEPTH (m) NOT TO SCALE	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm ²)
0.1	SM SAND, silty, trace gravel and clay Brown; Moist; Medium dense Sand is sub-rounded to angular, medium to fine grained Gravel is sub-rounded to angular, fine grained								
0.4	CL CLAY, silty, trace sand Brown; Moist(w<PL); Hard Sand is angular, medium to fine grained								
3.0	CH CLAY, silty, trace sand Brown mottled red; Moist(w<PL); Hard Sand is angular, medium to fine grained								
	END OF BORE (22-Nov-2023)		