GEOTECHNICAL INVESTIGATION:

Alterations and Additions at **5 Kooloora Avenue, Freshwater**

1. Proposed Development

1.1 Construct a new carport and paved terrace on the downhill side of the house.

1.2 Extend the lower ground floor of the existing house by excavating to a maximum depth of ~2.5m.

1.3 Add a new upper floor addition to the existing house.

1.4 Various other minor internal and external alterations to the existing house.

1.5 Construct a paved terrace on the uphill side of the house.

1.6 Install a new pool on the uphill side of the house by excavating to a maximum depth of ~2.2m.

1.7 Details of the proposed development are shown on 14 drawings prepared by Rachel Hudson, job number 199. Drawings numbered YH-01-DA to YH-14-DA, dated 10/6/21.

2. Site Description

2.1 The site was inspected on the 6th of July, 2021.

2.2 This residential property is on the corner of Kooloora Avenue and Murray Road. It is on the uphill side of Kooloora Avenue and is near level with Murray Road. The property has a NE aspect. The natural slope rises across the property at an average angle of ~5°. The slope above the property gradually increases in grade. Below the property is near level at the valley floor.

2.3 At the road frontage, a paved driveway runs to a garage attached to the house (Photo 1). Between the road frontage and the house is a near level lawn area. The part

two storey rendered brick house is supported by brick walls, brick piers and steel posts (Photos 2 & 3). The supporting walls, piers and posts stand vertical and show no significant signs of movement (Photo 4). A near level lawn and paved area extends off the uphill side of the house (Photo 3). No signs of slope instability were observed on the property. The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by Hawkesbury Sandstone. It is described as a medium to coarse grained quartz sandstone with very minor shale and laminite lenses.

4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Three Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The locations of the tests are shown on the site plan. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is not expected to be an issue for the testing on this site. But due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in the excavation and foundation budget to account for this. We refer to the appended “Important Information about Your Report” to further clarify. The results are as follows:

TEST RESULTS ON NEXT PAGE

AUGER HOLE 1 (~RL8.4) **–** AH1 (Photo 9)

Depth (m)	Material Encountered
0.0 to 0.4	**TOPSOIL**, sandy soil, dark brown, damp, fine to medium grained with fine trace organic matter.
0.4 to 1.0	**SILTY SAND**, dark grey and brown, moist, loose to medium dense, fine to medium grained.
1.0 to 1.4	**SAND**, light orange brown, damp, medium dense, medium grained.
1.4 to 1.8	**SANDY CLAY**, light brown and light grey, firm, moist to damp.
1.8 to 2.0	**SANDY CLAY**, derived from Very Low Strength Sandstone, orange, moist, sugary texture.

End of Hole @ 2.0m in sandy clay. No watertable encountered.

DCP TEST RESULTS – Dynamic Cone Penetrometer

Equipment: 9kg hammer, 510mm drop, conical tip. Standard: AS1289.6.3.2 - 1997

Depth(m) Blows/0.3m	DCP 1 (~RL9.2)	DCP 2 (~RL8.4)	DCP 3 (~RL6.5)
0.0 to 0.3	3	1	6
0.3 to 0.6	6	2	5
0.6 to 0.9	7	11	9
0.9 to 1.2	4	7	8
1.2 to 1.5	5	6	7
1.5 to 1.8	11	10	9
1.8 to 2.1	31	17	22
2.1 to 2.4	22	20	23
2.4 to 2.7	28	19	45
2.7 to 3.0	32	25	49
3.0 to 3.3	42	54	#
3.3 to 3.6	41	#	
3.6 to 3.9	50		
3.9 to 4.2	#		
	End of Test @ 3.7m	End of Test @ 3.3m	End of Test @ 3.0m

#refusal/end of test. F=DCP fell after being struck showing little resistance through all or part of the interval.

DCP Notes:

DCP1 – End of Test @ 3.7m, DCP still very slowly going down, dark brown and grey sandy soil on damp tip.
DCP2 – End of Test @ 3.3m, DCP still very slowly going down, dark brown soil and light brown sand on moist tip.
DCP3 – End of Test @ 3.0m, DCP still very slowly going down, grey sand on damp tip.

5. Geological Observations/Interpretation

In the test locations, the ground materials consist of a sandy topsoil, Loose to Medium Dense silty sand and Medium Dense sand over sandy clays. The clays merge into the underlying weathered rock at depths from between ~2.1m to ~2.4m below the current surface. The weathered rock is interpreted to be Very Low Strength Rock or better. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the rock and through the cracks in the rock.

From work done previously by this firm on Kooloora Avenue, the watertable is expected at or slightly above ~RL2.6. It is expected that the watertable will be well below the base of the pool (~RL6.3), lower ground floor excavation (~RL5.8) and any required foundations.

It should be noted the watertable fluctuates slightly with the tide and climatic changes.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below or beside the property. The proposed excavations for the lower ground floor extension and pool are a potential hazard until

retaining walls are in place (**Hazard One**). The proposed lower ground floor excavation undercutting the subject house, NW neighbouring concrete pathway (Photo 5) and NW neighbouring house (Photo 5) is a potential hazard (**Hazard Two**). The proposed excavation for the pool undercutting the existing low rendered masonry retaining wall (Photo 6), Rendered masonry boundary fence/retaining wall (Photo 7) and SW neighbouring pathway (Photo 8) is a potential hazard (**Hazard Three**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two	Hazard Three
TYPE	The proposed excavations for the lower ground floor and pool collapsing onto the worksite and impacting the neighbouring properties before retaining structures are in place.	The proposed excavation for the lower ground floor undercutting the subject house, NW neighbouring concrete pathway (Photo 5) and NW neighbouring house (Photo 5).	The proposed excavation for the pool undercutting the existing low rendered masonry retaining wall (Photo 6), Rendered masonry boundary fence/retaining wall (Photo 7) and SW neighbouring pathway (Photo 8).
LIKELIHOOD	'Possible' (10^{-3})	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (35%)	'Medium' (20%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	4.2×10^{-5}/annum	8.3×10^{-6}/annum	8.3×10^{-6}/annum
COMMENTS	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be followed.	This level of risk to life and property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be followed.	This level of risk to life and property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be followed.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

The fall is to Kooloora Avenue. All stormwater from the proposed development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

11. Excavations

An excavation to a maximum depth of ~2.5m is required to extend the lower ground floor of the house. Another excavation to a maximum depth of ~2.2m is required to install the proposed new pool.

The excavations are expected to be through topsoil, sand and sandy clay, with Very Low Strength Rock expected near the bases of the excavations. The excavations are expected to be carried out using a small excavator and hand tools due to access difficulties.

12. Vibrations

Possible vibrations generated during excavations through soil, sand, clay and Very Low Strength Rock will be below the threshold limit for building damage.

13. Excavations Support Requirements

Bulk Excavation for Proposed Lower Ground Floor Extension

An excavation to a maximum depth of ~2.5m is required to extend the lower ground floor of the house. Allowing for backwall drainage, the set backs are as follows:

- Underneath and Flush with the brick walls and brick piers supporting the existing house.

- ~2.0m from the NW neighbouring house and ~0.6m from the NW neighbouring concrete pathway (Photo 5).

The subject house, NW neighbouring house and NW neighbouring pathway will be within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 30° line through soil/sand and a 45° line through clay/weathered rock from the base of the excavation towards the surrounding structures and boundaries.

The structures supporting the existing house (within the zone of influence of the excavation) are to be propped or underpinned to beyond the zone of influence of the excavation, prior to the excavation commencing.

Where underpinning is not required (outside of the footprint of the existing house) heavy ground support is recommended due to the presence of deep sand and the proximity to the neighbouring structures.

It is recommended a secant or contiguous pile wall be constructed along the NW side and SW side of the excavation where underpinning is not required before the excavation commences. See the Lower Floor Plan attached for the minimum extent of the required shoring shown in blue. Secant piers are the preferred option but if contiguous piers are used, the gaps between the piers are to be grouted closed as the excavation is lowered so no material moves through the wall. The piers can be temporarily supported by bracing and/or embedment below the base of the excavation but are to be tied into the house structure during construction.

To drill the pier holes for the walls, a small pilling rig that can excavate through Medium to High Strength Rock will be required. If a machine of this type is not available, we recommend carrying out core drilling before the construction commences to confirm the strength of the rock and to ensure the excavation equipment is capable of reaching the required depths.

The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all the piers before any steel or concrete is placed.

Bulk Excavation for Proposed Pool

An excavation to a maximum depth of ~2.2m is required to install the proposed new pool.

The set backs are as follows:

- Flush with a low rendered masonry retaining wall on the subject property (Photo 6).
- ~1.3m from the SW rendered masonry boundary fence/retaining wall (Photo 7) and ~1.5m from the SW neighbouring pathway (Photo 8).
- ~1.0m from the NW common boundary.

The low retaining wall, SW boundary fence, SW neighbouring pathway and NW common boundary will be within the zone of influence of the excavation.

Due to the depth of the sand and the proximity to the surrounding structures and boundaries, all sides of the excavation will require shoring or underpinning.

The NW and SE cuts are to be supported as the excavation is progressed with typical pool shoring such as braced form ply or similar until the pool structure is in place.

There are two possible excavation support options for the SW and NW cuts:

1. If the low rendered masonry retaining (Photo 6) is to remain, it is to be underpinned to the base of the excavation, prior to the excavation commencing.
2. If the low rendered masonry retaining is to be demolished, ground support will be required for the SW cut and temporary pool shoring will be required for the NW cut. A secant or contiguous pile wall is recommended for the SW cut as per the recommendations for the lower ground floor excavation. For ease of design and construction it may be considered desirable to pile the entire excavation perimeter.

See the Mid Floor Plan attached for the minimum extent of the required underpinning or shoring shown in blue.

The excavation for the pool is to be completed prior to the construction of the proposed terrace on the uphill side of the house.

Advice Applying to Both Excavations.

The materials and labour to construct the retaining walls/pool structure are to be organised so on completion of the excavations they can be constructed as soon as possible. The excavations are to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

All excavation spoil is to be removed from site following the current Environmental Protection Agency (EPA) waste classification guidelines.

14. Retaining Structures

For cantilever or singly propped retaining structures it is suggested the design be based on a triangular distribution of lateral pressures using the parameters shown in Table 1.

Table 1 – Likely Earth Pressures for Retaining Structures

Unit	Earth Pressure Coefficients			
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0	Passive
Topsoil	20	0.40	0.55	N/A
Loose to Medium Dense Silty Sand and Sand	20	0.45	0.60	K_p = 3.0 ultimate
Residual Clays	20	0.35	0.45	Kp 2.0 ultimate
Very Low Strength Rock	22	0.22	0.35	400kPa ultimate

For rock classes refer to Pells et al "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region". Australian Geomechanics Journal 1978.

It is to be noted that the earth pressures in Table 1 assume a level surface above the structure, do not account for any surcharge loads and assume retaining structures are fully drained. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure with free draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining structures the full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

Spread footings or raft slabs supported on the underlying Loose to Medium Dense sandy soil or silty sand and taken to a minimum depth of 0.4m are suitable footings for the proposed carport and terraces. A maximum allowable bearing pressure of 100kPa can be assumed for footings on Loose to Medium Dense sandy soil/silty sand.

The footing walls are to be shored with timber to prevent collapse. The base of the footing excavations in sand should be compacted as the excavation will loosen the upper sands. This can be carried out with a hand-held plate compactor. Water may be used to assist in compaction in sand but footing materials should be kept damp but not saturated. As a guide to the level of compaction required a density index of >85% is to be achieved.

The proposed pool is expected to be seated in Very Low Strength Rock or better. This is a suitable foundation material. The proposed lower ground floor extension is expected to be seated in this ground material on the uphill side. On the downhill side where the rock drops away with the slope, piers taken to Very Low Strength Rock or better will be required to

maintain a uniform bearing material across the structure. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Very Low Strength Rock or better.

The foundations of the existing house are currently unknown. Ideally, footings should be founded on the same footing material across the structure. Where the footing material does change across the structure construction joints or similar are to be installed to prevent differential settlement, where the structure cannot tolerate such movement.

As the bearing capacity of weathered rock reduces when it is wet we recommend the footings be dug, inspected and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained and the soft layer of weathered rock on the footing surface will have to be removed before concrete is poured.

NOTE: If the contractor is unsure of the footing material required it is more cost effective to get the geotechnical consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over excavation in clay like shaly rock but can be valuable in all types of geology.

REQUIRED INSPECTIONS ON NEXT PAGE

16. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the owners or the regulating authorities if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect the ground materials while the first pier for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations.

- All finished pier holes for the piled wall/excavations for ground support are to be inspected and measured before concrete is placed.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.

Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist.

Photo 1

Photo 2

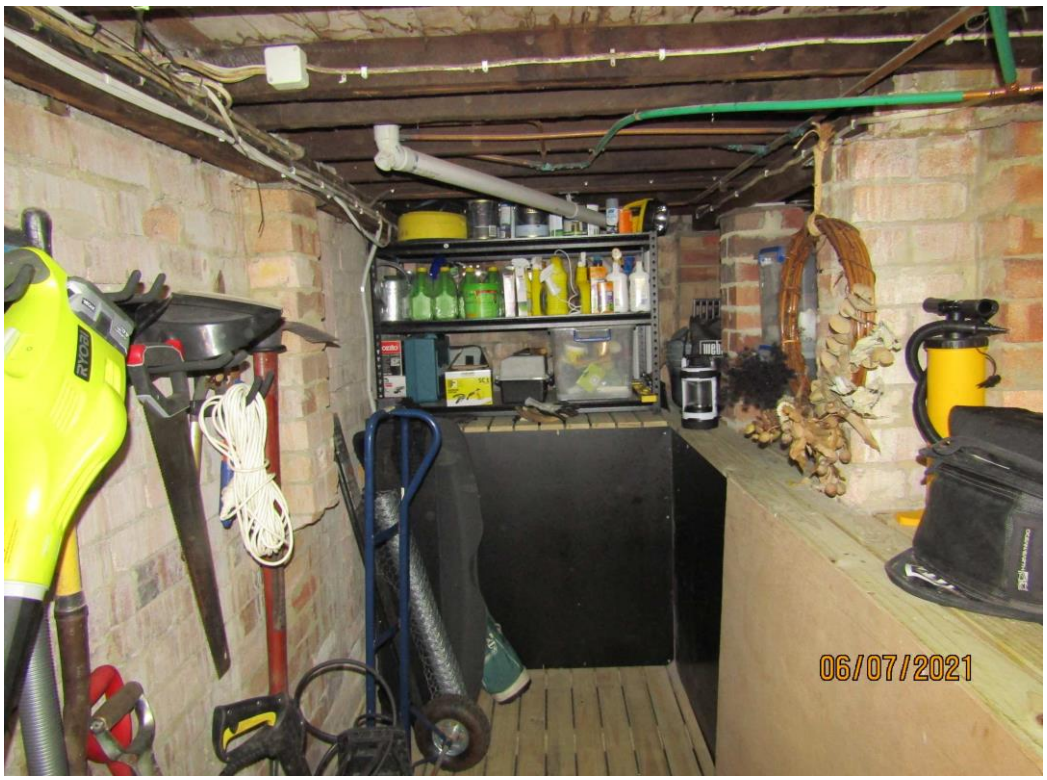


Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9: AH1 – Downhole is from top to bottom.

Important Information about Your Report

It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures on the site or by budget and time constraints of the client. Additionally, the test themselves, although chosen for their suitability for the particular project, have their own limiting factors. The testing gives accurate information at the location of the test, within the confines of the test's capability. A geological interpretation or model is developed by joining these test points using all available data and drawing on previous experience of the geotechnical consultant. Even the most experienced practitioners cannot determine every possible feature or change that may lie below the earth. All of the subsurface features can only be known when they are revealed by excavation. As such, a Geotechnical report can be considered an interpretive document. It is based on factual data but also on opinion and judgement that comes with a level of uncertainty. This information is provided to help explain the nature and limitations of your report.

With this in mind, the following points are to be noted:

- If upon the commencement of the works the subsurface ground or ground water conditions prove different from those described in this report, it is advisable to contact White Geotechnical Group immediately, as problems relating to the ground works phase of construction are far easier and less costly to overcome if they are addressed early.

- If this report is used by other professionals during the design or construction process, any questions should be directed to White Geotechnical Group as only we understand the full methodology behind the report's conclusions.

- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

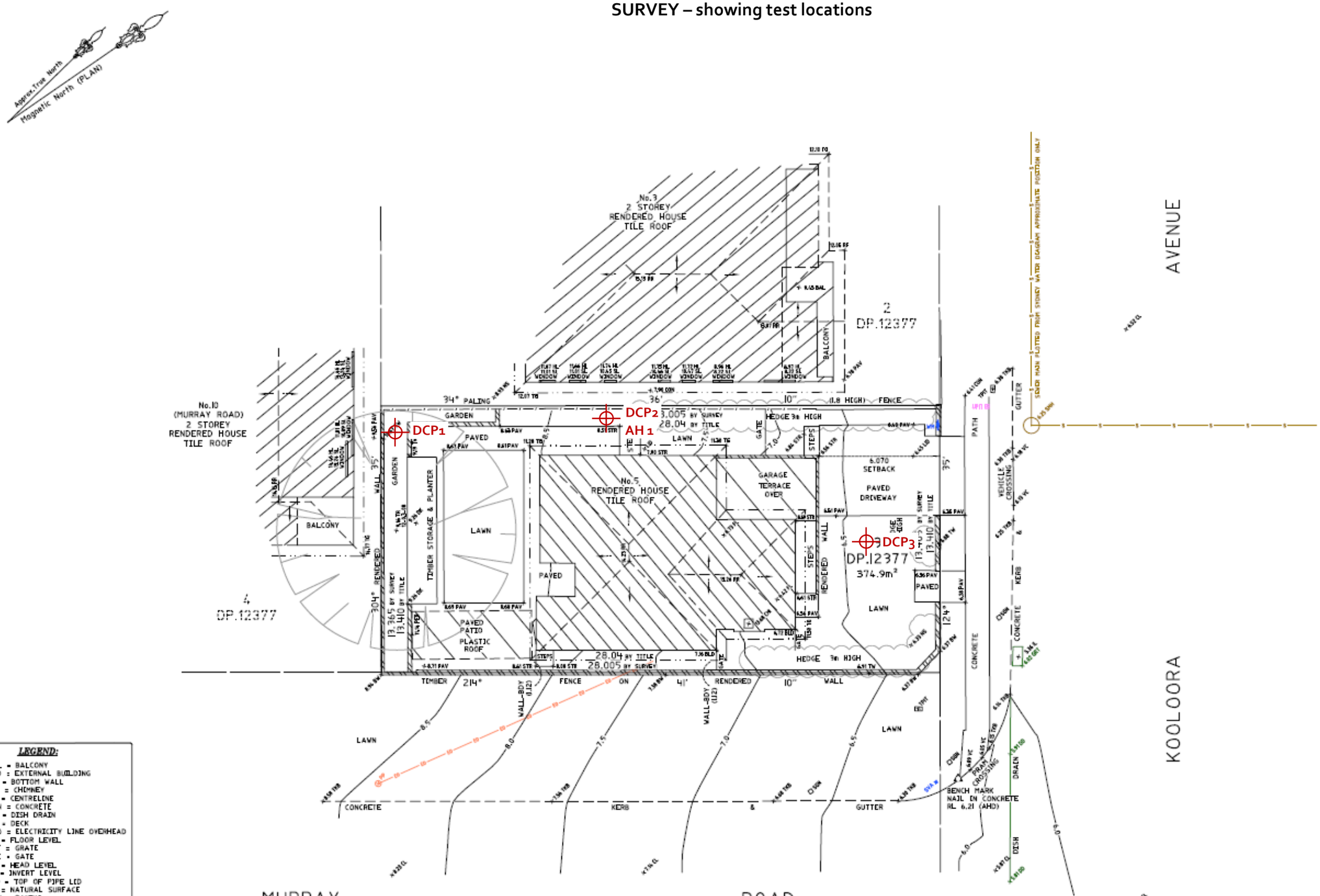
- This report should not be applied to any other project other than that outlined in section 1.0.

- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.

- It is common for the design and construction process to be adapted as it progresses (sometimes to suit the previous experience of the contractors involved). If alternative design and construction processes are required to those described in this report, contact White Geotechnical Group. We are familiar with a variety of techniques to reduce risk and can advise if your proposed methods are suitable for the site conditions.

A1

SURVEY – showing test locations



LEGEND:

BAL = BALCONY
BLD = EXTERNAL BUILDING
BW = BOTTOM WALL
CHI = CHIMNEY
CL = CENTRELINE
CON = CONCRETE
DD = DISH DRAIN
DK = DECK
ELO = ELECTRICITY LINE OVERHEAD
FL = FLOOR LEVEL
GRT = GRATE
GTE = GATE
HL = HEAD LEVEL
IL = INVERT LEVEL
LID = TOP OF PIPE LID
NS = NATURAL SURFACE
PAV = PAVING
PER = TOP OF PERGOLA
RF = TOP OF ROOF
RR = ROOF RIDGE
SGN = SIGN
SL = SILL LEVEL
SMH = SEWER MAN HOLE
STR = STAIRS
SVA = STOP VALVE
TG = TOP OF GUTTER
TKB = TOP OF KERB
TLE = TREE LINE
TPIT = TELSTRA PIT
TR = TREE
TW = TOP OF WALL
UPIT = UNKNOWN PIT
VC = VEHICLE CROSSING
WM = WATER METER
= ELECTRICITY OVERHEAD
= SEWER UNDERGROUND
TREE
SPREAD-DIAMETER-HEIGHT

0 1 2 3 4 5 6 7 8 9 10
SCALE 1:100

TITLE INDICATES THAT LOT 3 IN D.P.12377 IS SUBJECT TO:
- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S).

NOTES

- A BOUNDARY SURVEY HAS BEEN UNDERTAKEN.
- WALL TO BOUNDARY DIMENSIONS SHOWN HEREON MUST NOT BE USED FOR CONSTRUCTION.
- IF CONSTRUCTION IS INTENDED TO BE UNDERTAKEN ON OR ADJACENT TO PROPERTY BOUNDARIES THE BOUNDARIES OF THE LAND MUST BE MARKED OR THE BUILDING SETOUT.
- TREE SIZES ARE ESTIMATES ONLY.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF ANTHONY YEATES.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
- EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
- ONLY VISIBLE SERVICES HAVE BEEN LOCATED. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. DIAL BEFORE YOU DIG SERVICES ph 1100 SHOULD BE USED AND A FULL UTILITY INVESTIGATION, INCLUDING A UTILITY LOCATION SURVEY, SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
- SEWER MAIN PLOTTED FROM SYDNEY WATER SEWER DIAGRAM. LOCATION SHOULD BE MARKED ON SITE IF CRITICAL.
- CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
- THIS PLAN IS ONLY TO BE USED FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS.
- CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT, ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
- CONTOUR INTERVAL – 0.5 metre. – SPOT LEVELS SHOULD BE ADOPTED.
- POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
- THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
- DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.
-
- THIS NOTICE MUST NOT BE ERASED.

STEPHEN EMERY
REGISTERED SURVEYOR 8958 NUMBER 1615

HORIZONTAL DATUM:
CO-ORDINATE SYSTEM: ASSUMED
MARKS ADOPTED: N/A

VERTICAL DATUM:
DATUM: AUSTRALIAN HEIGHT DATUM (AHD)
B.M. ADOPTED: PM 2227
R.L. 12.719 (CLASS LB)
SOURCE: S.C.M.S. (29/01/2020)

1	FIRST ISSUE	12/02/2020

CLIENT:
ANTHONY YEATES
No.5 KOOLOORA AVENUE
FRESHWATER NSW 2096

SURVEY PLAN
SHOWING DETAIL & LEVELS
OVER LOT 3 IN D.P.12377
No.5 KOOLOORA AVENUE
FRESHWATER NSW 2096

C.M.S. Surveyors Pty Limited
ACN: 096 240 201
PO Box 463 Dee Why NSW 2099
2/99A South Creek Road, Dee Why NSW 2099
Telephone: (02) 9971 4822
Facsimile: (02) 9971 4822
E-mail: info@cmssurveyors.com.au

LGA: NORTHERN BEACHES | SHEET 1 OF 1

SURVEYED	DRAWN	CHECKED	APPROVED
NS	CJR	NS	AF

SURVEY INSTRUCTION	SCALE	DATE OF SURVEY
19102	1:100 @ A1 1:200 @ A3	04/02/2020

DRAWING NAME: 19102detail
CAD FILE: 19102detail 1.dwg
ISSUE: 1

LOWER FLOOR PLAN – showing test locations

Proposed additions shown in yellow

Proposed alterations shown in orange

Minimum extent of required shoring shown in blue.

DCP1

DCP2
AH 1

DCP3

existing dwelling footprint shown dashed

masonry retaining walls to eng's details

new internal stair

convert existing sub-floor storeroom to a laundry with external access door

store
RL 6.00
conc

bthrm
RL 6.00
tiles

garage
RL 6.00
conc

carport
conc

RL 6.00

RL 6.30

chute

HWS

indry
RL 6.00
tiles

media
RL 6.00
conc

terrace
RL 6.00
paving

lawn
RL 6.40

drying court
RL 6.91

new masonry entry stairs

new entry gate and stepping stone

grate drain

new concrete driveway for carport, max grade 1:20

repair existing sliding driveway gate as necessary

HW posts for new carport to eng's details, paint finish

0.4m(h) masonry wall

existing walls shown dashed

outdoor shower

repair existing masonry base to fenceline

excavtion and underpinning to existing slab and masonry walls to eng's details

BASIX 817L rainwater tank

4
DP.12377

3
DP.12377
374.9m²

2
DP.12377

304°35'

214°41'10"

124°35'

13.365

28.005

13.405

6000

6500

10930

3960

4970

3115

3500

900

600

270

110

100

955

300

260

820

200

3300

1650

4875

1750

4350

10605

8.58 TKB

kooloora avenue

murray road

rachel hudson *architect*

www.rachelhudson.com.au
0410 323 564

0 1m 2m 3m 4m

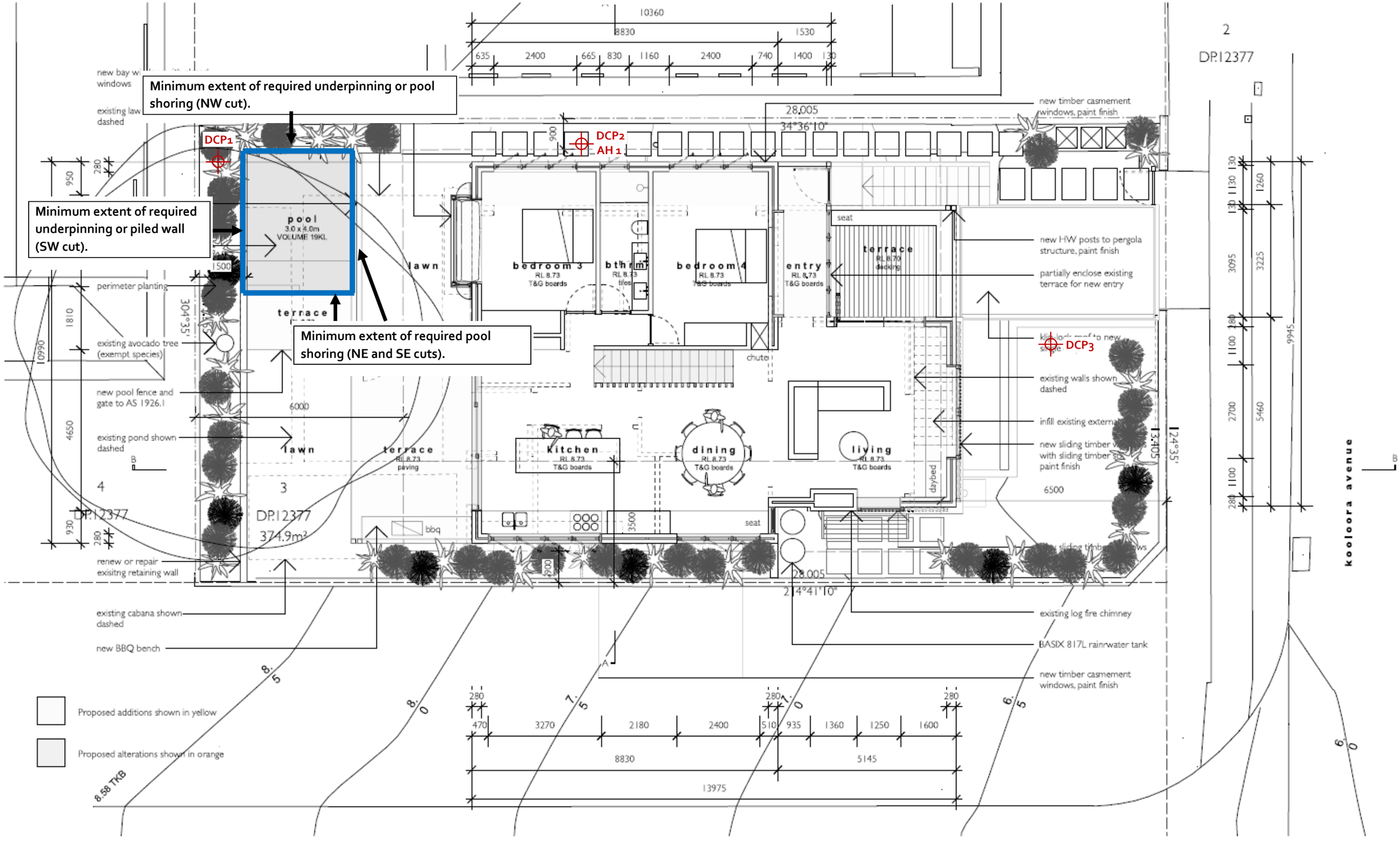
YEATES HOUSE

Michelle & Anthony Yeates
5 Kooloora Avenue
Freshwater
NSW 2096

DWG	YH-05-DA
DATE	10.06.21
ISSUE	A
JOB #	199
SCALE	1:100 @ A3

LOWER FLOOR PLAN

MID FLOOR PLAN – showing test locations



rachel hudson *architect*

www.rachelhudson.com.au
0410 323 564

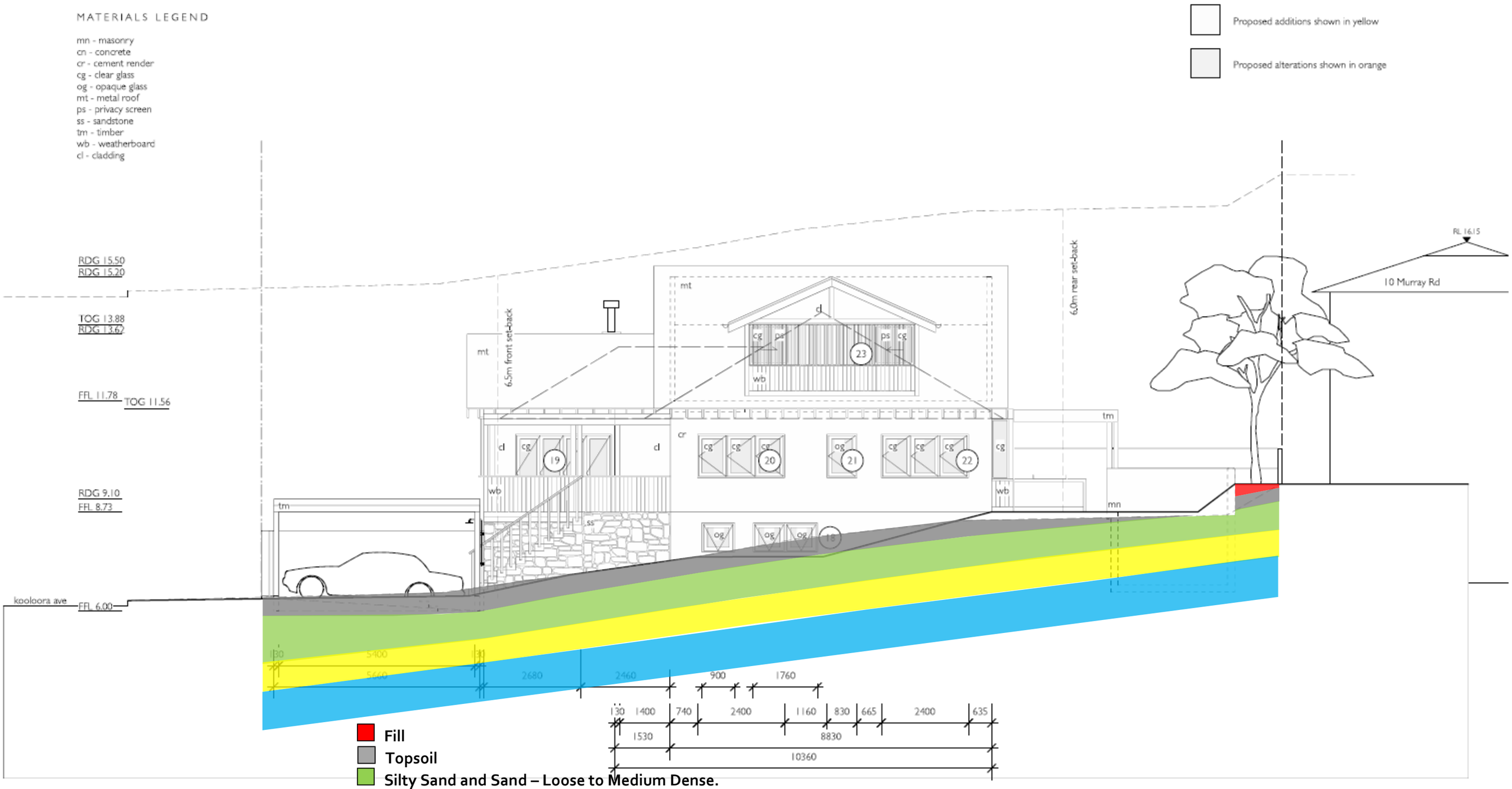
0 1m 2m 3m 4m

YEATES HOUSE
Michelle & Anthony Yeates
5 Kooloora Avenue
Freshwater
NSW 2096

DWG	YH-06-DA
DATE	10.06.21
ISSUE	A
JOB #	199
SCALE	1:100 @ A3

MID FLOOR PLAN

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Fill
Topsoil
Silty Sand and Sand – Loose to Medium Dense.
Sandy Clay
Very Low Strength Rock or better.

rachel hudson ***architect***

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0410 323 564

0 1m 2m 3m 4m

YEATES HOUSE

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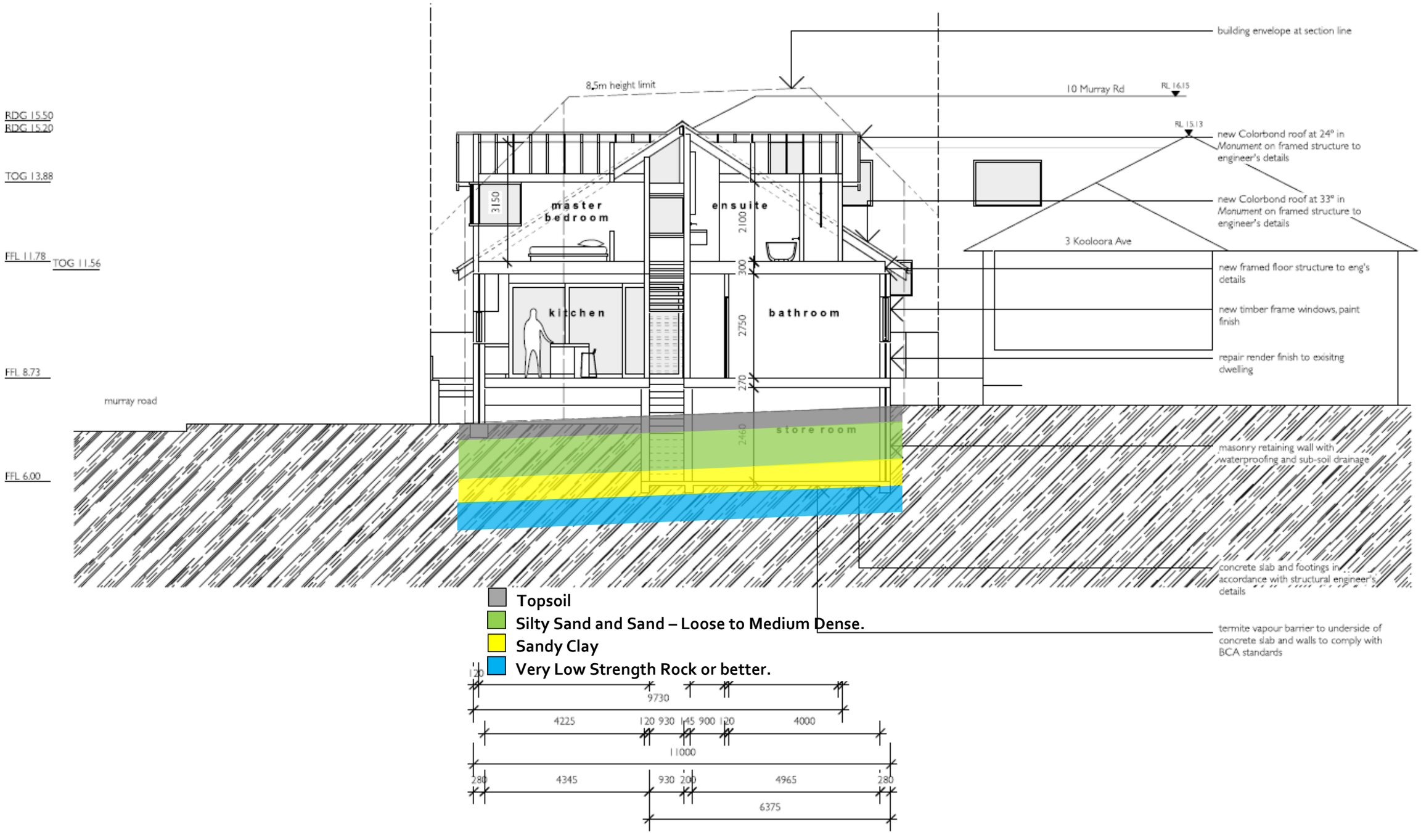
Freshwater
NSW 2096

DWG	YH-12-DA
DATE	10.06.21
ISSUE	A
JOB #	199
SCALE	1:100 @ A3

NW ELEVATION

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



rachel hudson *architect*

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0 1m 2m 3m 4m

YEATES HOUSE

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SECTION AA