PRELIMINARY GEOTECHNICAL ASSESSMENT:

12 Collaroy Street, Collaroy

1.0	***LANDSLIP RISK CLASS*** *(Highlight indicates Landslip Risk Class of property)*
☐	*A - Geotechnical Report not normally required*
☐	*B - Geotechnical Engineer (Under Council Guidelines) to decide if Geotechnical Report is required*
☐	*C - Geotechnical Report is required*
■	*D - Geotechnical Engineer (Under Council Guidelines) to decide if Geotechnical Report is required*
☐	*E - Geotechnical Report required*

2.0 Proposed Development

2.1 Install a pool on the S side of the property by excavating to a maximum depth of ~2.0m.

2.2 Construct a new cabana in the SW corner of the property by excavating to a maximum depth of ~0.9m.

2.3 No fills are shown on the plans.

2.4 Details of the proposed development are shown on 6 drawings prepared by Blackwood Architects, drawings numbered 01 to 06 are Issue 02, dated 19/10/18.

3.0 Site Location

3.1 The site was inspected on the 28th November, 2017 and again on the 25th October, 2018.

3.2 This residential property is level with the road and has an E aspect. The block runs longways to the S so the slope is a cross-fall. It is located on the moderate to steeply graded lower reaches of a hillslope. No rock outcrops on the property. The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale and quartz to lithic quartz sandstone. The natural surface of the block has been altered during its development to date with filling placed on the S side of the property for a level area. Excavations to maximum depths of ~2.0m and ~0.9m will be required for the proposed pool and cabana.

3.3 The site shows no indications of historical movement in the natural surface that could have occurred since the property was developed. We are aware of no history of instability on the property.

4.0 Site Description

The natural slope falls across the property at an average angle of ~19°. At the lower side of the road frontage, a concrete driveway runs to a weatherboard clad garage on the downhill side of the house. The part two-storey brick and weatherboard clad house is supported on brick walls and brick piers. No significant signs of movement were observed in the external supporting walls and the supporting brick piers stand vertical. Filling has been placed on the neighbouring property above. The fill is supported by a stable brick retaining wall reaching a maximum height of ~2.3m that lines the upper common boundary (Photo 1). The retaining wall has been constructed with a ~4° tilt back into the slope and a large vertical crack was observed on the S return of the wall. See **Section 7.0** for recommendations. A fill for a level patio and grass area on the downhill side of the subject house is supported by two stable retaining walls. The upper wall is a low treated timber retaining wall and the lower wall is a ~1.0m high concrete block retaining wall near the lower common boundary. The land surface surrounding the house and pool is lawn-covered with some paved areas. No signs of movement related to slope instability were observed on the grounds. No cliffs or large rock

faces were observed on the property or in the near vicinity. No geotechnical hazards that could impact on the subject property were observed on the surrounding neighbouring properties as viewed from the subject property and the street.

5.0 Ground Testing

As the proposed excavation for the cabana will come flush with the brick retaining wall lining the uphill common boundary in the SW corner of the property, ground testing in this location was undertaken to determine the depth to weathered rock.

Three small pits had been dug by the owner along the retaining wall to expose the existing foundation depth and subsurface materials. The ground materials of the pits were recorded. Four 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 and the results are as follows:

PIT 1 (~RL11.0) - (Photo 2)

Depth (m)	Material Encountered
0.0 to 0.2	**TOPSOIL**, sandy soil, dark brown, fine to coarse grained with fine trace organic matter.
0.2 to 0.4	**CLAY**, grey and brown, soft, very wet, fine to coarse grained with fine trace organic matter.

Base of pit @ 0.4m in wet clay. Existing foundations of the brick retaining wall taken to a depth of 0.25m onto the underlying clay.

PIT 2 (~RL11.3) - (Photo 3)

Depth (m)	Material Encountered
0.0 to 0.25	**TOPSOIL**, sandy soil, dark brown, fine to coarse grained with fine trace organic matter.
0.25 to 0.5	**CLAY**, grey and brown, soft, very wet, fine to coarse grained with fine trace organic matter.

Base of pit @ 0.5m in wet clay. Existing foundations of the brick retaining wall not visible.

PIT 3 (~RL11.3) - (Photo 4)

Depth (m)	Material Encountered
0.0 to 0.3	**TOPSOIL**, sandy soil, dark brown, fine to coarse grained with fine trace organic matter.
0.3 to 0.5	**CLAY**, grey and brown, soft, very wet, fine to coarse grained with fine trace organic matter.

Base of pit @ 0.5m in wet clay. Existing foundations of the brick retaining wall not visible. Water pooling from 0.4m.

DCP TEST RESULTS ON THE NEXT PAGE

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** (~RL11.0)	**DCP 2** (~RL11.3)	**DCP 3** (~RL9.8)	**DCP 4** (~RL10.7)
0.0 to 0.3	F	4	1F	3
0.3 to 0.6	3F	5	3	5
0.6 to 0.9	2	6	5	5
0.9 to 1.2	16	25	5	9
1.2 to 1.5	33	30	9	28
1.5 to 1.8	42	#	#	35
1.8 to 2.1	#			#
	End of Test @ 1.8m	End of Test @ 1.4m	Refusal on Rock @ 1.4m	End of Test @ 1.8m

#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 @ 1.8m, DCP still very slowly going down, clean dry tip, orange and brown clay in collar above tip.
DCP2 – End of test @ 1.4m, DCP still very slowly going down, clean dry tip, orange and brown clay in collar above tip.
DCP3 – Refusal on rock @ 1.4m, DCP bouncing, orange impact dust on dry tip, brown clay in collar above tip. Test taken at base of ~1.0m high retaining wall.
DCP4 – End of test @ 1.8m, DCP still very slowly going down, wet muddy tip, orange and maroon clay in collar above tip.

6.0 Geological Observations and Interpretations

The slope materials are colluvial at the near surface and residual at depth. They consist of a manmade fill over sandy topsoil and silty clays and clays. In the test locations, the silty clays and clays merge into the weathered zone of the under lying shale at an average depth of ~1.2m below the current surface. The weathered zone is interpreted as Extremely Low Strength Shale. It is to be noted that this material can appear as a mottled stiff clay when it is

cut up by excavation equipment. The water that was observed to be pooling in the pits likely originates from standard groundwater that flows over the buried surface of the clays. See Type Section attached for a diagrammatical representation of the expected ground materials.

7.0 Recommendations

On the basis of the ground testing, we expect the brick retaining wall on the boundary will be undercut by the proposed excavation. As such the wall will need to be propped and underpinned to rock prior to the commencement of the excavation. A new engineered retaining wall will then need to be constructed in front of the existing wall. The new wall is to be designed to support the loads on the existing wall.

Underpinning is to follow the underpinning sequence 'hit one miss two'. Under no circumstances is the bulk excavation to be taken to the edge of the retaining wall and then underpinned. Underpins are to be constructed from drives that should not exceed 0.8m in width along strip footings and be proportioned according to footing size. Allowances are to be made for drainage through the underpinning to prevent a build-up of hydrostatic pressure. This is especially necessary in this case as water was observed to be pooling at the base of the wall. Underpins that are not designed as retaining walls are to be supported by retaining walls. The void between the retaining walls and the underpinning is to be filled with free-draining material such as gravel.

Alternatively, a secant or contiguous piled wall may be constructed before the excavations commence. A mini piling rig (6 tonne) capable of drilling through Medium Strength Rock will be required to accomplish this. The wall may be supported by embedment.

In regards to the proposed pool excavation, no structures or boundaries will be within the zone of influence of the excavation. The cut batters are expected to stand at near-vertical angles provided they are kept from becoming saturated.

Unsupported cut batters through soil and clay are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The covers are to be tied down with metal

pegs or other suitable fixtures so they can't blow off in a storm. Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The materials and labour to construct the pool structure are to be organised so on completion of the excavation it 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.

We recommend the pool and cabana both be supported on piers taken to the underlying Extremely Low Strength Shale at an average depth of ~1.2m below the current surface. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale.

8.0 Inspections

It is recommended the following inspections be carried out and if geotechnical certification is desired/required the inspections are a requirement.

- The underpin excavations are to be inspected by the geotechnical consultant.

- Should a piled wall be installed, the geotechnical consultant is to inspect the ground materials while the first pile for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations. Additionally, all finished pier holes for 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.

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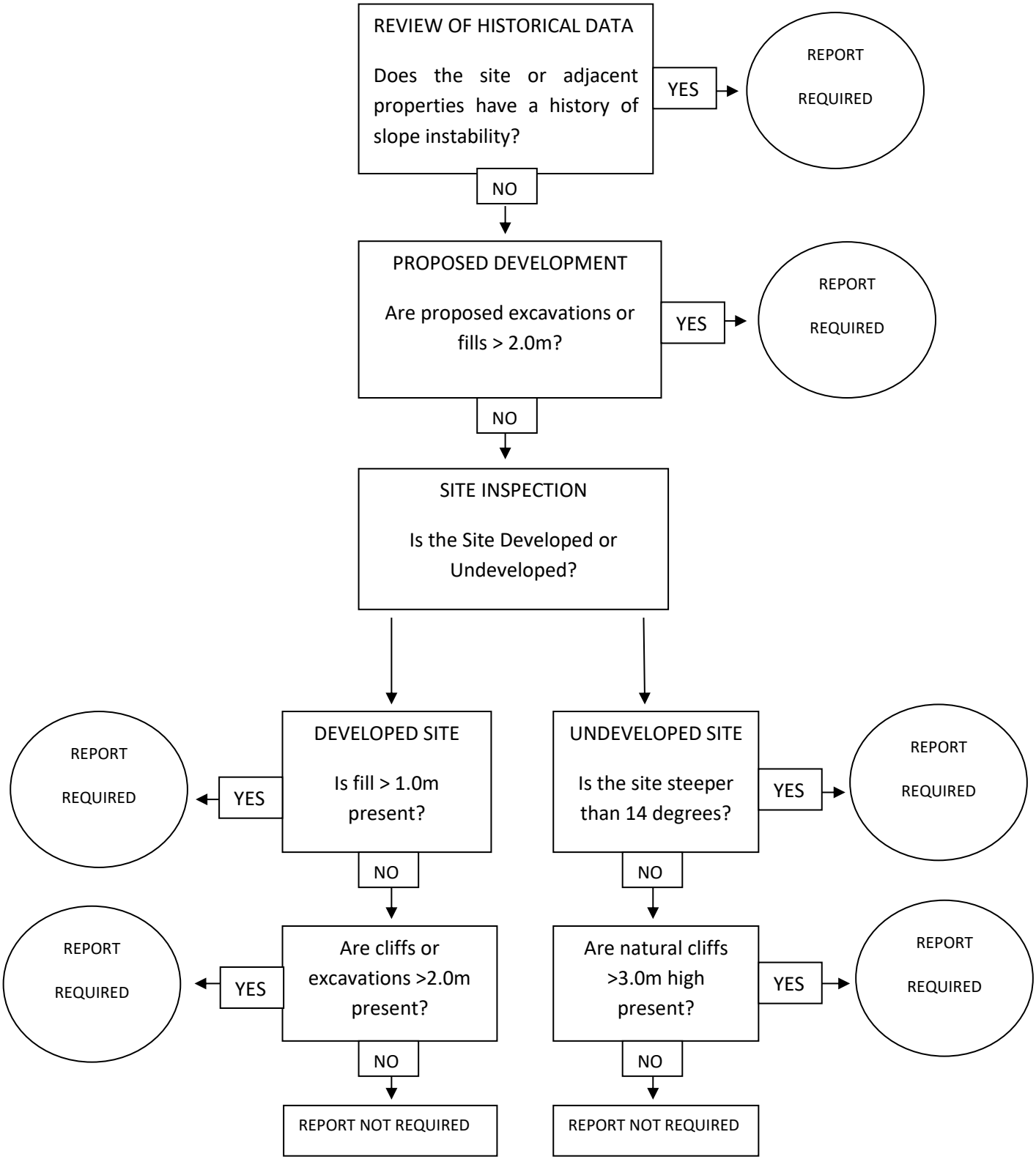
Photo 1

Photo 2: PIT 1

Photo 3: PIT 2

Photo 4: PIT 3

Preliminary Assessment Flow Chart – Northern Beaches Council (Warringah)



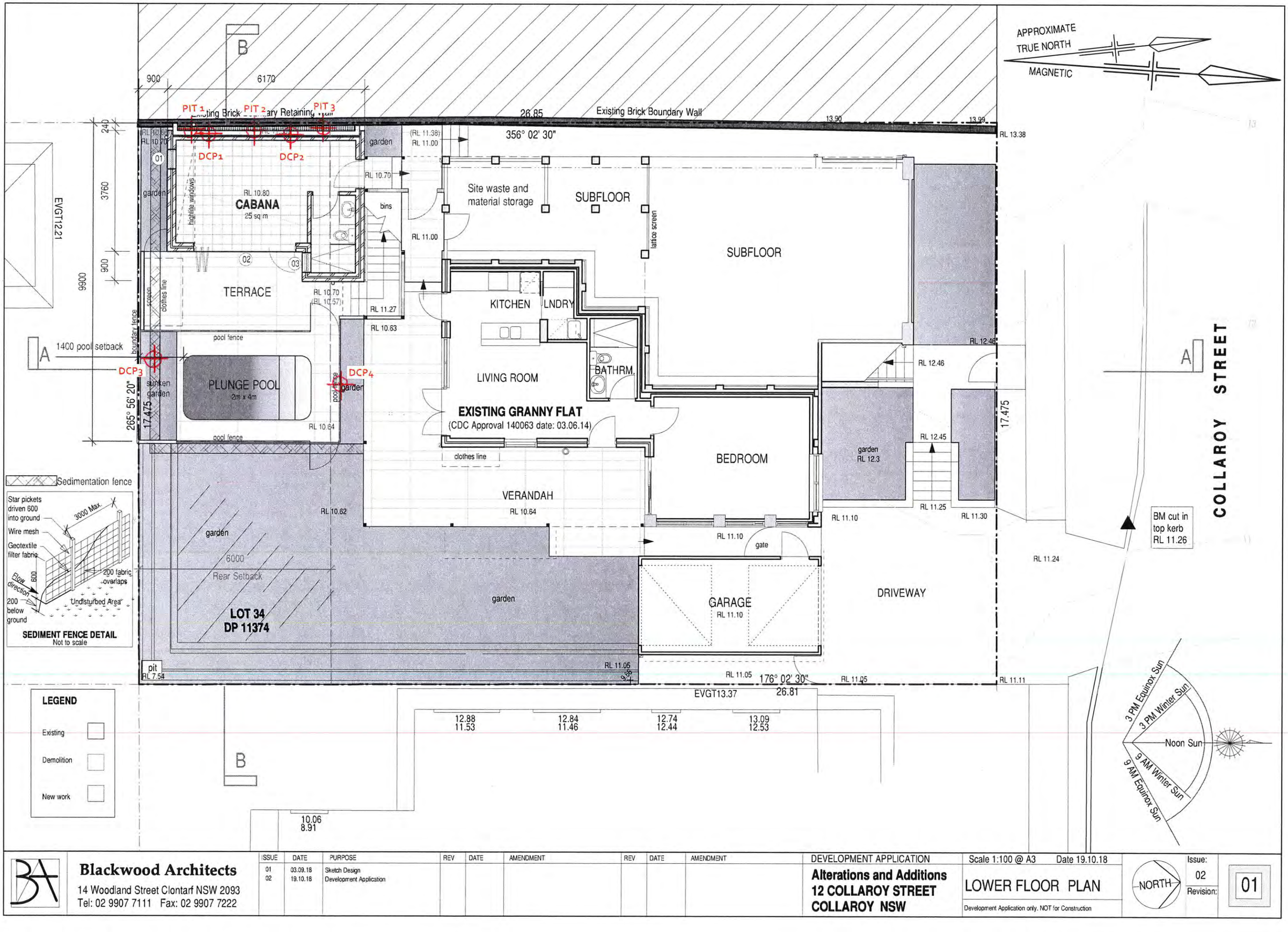
Information about your Preliminary Assessment

This Preliminary Assessment relies on visual observations of the surface features observed during the site inspection. Where reference is made to subsurface features (e.g. the depth to rock) these are interpretations based on the surface features present and previous experience in the area. No ground testing was conducted as part of this assessment and it is possible subsurface conditions will vary from those interpreted in the assessment.

In some cases, we will recommend no further geotechnical assessment is necessary despite the presence of existing fill or a rock face on the property that exceed the heights that would normally trigger a full geotechnical report, according to the Preliminary Assessment Flow Chart. Where this is the case, if it is an existing fill, it is either supported by a retaining wall that we consider stable, or is battered at a stable angle and situated in a suitable position on the slope. If it is a rock face that exceeds the flow chart limit height, the face has been deemed to be competent rock that is considered stable. These judgements are backed by the inspection of over 5000 properties on Geotechnical related matters.

The proposed excavation heights referred to in section 2.0 of this assessment are estimated by review of the plans we have been given for the job. Although we make every reasonable effort to provide accurate information excavation heights should be checked by the owner or person lodging the DA. If the excavation heights referred to in in section 2.0 of this assessment are incorrect we are to be informed immediately and before this assessment is lodged with the DA.

SITE PLAN – showing test locations



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ISSUE	DATE	PURPOSE	REV	DATE	AMENDMENT	REV	DATE	AMENDMENT
01	03.09.18	Sketch Design						
02	19.10.18	Development Application						

DEVELOPMENT APPLICATION

Alterations and Additions
12 COLLAROY STREET
COLLAROY NSW

Scale 1:100 @ A3 Date 19.10.18

LOWER FLOOR PLAN

Development Application only. NOT for Construction

NORTH

Issue: 02
Revision:

01

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

north elevation

- Fill
- Topsoil
- Sandy Clay – Firm to Stiff
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

south elevation

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DEVELOPMENT APPLICATION

Alterations and Additions
12 COLLAROY STREET
COLLAROY NSW

Scale 1:100 @ A3 Date 19.10.18

NORTH & SOUTH ELEVATIONS

Development Application only. NOT for Construction

Issue: 02
Revision:

04