GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application

Development Application for _____
Name of Applicant

Address of site 39 Attunga Road, Newport

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk ***Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report***

I, Ben White *on behalf of* White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 5/3/21 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least $10million.

I:
Please mark appropriate box

☒ have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☒ am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☐ have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.

☐ have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

☐ have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

☐ have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Geotechnical Report **39 Attunga Road, Newport**
Report Date: 5/3/21

Author: BEN WHITE

Author's Company/Organisation: **WHITE GEOTECHNICAL GROUP PTY LTD**

Documentation which relate to or are relied upon in report preparation:

Australian Geomechanics Society Landslide Risk Management March 2007.

White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for Development Application

Development Application for _____
Name of Applicant

Address of site 39 Attunga Road, Newport

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Geotechnical Report **39 Attunga Road, Newport**

Report Date: 5/3/21

Author: BEN WHITE

Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Please mark appropriate box

☒ Comprehensive site mapping conducted **2/3/21**
(date)

☒ Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)

☒ Subsurface investigation required
- ☐ No Justification _____
- ☒ Yes Date conducted **2/3/21**

☒ Geotechnical model developed and reported as an inferred subsurface type-section

☒ Geotechnical hazards identified
- ☐ Above the site
- ☒ On the site
- ☒ Below the site
- ☐ Beside the site

☒ Geotechnical hazards described and reported

☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Consequence analysis
- ☒ Frequency analysis

☒ Risk calculation

☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.

☒ Design Life Adopted:
- ☒ 100 years
- ☐ Other _____
specify

☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified

☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.

☐ Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

New House and Pool at **39 Attunga Road, Newport**

1. Proposed Development

1.1 Demolish the existing garage and construct a new garage.

1.2 Demolish the existing house and construct a new part three storey house requiring minor levelling.

1.3 Install a new pool and spa by excavating to a maximum depth of ~1.4m.

1.4 Details of the proposed development are shown on 7 drawings prepared by MHDP Architects, drawings numbered SK001, SK101 to 104 and SK301 to 302, dated February 2021.

2. Site Description

2.1 The site was inspected on the 2nd of March, 2021.

2.2 The road wraps from the S side to around the N side of this residential property. It has a S aspect and is located on the gentle to moderately graded upper reaches of a hillslope. The natural slope falls from the uphill boundary to the uphill side of the house at angles of <5°. The slope continues from the uphill side of the house at an angle of ~15° before increasing to a maximum angle of ~19° near the downhill property boundary. The slope above the property is near level at the crest of the slope. The slope below the property continues at similar angles for ~125m before easing to near level angles at Newport Beach.

2.3 Between the road frontage and the house is a fibro garage and near level lawn (Photo 1). Fill levels the lawn area. The part two storey brick and fibro house is supported by brick walls and brick piers (Photos 1 & 2). The supporting walls and piers stand vertical and show no significant signs of movement (Photo 3). A brick

wall/retaining wall ~1.8m high supports a low cut in the foundation space and the fill for the lawn on the uphill side of the house (Photo 3). A moderately sloping lawn extends off the downhill side of the house (Photos 2 & 4). Fill supported by a low brick retaining wall has been placed on the upper area of the slope (Photo 2). A brick retaining wall up to ~2.0m high along the E common boundary supports fill on the E neighbouring property (Photo 5). The wall displays cracks up to ~30mm wide and has separated the brickwork up to ~60mm from vertical downslope (Photos 6 & 7). See '**Section 16** Ongoing Maintenance'. Apart from the cracked retaining wall supporting fill, no signs of slope instability were observed on the property.

3. Geology

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.

4. Subsurface Investigation

One Auger hole was put down to identify the soil materials. 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 may have occurred for DCP3. 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 (~RL50.5) **–** AH1 (photo 8)

Depth (m)	Material Encountered
0 to 0.5	**FILL**, topsoil, dark and light brown, dry, fine to medium grained with fine trace organic matter.
0.5 to 0.7	**SILTY CLAY**, orange brown, firm to stiff, dry.

End of Hole @ 0.7m in firm to stiff silty 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** (~RL47.5)	**DCP 2** (~RL50.5)	**DCP 3** (~RL52.9)	**DCP 4** (~RL54.9)
0.0 to 0.3	6	6	16	7
0.3 to 0.6	7	12	#	7
0.6 to 0.9	20	11		14
0.9 to 1.2	15	8		25
1.2 to 1.5	29	5		#
1.5 to 1.8	#	#		
	End of Test @ 1.5m	Refusal @ 1.3m	Refusal @ 0.2m	Refusal @ 1.4m

#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 @ 1.5m, DCP still very slowly going down, red and orange shale fragments on moist tip.

DCP2 – Refusal on rock @ 1.3m, DCP bouncing off rock surface, white and orange rock fragments on dry tip.

DCP3 – Refusal on rock @ 0.2m, DCP bouncing off rock surface, orange brown rock fragments on moist tip.

DCP4 – Refusal on rock @ 1.1m, DCP bouncing off rock surface, brown orange rock fragments on dry tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of fill and a thin sandy topsoil over firm to stiff silty clays. Fill provides a level lawn area on the uphill side of the house has been placed on the slope below the house. The clays merge into the weathered zone of the under lying rocks at depths of between ~0.2m to ~1.5m below the current surface, being shallower at the location of an existing cut (DCP3). The weathered zone of the underlying rock is interpreted as Extremely Low to Medium Strength Rock. 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.

Due to the slope and elevation of the block, the water table in the location is expected to be many metres below the base of the proposed works.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system for Attunga Road above.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above or beside the property. The gentle to moderately graded slope that falls across the property and continues below is a potential hazard (**Hazard One**). The vibrations produced during the proposed excavations for the house and pool are a potential hazard (**Hazard Two**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The gentle to moderate slope that falls across the property and continues below failing and impacting on the property.	The vibrations produced during the proposed excavations for the house and pool impacting on the neighbouring properties.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	5.3×10^{-7}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Sections 11 & 12** 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 Attunga Road. 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

Minor levelling is required to construct the proposed new house. The excavation is interpreted to be through clay, with Extremely Low to Medium Strength Rock expected at a depth of ~0.2m below the current surface.

Another excavation to a maximum depth of ~1.4m is required to install the proposed pool. The excavation is interpreted to be through fill, topsoil and clay, with Extremely Low to Medium Strength Rock expected at a depth of ~1.3m below the current surface.

Excavations through fill, soil, clay and rock up to Low Strength can be carried out with an excavator and bucket. Excavations through Medium Strength Rock or better will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through fill, soil, clay and rock up to Low Strength will be below the threshold limit for building damage.

If Medium Strength Rock or better is encountered, excavations are to be carried out to minimise the potential to cause vibration damage to the neighbouring structures to the E and W. Allowing for backwall-drainage, the excavation for the house is set back ~6.0m from the E neighbouring garage, ~3.3m from the E neighbouring house and ~2.9m from the W neighbouring house. The excavation for the pool is set back ~5.0m from the E neighbouring house and ~6.0m from the E neighbouring pool. Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated. Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the property boundaries. Vibration monitoring will be required to verify this is achieved.

If a milling head is used to grind the rock, vibration monitoring will not be required. Alternatively, if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, a rock hammer up to 300kg could be used to break the rock without

vibration monitoring. Peak particle velocity will be less than 5mm/sec at the property boundaries using this method provided the saw cuts are kept well below the rock to broken.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the neighbouring properties.

13. Excavation Support Requirements

An excavation to a maximum depth of ~1.4m is required to install the proposed pool. The excavation is set back sufficiently from the surrounding structures and boundaries.

The low cut batters through fill, soil, clay and rock up to Low Strength will stand at near-vertical angles for a short period of time until the pool structure is in place, provided the cut batters are kept from becoming saturated.

Medium Strength Rock or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through fill, soil, clay and rock up to Low Strength are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The materials and labour to construct the pool structure are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. If the cut batters remain unsupported for more than a few days before the commencement of pool construction they are to be temporarily supported with typical pool shoring such as braced form ply or similar until the pool structure is in place.

All excavation spoil is to be removed from site or be supported by engineered retaining walls.

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
Fill and Topsoil	20	0.40	0.55
Residual Clays	20	0.35	0.45
Extremely Low to Very Low Strength Rock	22	0.25	0.35
Low Strength Rock	24	0.25	0.35
Medium Strength Rock	24	0.00	0.01

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.

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

The proposed garage can be supported on spread footings or shallow piers embedded into the clays of the natural profile. A maximum allowable bearing pressure of 200kPa can be assumed for footings on firm to stiff clay.

The lower ground floor of the house and pool are expected to be seated in Extremely Low Strength Rock or better on the uphill side. This is a suitable bearing material. Where the house and pool/spa are not cut into the rock they are to be supported on piers taken Extremely Low Strength Rock or better to maintain a uniform bearing material across the structure. The downhill sides of the house and pool are suspended. The piers on the downhill edge of the house and pool are to be embedded at least 0.8m into Extremely Low Strength Rock or better.

As the bearing capacity of clay and 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 clay or weathered rock on the footing surface will have to be removed before concrete is poured.

If a rapid turnaround from footing excavation to the concrete pour is not possible a sealing layer of concrete may be added to the footing surface after it has been cleaned.

NOTE: If the contractor is unsure of the footing material required it is more cost effective to get the geotechnical professional 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.

16. Ongoing Maintenance

The cracked brick retaining wall (Photos 5 to 7) is to be monitored by the owners on an annual basis or after heavy rainfall, whichever occurs first. A photographic record of these inspections is to be kept. Should further movement occur the walls is to be remediated so it meets current engineering standards. We can carry out these inspections upon request.

17. Inspections

The client and builder are to familiarise themselves with the following required inspection as well as council geotechnical policy. We cannot provide geotechnical certification for the Occupation Certificate if the following inspection has not been carried out during the construction process.

- 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: AH1 – Downhole is from left to right.

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.

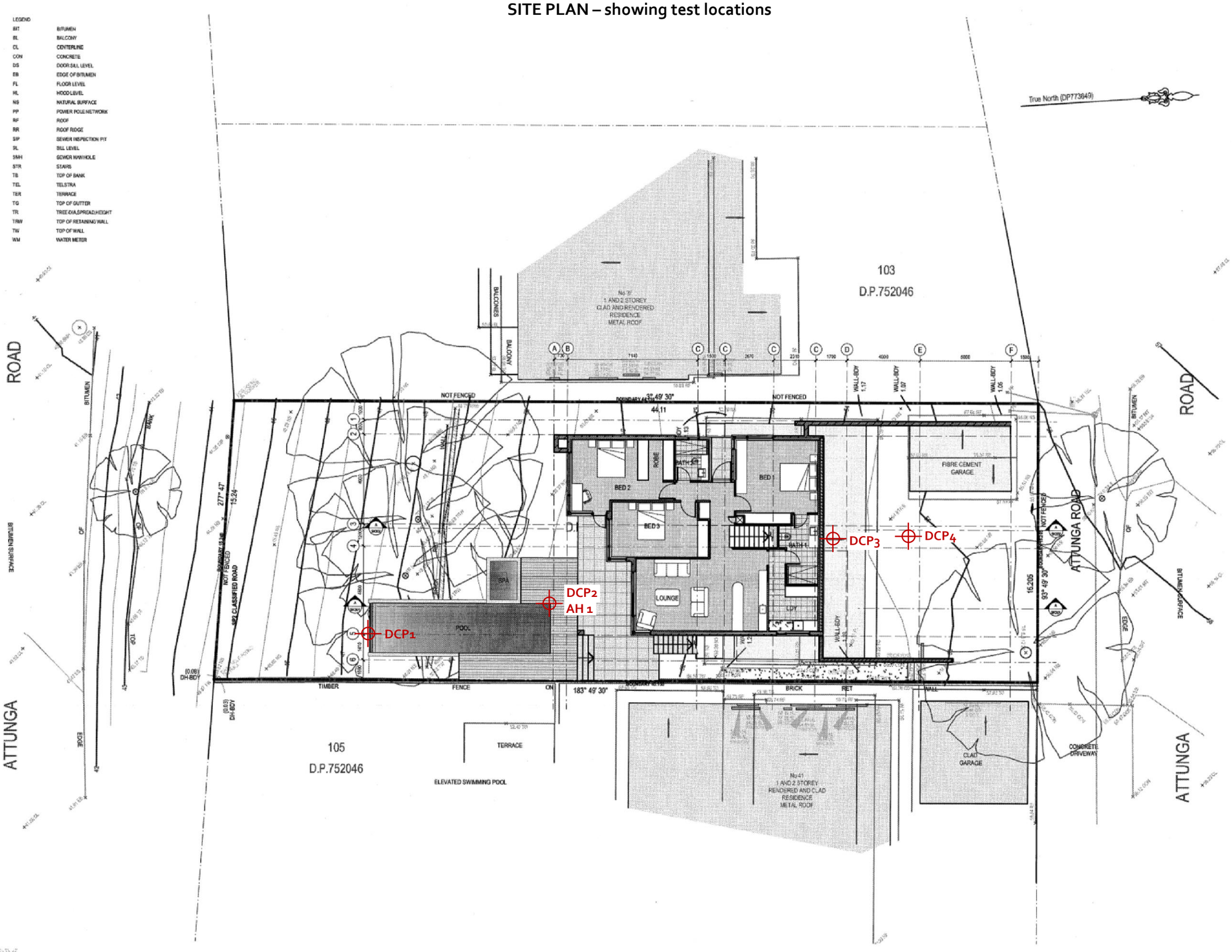
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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.

SITE PLAN – showing test locations



PRELIMINARY

AMENDMENT

LEVEL 2 / 271 ALFRED STREET NORTH
NORTH SYDNEY NSW 2060
EMAIL architects@mhdp.com.au
TELEPHONE (02) 9955 5606
NSW NOMINATED ARCHITECT
MARK HURCUM – Reg. No. 5605

DATE REVISION

NEW RESIDENCE

39 ATTUNGA ROAD NEWPORT

SITE PLAN

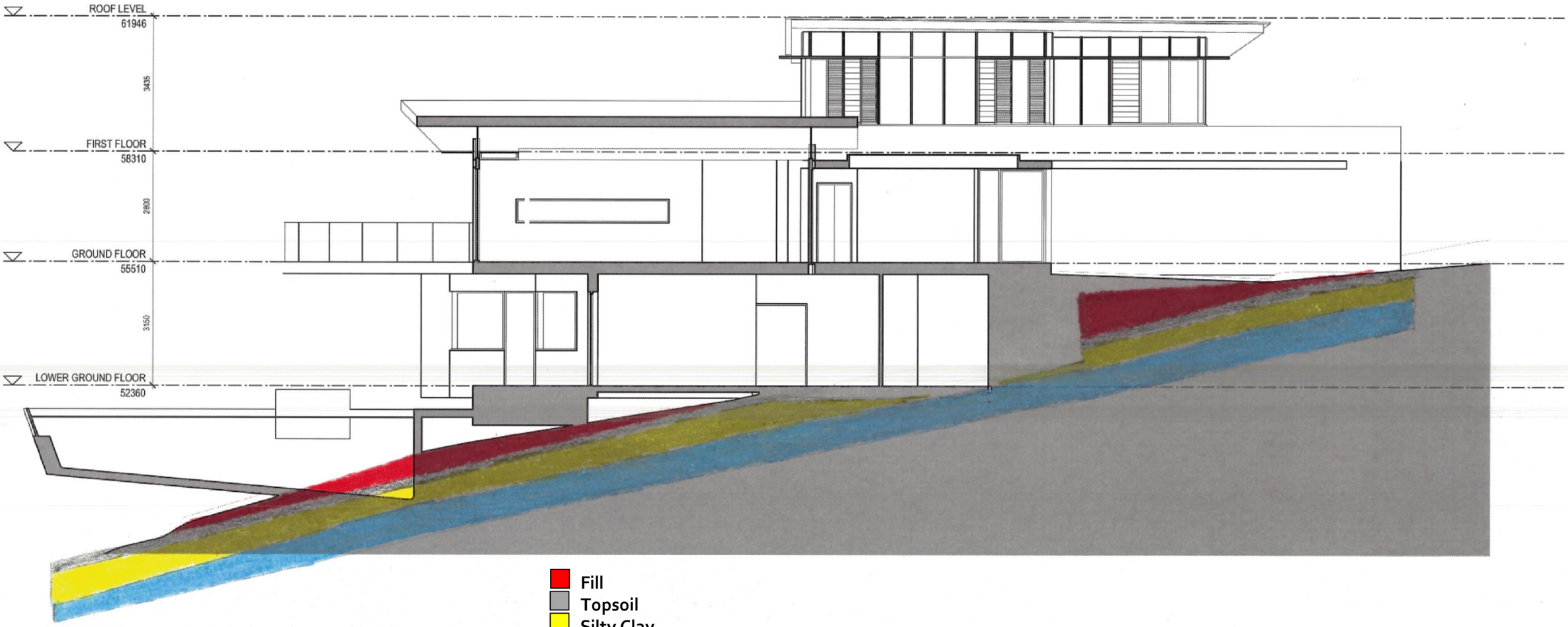
1:200 @ A3

2003 **SK001**

FEB 2021

MHDP ARCHITECTS

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



- Fill
- Topsoil
- Silty Clay
- Narrabeen Group Rocks – Extremely Low to Medium Strength Rock

PRELIMINARY

0 1:100 5m 10m

AMENDMENT DATE REVISION

LEVEL 3 / 271 ALFRED STREET NORTH
NORTH SYDNEY NSW 2060
EMAIL architects@mhdp.com.au
TELEPHONE (02) 9955 5608
NSW NOMINATED ARCHITECT
MARK HURCUM - Reg. No. 5605

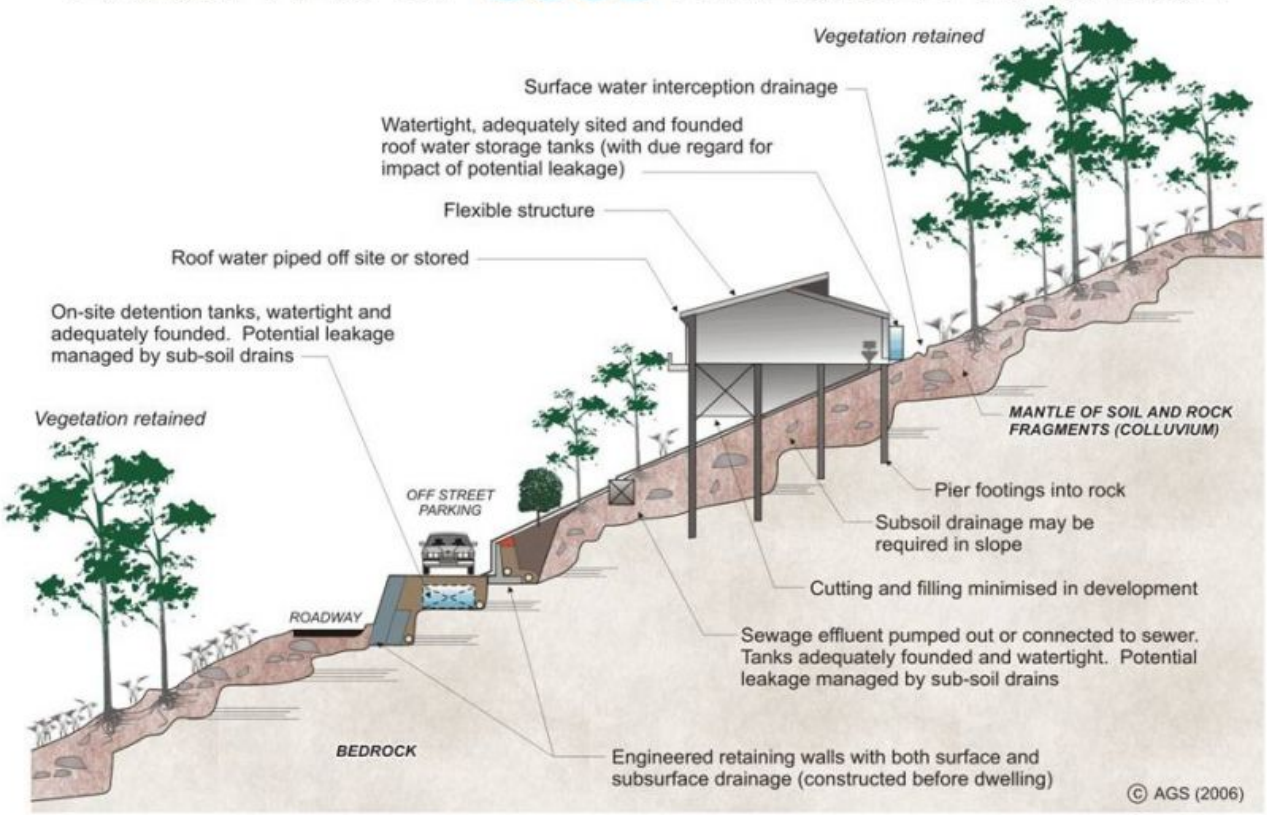
NEW RESIDENCE
39 ATTUNGA ROAD NEWPORT

SECTION A-A
1:100 @ A3

2003 **SK301**
FEB 2021

MHDP ARCHITECTS

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE