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

Development Application for _____
Name of Applicant

Address of site 3 Capua Place, Avalon

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 27/3/19 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 **3 Capua Place, Avalon**

Report Date: 27/3/19

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 3 Capua Place, Avalon

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 **3 Capua Place, Avalon**

Report Date: 27/3/19

Author: BEN WHITE

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

Please mark appropriate box

- ☒ Comprehensive site mapping conducted **28/2/19** (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 **1/3/19**
- ☒ 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:

Proposed Pool and Alterations and Additions at **3 Capua Place, Avalon**

1. Proposed Development

1.1 Install a pool on the downhill side of the property by excavating to a maximum depth of ~1.9m into the slope.

1.2 Construct a balcony to the downhill side of the house.

1.3 Details of the proposed development are shown on 4 drawings prepared by Space Landscape Designs, project number 181616, Revision C, drawings number DA-01 to DA-04, drawings dated 14.3.18.

2. Site Description

2.1 The site was inspected on the 28th February, 2019.

2.2 This residential property is on the low side of the road and has a S aspect. It is positioned on the gentle to moderately graded lower reaches of a hillslope. From the road frontage to the downhill side of the house the slope is broken by a series of terraced steps that fall at moderate angles. The slope below the property falls at gradually decreasing angles. The land surface above rises at gradually increasing angles to the crest of the slope.

2.3 At the road frontage a concrete driveway runs down the slope to a garage under E side of the house (Photo 1 & 2). A series of low stable sandstone block retaining walls and a ~1.2m brick retaining wall terrace the slope above the house (Photo 3). The brick retaining wall displays cracking through the mortar (Photo 4). No significant deflection was observed in the wall and it is currently considered stable. A ~2.5m high excavation has been made to level an area for the house, the excavation runs along a portion of the E side of the driveway. The cut is supported by a brick

retaining wall (Photo 5). The cracked portion of the wall shows slight deflection downslope but this is limited to the top ~0.5m of the wall (Photo 6). The reason for cracking is unclear but it may have been due to the growth of shrub/tree that has since been removed. See recommendations in **Section 16** for advice. The two storey brick house is supported on brick walls (Photo 7). Cracking was observed in the external supporting walls of the house (Photos 8 & 9). Some of the cracking appears to be related to rusting window lintels. The majority of the cracking appears to be due to uneven settlement of the house. This type of settlement is common in houses with shallow or variable foundations on soil and surface clay. Brick paving and a level lawn area extend from the downhill side of the house (Photo 10). The ground surface around the paving and lawn has settled in places (Photo 11). Stable mortared sandstone block retaining walls reaching a maximum height of ~1.0m terrace the slope below the lawn and paved area (Photo 12). A gently sloping lawn continues from the walls to the lower common boundary (Photos 13 & 14).

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 Hand Auger Hole (AH) was put down to identify the soil materials. Two Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The location 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:

AUGER HOLE 1 (~RL 36.7) **–** AH1 (Photo 15)

Depth (m)	Material Encountered
0.0 to 0.05	**SANDY SOIL**, brown, loose, fine to medium grained, organic matter, roots, dry.
0.05 to 0.2	**SANDY CLAY**, orange and brown, firm, fine to medium grained, dry.
0.2 to 0.7	**SILTY SAND**, light brown to medium tan, loose, fine to medium grained, damp.
0.7 to 1.0	**SANDY CLAY**, light brown, orange mottling, firm, fine to medium grained, damp.
1.0 to 1.3	**SANDY CLAY**, orange and brown, firm, fine to medium grained, slightly damp.

End of Hole @ 1.3m 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 (~RL33.7)	DCP 2 (~RL36.8)
0.0 to 0.3	3	3F
0.3 to 0.6	7	3F
0.6 to 0.9	15	10
0.9 to 1.2	14	14
1.2 to 1.5	16	43
1.5 to 1.8	21	#
1.8 to 2.1	16	
2.1 to 2.4	23	
2.4 to 2.7	46	
2.7 to 3.0	#	
	End of Test @ 2.7m	End of Test @ 1.5m

#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 @ 2.7m, DCP still very slowly going down, orange shale on dry tip.
DCP2 – End of test @ 1.5m, DCP still very slowly going down, orange shale on dry tip.

5. Geological Interpretation

The slope materials are colluvial at the near surface and residual at depth. They consist of a fill and sandy soil over clays. In the test locations, the sandy clays and clays merge into the weathered zone of the underlying shale at depths of between ~1.5 to ~2.4m below the current ground surface. It is interpreted from ground tests that the fill on the downhill side of the house reaches a maximum depth of ~1.2m. 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. No other fill was encountered or observed during the ground testing on the property. 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 clay and rock and through the cracks in the rock.

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

7. Surface Water

No evidence of significant 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 Capua Place.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below or beside the property. The proposed pool excavation is a potential hazard until retaining walls are in place (**Hazard One**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The proposed pool excavation collapsing onto the work site before the retaining structures are in place.
LIKELIHOOD	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum
COMMENTS	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Section 12** are 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

No significant stormwater runoff will be created by the proposed developments.

11. Excavations

An excavation to a maximum depth of ~1.9m is required to install the pool. It is expected to be through a shallow fill and topsoil over firm to stiff clays with Extremely Low Strength Shale expected at depths of between ~1.2 to ~2.1m below the current ground surface. It is envisaged the excavations can be carried out with a bucket and rock hammers will not be required.

12. Vibrations

Any vibrations generated during the excavations through fill, soil, clay, and Extremely Low Strength Shale will be well below the threshold limit for infrastructure or building damage.

13. Excavation Support Requirements

No structures or boundaries will be within the zone of influence of the excavation for the pool. In this instance the zone of influence is the area above a theoretical 30° line through soil and a 45° line through clay from the top of shale or the base of the excavation, whichever is encountered first towards the surrounding structures and boundaries.

The fill, soil, clay, and shale portions of the cut will stand at near vertical angles for short periods of time until the pool structure is installed provided the cut batters are kept from becoming saturated. 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 sheet metal or similar until the pool structure is in place.

During the excavation process, the geotechnical consultant is to inspect the cut in 1.5m intervals as it is lowered, while the machine/excavation equipment is on site, to ensure the ground materials are as expected and no additional temporary support is required.

Unsupported cut batters through soil, sand, 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 install the pool are to be organised so on completion of the excavation it can be installed 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.

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 Sandy Soil	20	0.40	0.55
Residual Clays	20	0.35	0.45
Extremely Low Strength Shale	22	0.25	0.35

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 likely hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

Due to the varying depths of the pool, it is expected to be partially seated in the Extremely Low Strength Shale on the uphill side. To ensure a uniform bearing material shallow piers will need to be taken to Extremely Low Strength Shale, where it is not exposed. It should be noted that this material is a soft rock and a rock auger will cut through it so the builders should not be looking for refusal to end the footings.

As the area around the pool will become saturated during pool use, it is recommended any paving around the pool be supported on a slab supported off Extremely Low Strength Shale. This will reduce the risk of settlement around the pool that can result from ongoing saturation of the soil.

To prevent potential settlement of the proposed new balcony, we recommend footings be taken to Extremely Low Strength Shale. A concrete slab and piers founded on the underlying Extremely Low Strength Shale is a suitable footing for the paved entertaining area below the balcony.

A maximum allowable bearing pressure of 600 kPa can be assumed for footings on Extremely Low Strength Shale

Ideally, footings should be founded on the same footing material across the existing house and new balcony and paved area. Where the footing material changes 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 clay and shale 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 wet clay or shale 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 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.

16. Maintenance

The brick retaining wall on the uphill side of the house is cracked and deflected slightly over the top ~0.5m (Photo 6). To be prudent, we recommend it be inspected by the owners on an annual basis or after heavy prolonged rainfall, whichever occurs first, keeping a photographic record of the inspections. We can carry out these inspections upon request. Should any new movement be observed, the geotechnical consultant is to be engaged to assess the movement and provide remedial advice if necessary.

SEE OVER THE PAGE FOR REQUIRED INSPECTIONS

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.

- During the excavation process, the geotechnical consultant is to inspect the cuts in 1.5m intervals as it is lowered, while the machine/excavation equipment is on site, to ensure the ground materials are as expected and no additional temporary support is required.

- 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

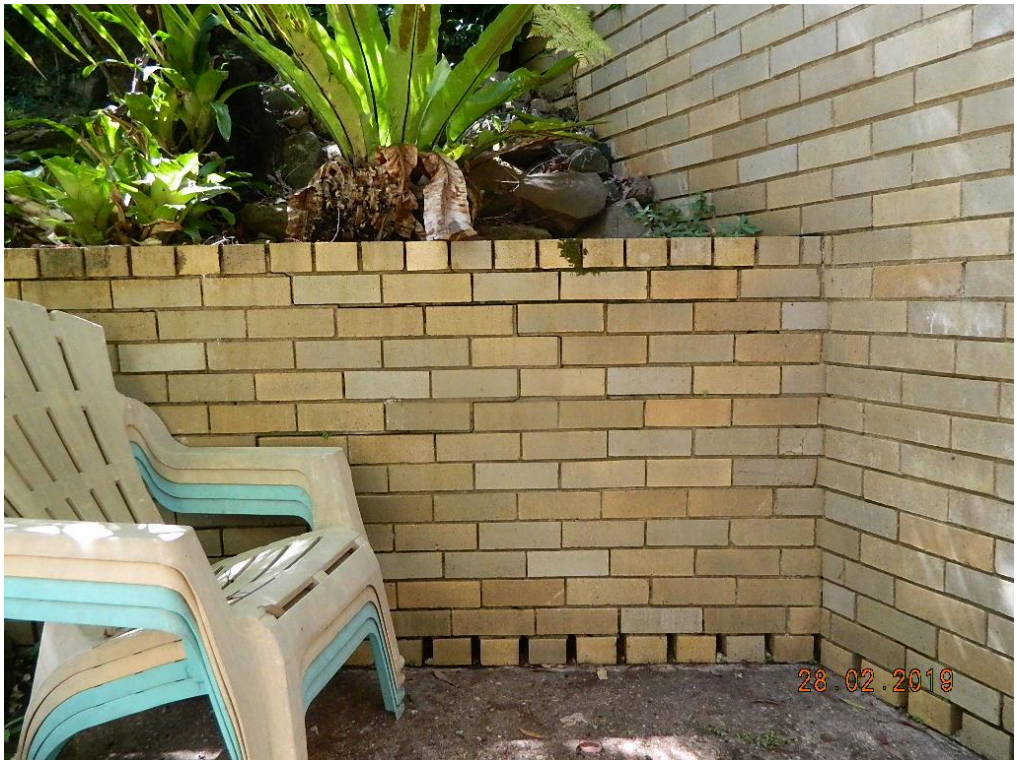


Photo 4

Photo 5

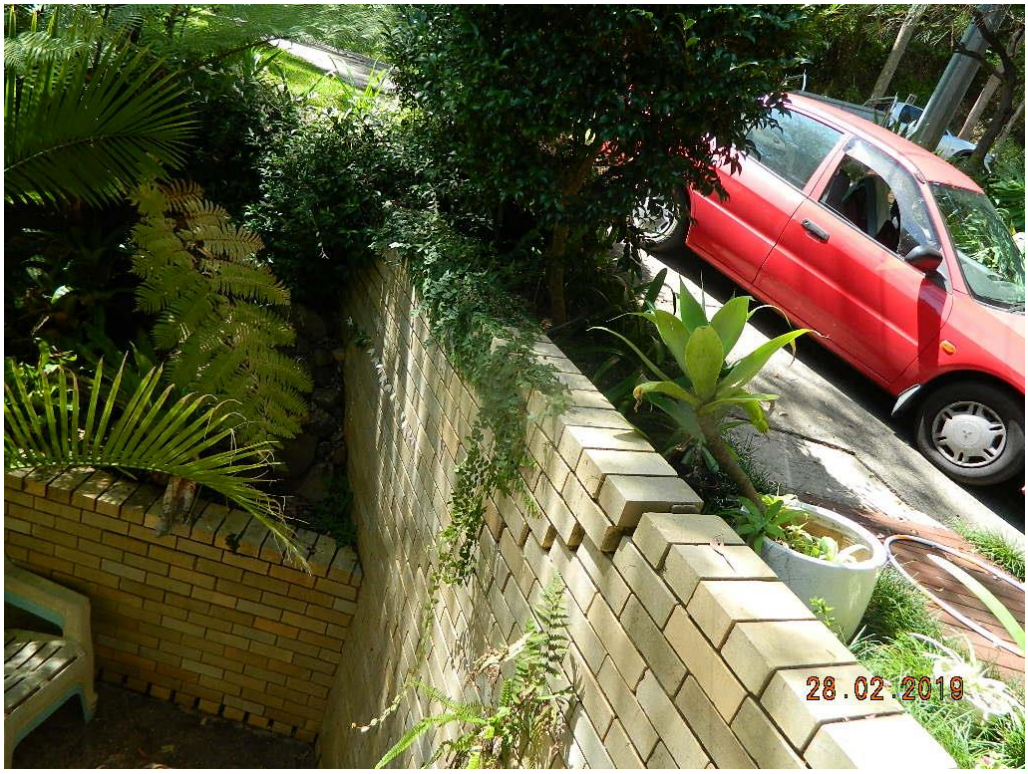


Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14

Photo 15: Auger Hole 1: Base of image is base of hole.

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 tests 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 professional. 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.

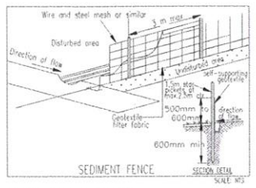
SITE PLAN – showing test locations

LEGEND

- BOUNDARY
- SEWER
- EASEMENT
- PROPOSED BOUNDARY FENCE
- POOL FENCE
- SEDIMENT CONTROL FENCE
- RETAINING WALL
- ALUMINIUM EDGE
- SAFETY BALUSTRADE
- PROPOSED PAVEMENT
- PROPOSED TIMBER DECK
- PROPOSED TURF
- MULCH GARDEN BED
- SCULPTURAL ELEMENT
- EXISTING PLANTING TO BE RETAINED
- PROPOSED PLANTING
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO BE TRANSPLANTED

SITE ANALYSIS LEGEND

	SITE VEHICLE ENTRY		EXISTING LANDSCAPE AREA
	WASTE STORAGE AREA		MATERIALS STORAGE AREA
NEW WORKS COLOURS			BRICK
	TIMBER		CONCRETE
	GLASS		METAL



SEDIMENT & EROSION CONTROL NOTES
During earthworks the following procedures shall be followed
1. Install silt barriers where shown on plan prior to commencement of works.
2. Silt barriers to be maintained regularly & after heavy rain by removal of built up silt & spreading silt on existing site when 50% capacity.
3. Repair any damages to fence immediately.
4. Clean up spillages outside silt fence immediately.
5. Sediment control measures to be left in place until works completed.
6. Topsoil from the work's area will be stockpiled for later use in landscaping if necessary.
7. Approved bins for building waste, concrete and mortar slurries, paints and acid washings will be provided by contractor.

RESIDENCE No 1
ONE & TWO STOREY
BRICK RESIDENCE
(TILE ROOF)

RESIDENCE No 1
BRICK RESIDENCE
(TILE ROOF)

RESIDENCE No 5
BRICK RESIDENCE
(TILE ROOF)

LOT 5 DP 208139

LOT 6 DP 208139

LOT 27 DP 213661

LOT 26 DP 213661

LOT 24 DP 213661

RESIDENCE No 3
TWO STOREY BRICK RESIDENCE
(TILE ROOF)
LOT 25 DP 213661
728.9m²

RESIDENCE No 5
BRICK RESIDENCE
(TILE ROOF)

Sediment Control Fence during construction
Locally occurring native canopy tree
Glass pool fence side fixed to pool concourse and timber deck 1200mm high
ER (1)
Existing *Plumeria acutifolia* to be transplanted to eastern boundary garden
Feature timber screen atop of retaining wall Top of Screen 38.76
New concrete block retaining wall TW 36.96
New concrete block retaining wall TW 36.70
Mulched garden bed with sculptural element
Clothesline area
39.825
13° 04' 20"
AH 1
DCP1
DCP2
Clad front facade of pool undercroft
Native hedge to screen front facade of pool enclosure
(15) maintain to height RL 37.00
Native screen planting to southern boundary
PROPOSED POOL 7.5m x 3.8m AREA 28.5m² Volume 39.132L
Lawn
Storage area under pool deck
Pool filter box in sound proof enclosure under pool deck
New concrete block retaining wall. Stone clad. TW 36.26
Existing Murraya to be removed
Black circular post safety balustrade to top of new retaining wall 1000mm high
Timber landing, stairs & balustrade to lower lawn level
New concrete block retaining wall TW 36.26
CG (1)
Materials storage area during construction phase
Timber clad facade to timber deck
Relocated existing *Plumeria acutifolia*
Native screen planting to Eastern boundary
Line of proposed balcony above (magneta)
Line of proposed balcony roof over (dashed)
Paved entertaining area under balcony
Strip drain
Glass pool fence and gate
Square off existing concrete driveway with line of Residence
Existing Concrete Driveway
Remove portion of existing concrete driveway
Existing Concrete Driveway
Locally occurring native canopy tree
Waste storage area during construction phase
98° 34'
8.56
CH.308°34'00"-6.095
A.6.385-R.6.095
CH.147°06'30"-4.845
A.4.875-R.12.19
29.38
182° 43' 45"
Note: Denotes difference between coping & existing ground level

NOTE:
1. ALL STAIRS & RAMPS BALUSTRADES HANDRAILS AND FITTING TO BE INSTALLED IN ACCORDANCE WITH AS 1428.1- 2009.

NORTH EAST SUMMER BREEZE
SOUTH WEST WINDS AND SUNS
IDEAL SUN WINTER SUMMER NORTH

CAPUA PLACE
(BITUMEN FORMATION)

BENCH MARK
NAIL IN KERB
RL 40.40

Existing Concrete Driveway

NOTES:

1/ Refer to Pool Fencing Code per AS 1926.1 - 2012 for compliance of the safety barriers for swimming pools.

2/ Overflow of pool is to be connected to sewer according to Sydney Water specifications.

3/ Pool pavement pattern and setout shown is indicative only. No allowance has been made for coping overhang, mortar gaps and joints.

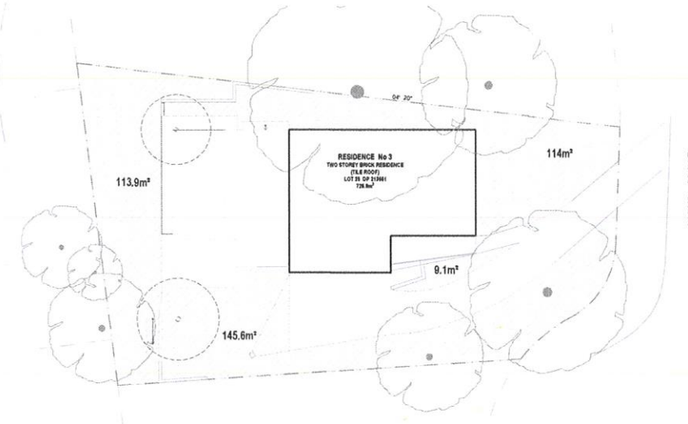
4/ Pool fence shown is the approximate position of proposed 1200mm(h) minimum childproof safety barrier with sch'd gate in accordance with AS1926.1-2012. The proposed pool enclosure has been designed to comply with the Australian Standard, the Swimming Pools Act and Swimming Pool Regulations.

5/ The boundary fence inside the pool zone must be a minimum height of 1800mm with a non climbable zone of 900mm on the inside of the fencing. Any shrubs or plants located adjacent to the inside of the boundary fence must be maintained for the lifetime of the development at a height that does not interfere with the 900mm non climbable zone.

DENOTES LANDSCAPE AREA

SITE CALCULATIONS

Site Area	728.9m²
Required Landscape Area	437.34m² (60%)
Proposed Landscape Area	382.5m² (52.5%)
Impervious area allowance	43.7m² (6%)
Total Landscape Areas:	426.2m² (58.5%)



LANDSCAPE CALCULATIONS PLAN
SCALE 1:200

NOTES:
Contractor to check and verify all dimensions and all levels on site prior to any work. Any discrepancies should be immediately referred to Space Landscape Designs. All work to comply with B.C.A. Statutory Authorities and relevant Australian Standards. Dimensions not to be taken from drawing. All heights are subject to variations.

Rev.	Date	Issue	Checked
A	14/03/18	Preliminary Issue	AE
B	20/03/18	Preliminary Issue	AE
C	22/03/18	DA Issue	AE

SPACE LANDSCAPE DESIGNS

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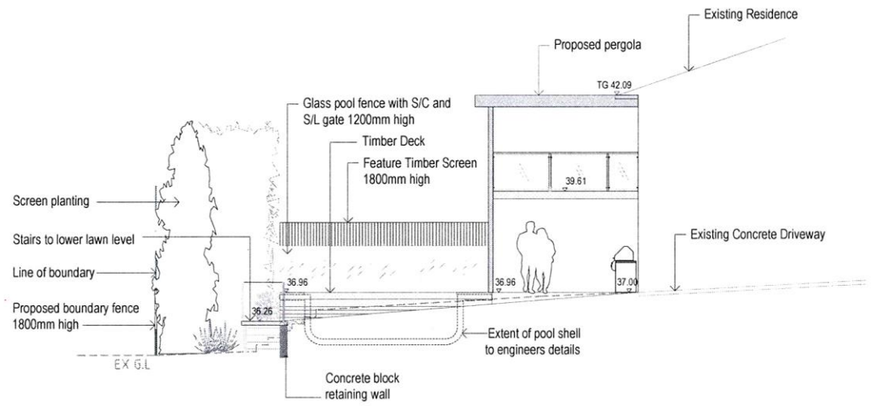
DRN: C.Wallace (B.LArch)
DATE: 14/03/2018
SCALE: 1:100@A1
PROJECT NO: 181616

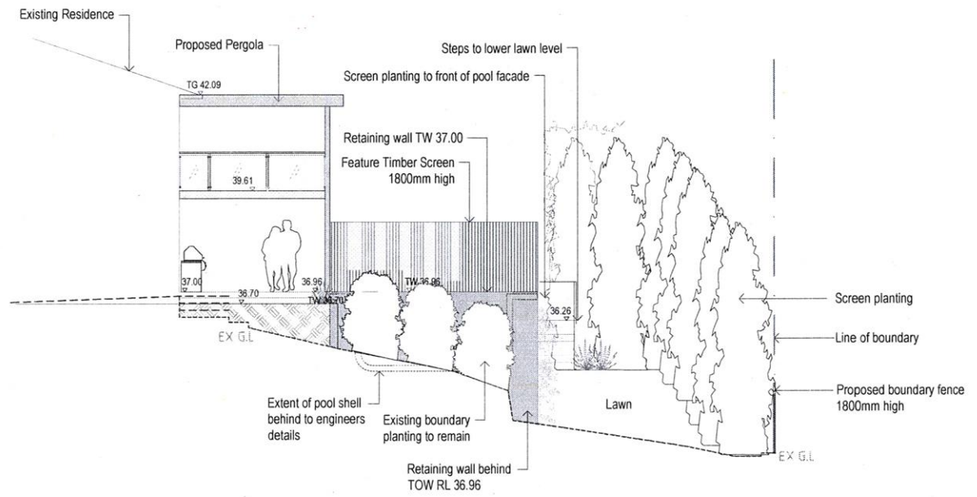
NORTH

SITE PLAN SITE ANALYSIS
EROSION & SEDIMENT CONTROL PLAN
DA-01 Rev C

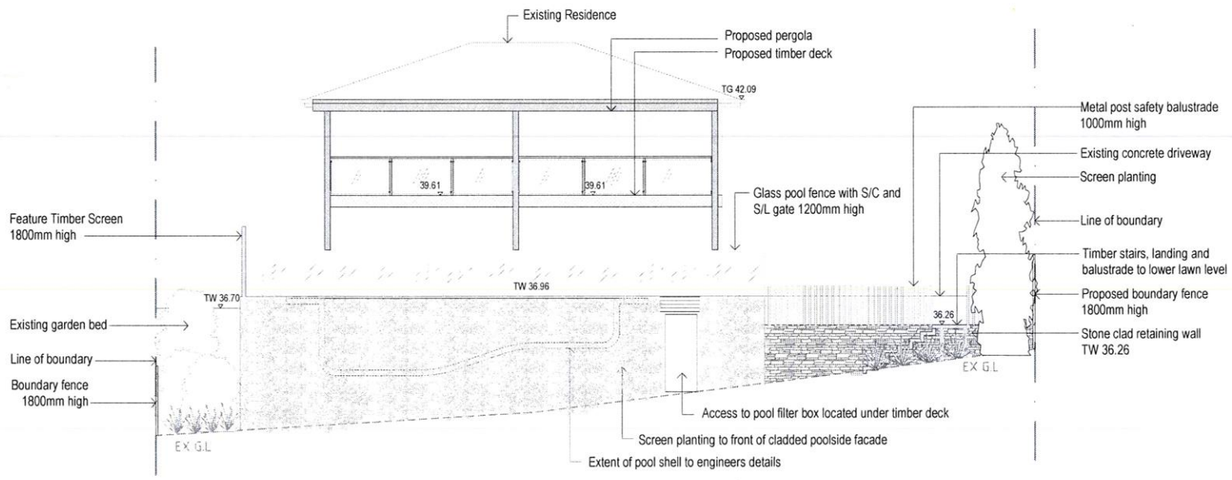
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



EASTERN ELEVATION AA
Scale 1:100



WESTERN ELEVATION CC
Scale 1:100



SOUTHERN ELEVATION BB
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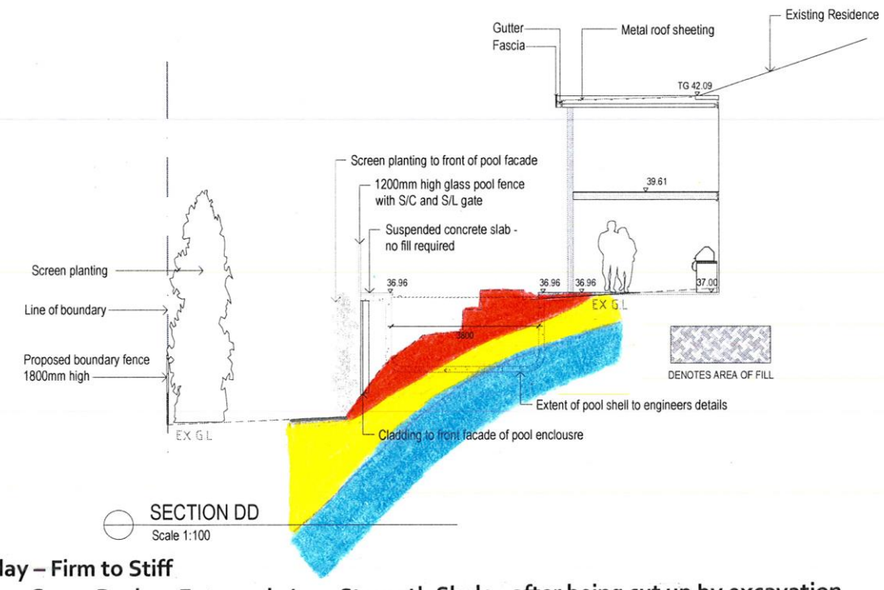

SECTION DD
Scale 1:100

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.

NOTES:
- Contractors to check and verify all dimensions and all levels on site prior to any works.
- Any discrepancies should be immediately referred to Space Landscape Designs.
- All work to comply with B.C.A. Statutory Authorities and relevant Australian Standards.
- Dimensions recognised over scaling. All measurements are in millimetres.

Rev.	Date	Issue	Checked
A	14/03/19	Preliminary Issue	AE
B	20/03/19	Preliminary Issue	AE
C	22/03/19	DA Issue	AE

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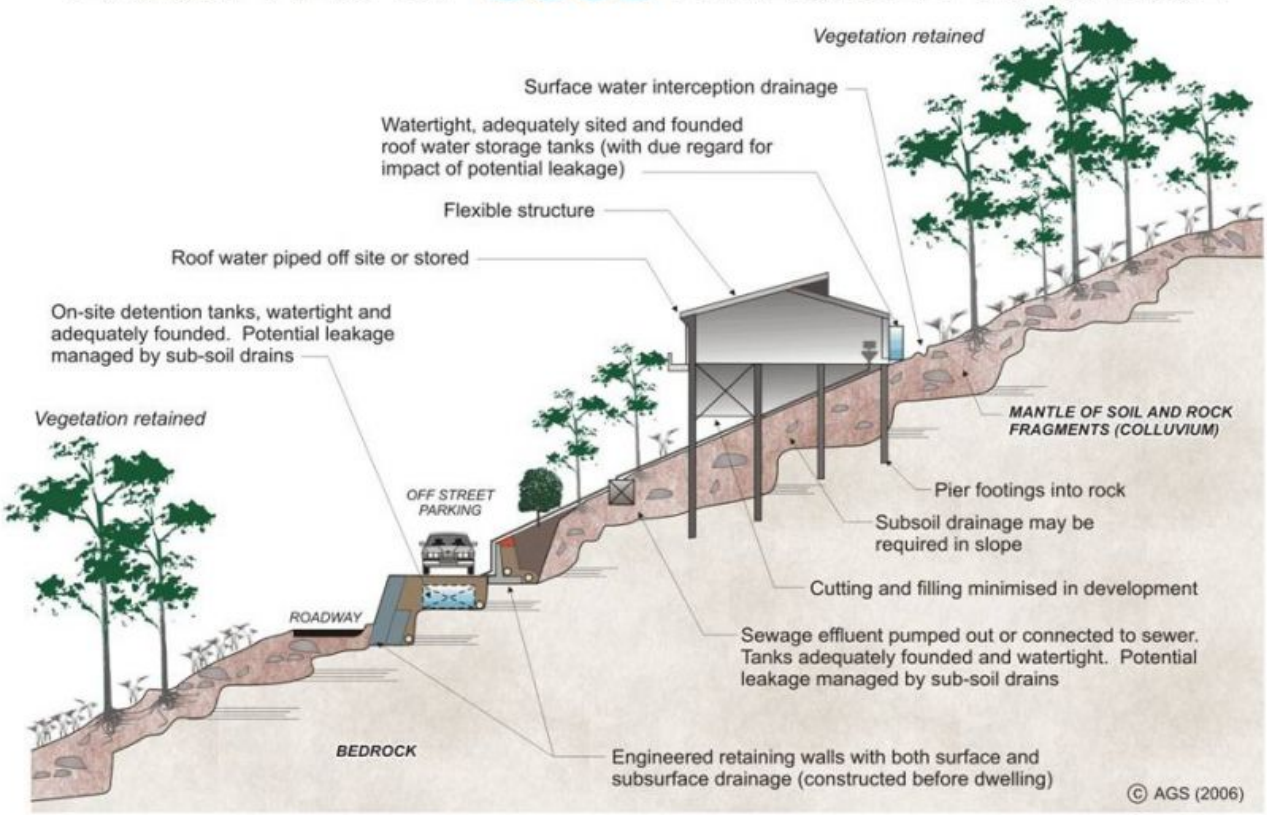
SCALE: 1:100@A2
PROJECT NO: 181616

NORTH

SECTION/ELEVATION PLAN
DA-03 Rev C

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE