

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

Development Application for _____
Name of Applicant

Address of site 4 Yachtsmans Paradise, 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 2/9/19 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 4 Yachtsmans Paradise, Newport

Report Date: 29/8/19

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	<u>4 Yachtsmans Paradise, Newport</u>

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 <u>4 Yachtsmans Paradise, Newport</u>
Report Date: <u>29/8/19</u>
Author: <u>BEN WHITE</u>
Author's Company/Organisation: <u>WHITE GEOTECHNICAL GROUP PTY LTD</u>

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 27/8/19
(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 27/8/19
- ☒ 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:

New Pool at 4 Yachtsmans Paradise, Newport

1. Proposed Development

- 1.1** Install a pool in the NE corner of the property by excavating to a maximum depth of ~1.8m.
- 1.2** Details of the proposed development are shown on 2 drawings prepared by Peter Formosa, Amendment 2, sheet 1 is dated 15/7/19 and sheet 2 is dated 3/7/19.

2. Site Description

- 2.1** The site was inspected on the 27th August, 2019.
- 2.2** This residential property is on the low side of the road and has a NE aspect. The block is located on the gently graded toe of a hillside. The gully of the slope approximates the N boundary where a drainage easement flows from E to W. The slopes above the N and S sides of the property rise at increasing angles.
- 2.3** At the road frontage, a concrete driveway runs to a garage on the ground floor of the house (Photo 1). Between the road frontage and the house is a gently sloping lawn (Photo 2). The part two-storey rendered masonry house is supported on masonry walls (Photo 3). No significant signs of cracking or movement were observed in the external supporting walls. A near-level lawn surrounded by garden beds extends off the N side of the house to the N common boundary (Photo 4).

3. Geology

The block encompasses the low-lying gully between two slopes over what is most likely an infilled low-lying swamp or creek. The fill extends to a maximum depth of ~1.7m and appears to be locally-sourced Holocene sediments. The Sydney 1:100 000 Geological sheet indicates

the site is underlain by the Narrabeen Group of Rocks. However, ground testing indicates the Alluvial Stream and Estuarine Sediment is present over the footprint of the proposed works under the surface fill. These are described as silty to peaty quartz sand, silt and clay with ferruginous and humic cementation in places and common shell layers.

4. Subsurface Investigation

Four auger holes were put down to identify the subsurface materials. Two Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the subsurface profile. 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 expected to have occurred in AH2, AH3, and DCP1:

AUGER HOLE 1 (~RL4.9) – AH1 (Photo 5)

Depth (m)	Material Encountered
0.0 to 1.6	FILL , disturbed sandy soil, light brown and brown, very loose to loose, dry, fine to coarse grained with fine trace organic matter, shells, trace clay, and glass.
1.6 to 2.8	CLAYEY SAND , grey, medium dense to very dense, wet (very wet from 2.3m), fine grained with fine trace organic matter.

End of hole @ 2.8m in very dense clayey sand. Watertable encountered at ~2.3m.

AUGER HOLE 2 (~RL4.9) – AH2 (Photo 6)

Depth (m)	Material Encountered
0.0 to 0.9	FILL , disturbed sandy soil, light brown and brown, very loose to loose, dry, fine to coarse grained with fine trace organic matter, shells, and trace clay.

Refusal @ 0.9m on unknown obstruction in the fill. No watertable encountered.

AUGER HOLE 3 (~RL4.9) – AH3 (Photo 7)

Depth (m)	Material Encountered
0.0 to 1.2	FILL , disturbed sandy soil, light brown and brown, very loose to loose, dry, fine to coarse grained with fine trace organic matter, shells, and trace clay.

Refusal @ 0.9m on unknown obstruction in the fill. No watertable encountered.

AUGER HOLE 4 (~RL5.0) – AH4 (Photo 8)

Depth (m)	Material Encountered
0.0 to 1.7	FILL , disturbed sandy soil, light brown and brown, very loose to loose, dry, fine to coarse grained with fine trace organic matter, shells, and trace clay.
1.7 to 2.4	CLAYEY SAND , grey, medium dense to very dense, wet (very wet from 2.1m), fine grained with fine trace organic matter.

End of hole @ 2.4m in very dense clayey sand. Watertable encountered at ~2.1m.

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 (~RL5.0)	DCP 2 (~RL4.9)
0.0 to 0.3	4	3
0.3 to 0.6	5	5F
0.6 to 0.9	36	2
0.9 to 1.2	33	6
1.2 to 1.5	#	8
1.5 to 1.8		9
1.8 to 2.1		44
2.1 to 2.4		#
	End of Test @ 1.2m	End of Test @ 2.1m

#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 @ 1.2m, DCP still very slowly going down, brown clay on wet tip.

DCP2 – End of test @ 2.1m, DCP still very slowly going down, brown clay on wet tip.

5. Geological Observations/Interpretation

The site encompasses the low-lying gulley between two slopes. It is underlain by manmade fill across the downhill side of the property over clayey sands that were encountered to the extent of the testing. The property has been levelled with manmade filling over what was likely a low-lying swamp or creek to a maximum depth of ~1.7m. The fill overlies clayey sands that extended to the extent of the depths tested at 2.8m. Rock was not encountered during the tests. The clayey sands were wet from ~1.6 and became very wet in the auger holes from a depth of ~2.1m. This indicates the watertable is present at this depth (~RL2.9). See the Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

In the location of the proposed pool, the watertable was encountered at ~2.1m below the current ground surface. This is to be considered by the structural engineer and pointed out to the pool builders as it will have an impact on excavation stability and the excavation walls will need to be supported until the pool structure is in place. It is to be noted the water table fluctuates with the tide and climatic conditions.

7. Surface Water

No evidence of significant surface flows were observed on the property during the inspection. Normal sheet wash from the slopes above will be intercepted by the street drainage system for Yachtsmans Paradise above or will quickly be absorbed into the sandy soil and fill where surfaces are unsealed.

8. Geotechnical Hazards and Risk Analysis

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

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The excavation for the proposed pool (up to a depth of ~1.8m) collapsing onto the work site before the pool structure is in place.	The proposed excavation undercutting the footings of nearby structures causing failure (Photo 4).
LIKELIHOOD	'Likely' (10^{-2})	'Likely' (10^{-2})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (15%)
RISK TO PROPERTY	'High' (2×10^{-3})	'High' (2×10^{-3})
RISK TO LIFE	5.3×10^{-5} /annum	5.3×10^{-5} /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.

(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 will be produced by the proposed works.

11. Excavations

An excavation to a maximum depth of ~1.8m is required to install the proposed pool. The excavation is expected to be almost entirely through sandy fill with natural clayey sand encountered at the base of the excavation. It is envisaged that excavations through fill and sand can be carried out with a bucket.

12. Excavation Support Requirements

The proposed pool excavation will reach a maximum depth of ~1.8m, will be located ~1.0m from the timber deck on the downhill side of the house (Photo 4), ~2.0m from the E common boundary and ~2.3m from the N common boundary. Thus, the timber deck, E, and N common boundaries will lie within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 30° line from the base of the excavation towards the surrounding structures and boundaries. Additionally, the excavation is expected to encounter wet clayey sands from an average depth of ~1.6m. Seepage at this level will likely undercut the excavation and cause batter collapse. As such, it is crucial that the following excavation advice is carried out to ensure the stability of the excavation is not impacted.

Where the timber deck falls within the zone of influence of the excavation, exploration pits in this location will need to be put down by the builder to determine the foundation depth and material. The pits are to be inspected by the geotechnical consultant.

If the foundations for the deck extend below the zone of influence of the proposed excavation, the excavation may commence. If they do not extend below the zone of influence of the proposed excavation, they will need to be underpinned prior to the excavation commencing. Alternatively, the deck can be supported from beyond the zone of influence of the pool excavation until the pool structure is in place.

As wet clayey sands are expected to be encountered in the vicinity of ~1.6m, the perimeters of the excavation will require temporary support. A sandbag retaining wall that is systematically installed as the excavation is progressed is one such suitable support. The sandbag wall is 'sacrificial' in that it is to remain in place and the pool structure is constructed over it. The sandbags allow water to flow through the soil but prevent sediment movement and subsequent batter collapse. The ground support is to be designed and approved by a Structural Engineer and may be similar temporary support to that described.

A sump and pump will likely be required during construction to keep the base of the pool excavation dry.

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 excavation is 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.

13. Retaining Structures

For cantilever or singly-propped retaining structures, it is suggested the design be based on a triangular pressure 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	20	0.4	0.55

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 structural design.

14. Foundations

The proposed pool is expected to be seated in the loose manmade fill and natural clayey sand. However, the watertable was encountered ~0.3m below the base of the proposed excavation and this can fluctuate with climatic conditions and the tide. We recommend screw piles be installed to prevent possible 'pop-out' that can occur when the pool is not full and it floats on the water table when the hydrostatic valve fails. The screw piles are to be torqued to a depth and density to resist the potential buoyancy of the pool.

If another method of "hold down" is used and the pool is supported on the natural sand at the base of the excavation, it should be compacted as the excavation will loosen the upper sands. This can be carried out with a hand-held plate compactor. As a guide to the level of compaction required, a density index of >65% is to be achieved, correlating to a dense sand. The geotechnical consultant is to inspect and test the compacted base of the pool excavation to ensure the required density has been achieved.

If the cost of these measures to prevent potential 'pop out' are considered too much and the owners wish to support the pool on the base of the excavation only, we point out the pool will always need to be kept full of water to prevent it floating on the water table. We

recommend the pool be anchored. If it is not and the pool does pop out of the ground, we accept no liability whatsoever.

As the area around the pool will become saturated during pool use, it is recommended any paving around the pool be supported on a screw piled or piered slab taken to a depth of ~1.8m below the current surface. This will reduce the risk of settlement around the pool that can result from ongoing saturation of the soil. A maximum allowable bearing pressure of 100kPa can be assumed for footings on loose sand.

Screw pile design varies considerably between contractors. For this job, a screw pile is required that has been designed specifically to be embedded in sand. This will generally have a large helix. We can provide details of contractors with suitable pile design upon request.

Note that we do not certify screw pile foundations. We are not privy to the details of individual screw pile design or how the screw pile contractor converts torque to bearing pressure. As such, the screw pile contractor is totally responsible for ensuring the screw piles can resist the required pull out forces and can support the loads on the piles.

REQUIRED INSPECTIONS ARE ON THE NEXT PAGE

15. 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 owner or the regulating authorities if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect any exploration pits that may be required to expose the foundation materials of the house.
- 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. If screw piles are not utilised as footings, the base of the pool excavation is to be inspected and tested by the geotechnical consultant to ensure the required compaction is achieved.

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: AH1 – Downhole is from left to right.



Photo 6: AH2 – Downhole is from left to right.



Photo 7: AH3 – Downhole is from left to right.



Photo 8: AH4 – Downhole is from left to right.

Important Information about Your Report

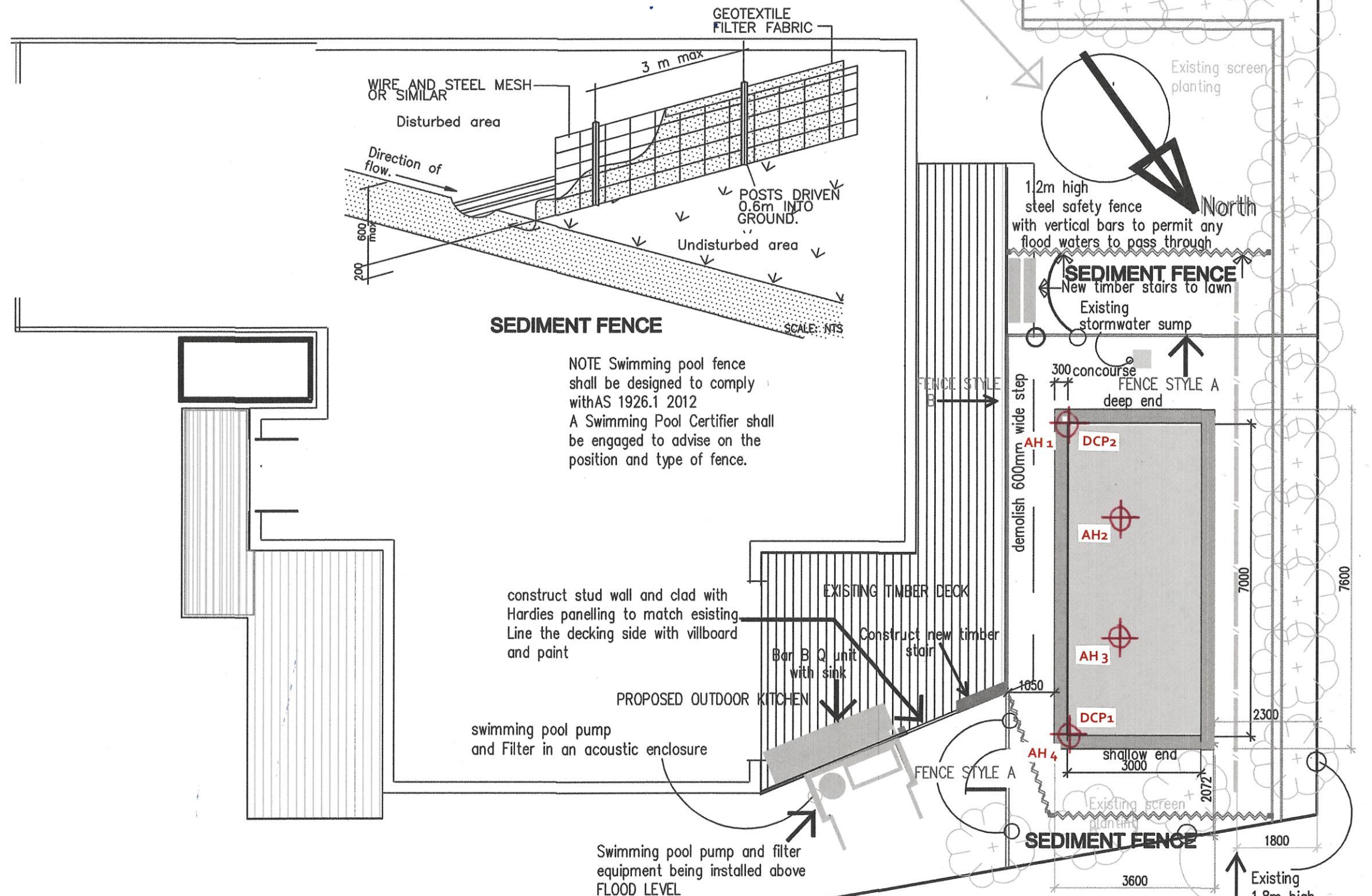
It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures 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.

Existing underground
absorption pit in sand
for Storm Water

PREMSES No 4 YACHTSMANS PARADISE

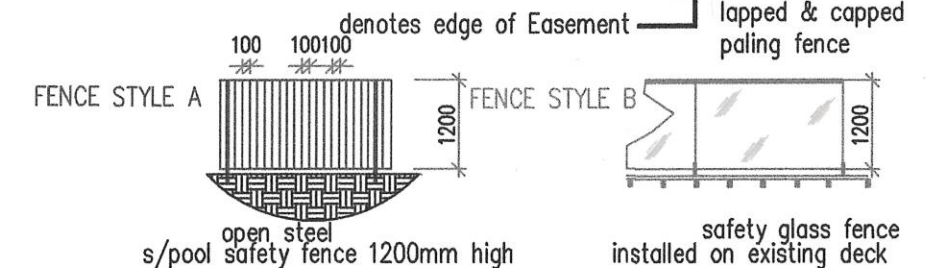


NOTE Swimming pool fence
shall be designed to comply
with AS 1926.1 2012
A Swimming Pool Certifier shall
be engaged to advise on the
position and type of fence.

SITE PLAN 1-100

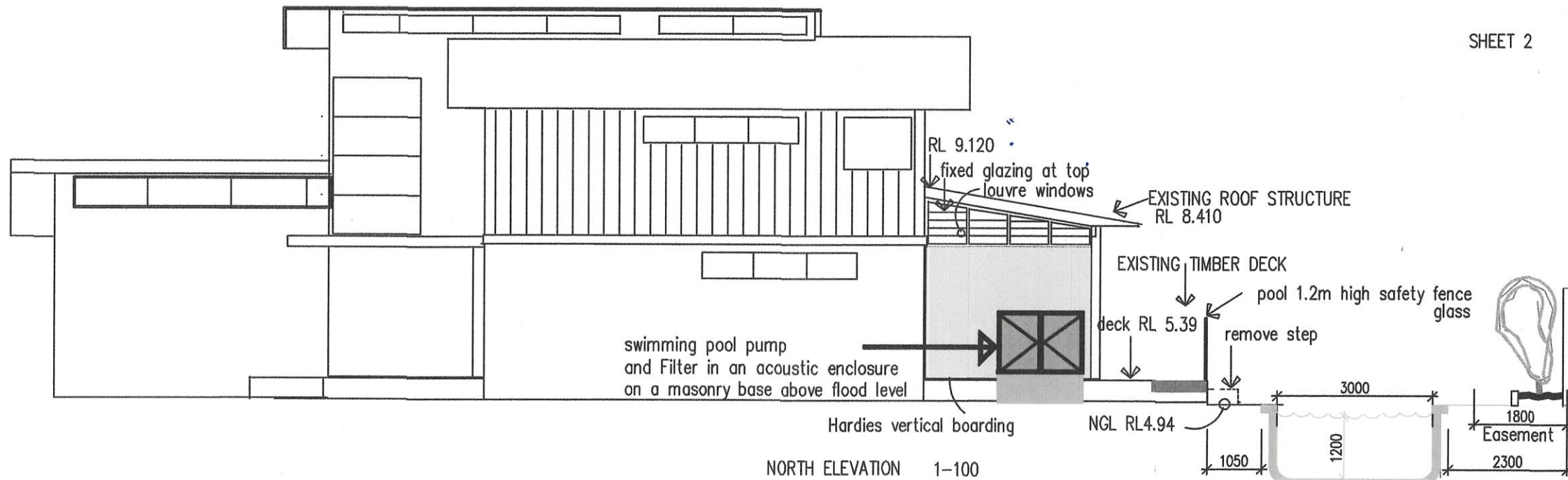
PREMSES No 4 YACHTSMANS PARADISE
PROPOSED SWIMMING POOL & BUILT IN Bar
Details prepared by Peter Formosa 0410403440
3/06/2019 1-100

AMENDED 3rd July 2019 2ND AMENDMENT
AMENDED 15/07/19 Colour of pool safety fences

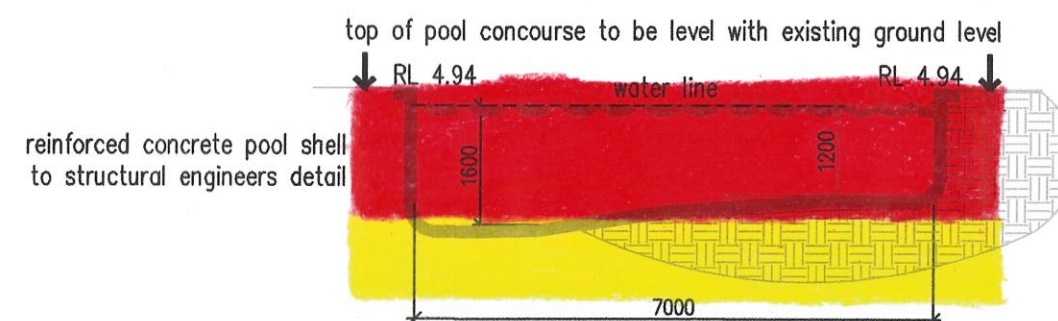
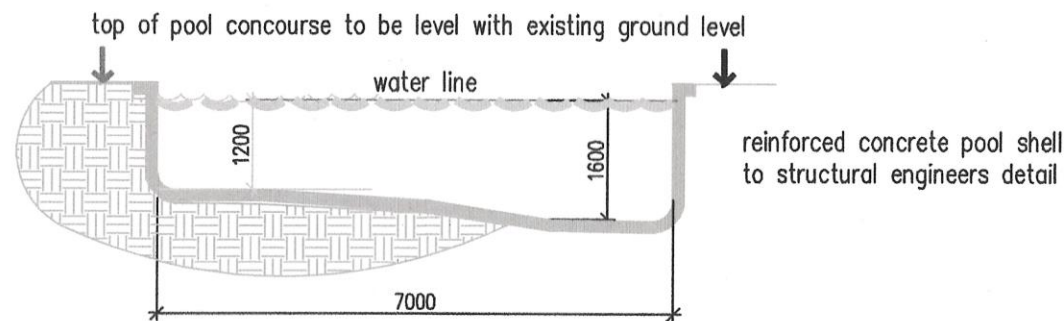


TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

SHEET 2



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



EXISTING AND PROPOSED LANDSCAPING

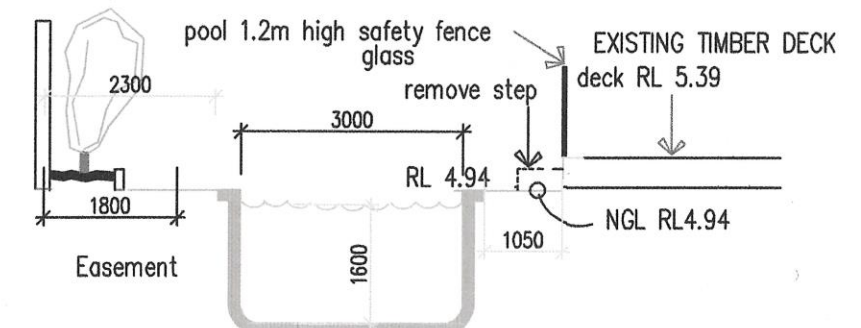
CAPACITY OF SWIMMING POOL= 29,400 Litres of water

SITE AREA =756.4 sqm
REQUIRED LANDSCAPING 50% OF SITE =378.2 sqm

Existing Landscaping to front yard = 156.22 sqm
Existing Landscaping to rear yard =152.5 sqm

EXISTING Total = 308.72 sqm = 40.8%

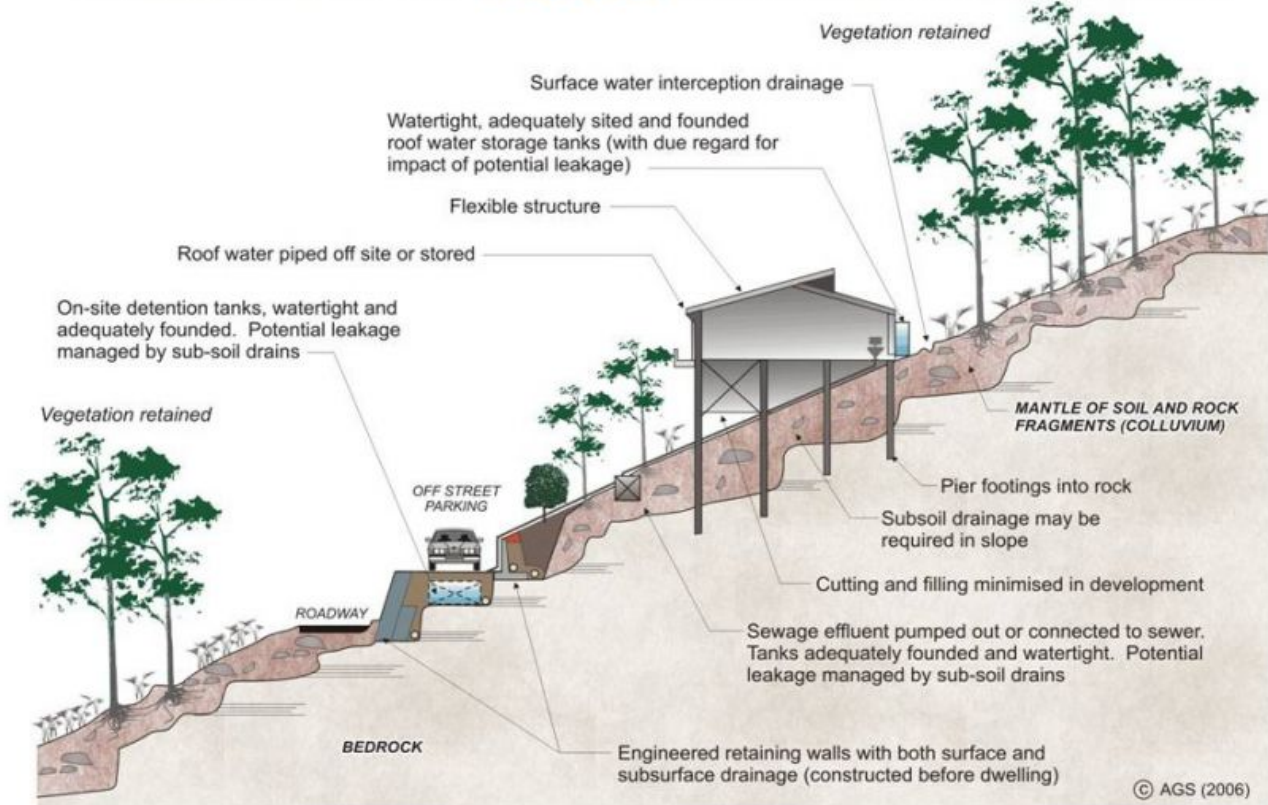
Proposed Landscaping to Front yard – No change = 156.22sqm +
Removal of lower step to rear deck =7.1 sqm of landscaping +
6% of site Area for open decking less than 300mm above ground =45.384 sqm +
Area of swimming pool =31.050 sqm +
Residual landscaping after deduction of swimming pool area=128.21 sqm
TOTAL proposed landscape area of site = 336.94sqm = 44.5%



PREMSES No 4 YACHTSMANS PARADISE
PROPOSED SWIMMING POOL & BUILT IN Bar-B-Q
Details prepared by Peter Formosa 0410403442
3/06/2019

AMENDED 3rd July 2019 2ND AMENDMENT

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

