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

Development Application for _____
Name of Applicant

Address of site 73 Marine Parade, 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 14/1/22 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 **73 Marine Parade, Avalon**
Report Date: 14/1/22

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 73 Marine Parade, 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 **73 Marine Parade, Avalon**

Report Date: 14/1/22

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **18/10/21**
(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 **18/10/21**

☒ 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 **73 Marine Parade, Avalon**

1. Proposed Development

1.1 Demolish the existing house and construct a new part four-storey house by excavating to a maximum depth of ~5.0m.

1.2 Install a new pool on the uphill side of the property by excavating to a maximum depth of ~1.5m.

1.3 Various other minor alterations.

1.4 Details of the proposed development are shown on 10 drawings prepared by Gartner Trovato Architects, Project number 2105, drawings numbered A-00 to A-09, Revision A, dated 13/1/22.

2. Site Description

2.1 The site was inspected on the 18th October, 2021.

2.2 This residential property is on the high side of the road and has a predominantly W aspect. The block is located on the gentle to moderately graded upper reaches and crest of a hillslope that rises to the top of a ~50m high sea cliff. The slope rises across the site at an average angle of ~12°. The slope below the property (to the W) continues at gradually easing angles

2.3 At the road frontage, a concrete driveway runs up the slope to a gravel parking area on the downhill side of the property (Photo 1) and to a garage on the lower ground floor of the house (Photo 2). The cut for the driveway is supported by stable mortared stack rock retaining walls that will be demolished as part of the proposed works (Photo 3). Between the road frontage and the house is a gently sloping lawn and garden area (Photo 4). The part two-storey brick house was observed to be

supported directly onto outcropping sandstone bedrock and will be demolished as part of the proposed works (Photos 5 & 6). A gentle to moderately-sloping garden area extends off the uphill side of the house (Photo 7). Sandstone bedrock was observed to be outcropping through the slope in multiple places (Photo 8). A near-level brick-paved fill has been placed at the top of the property (Photo 9). The fill is battered to stable angles and the fill batter is lined with large sandstone boulders (Photo 10). A ~50m high sea cliff falls from the top of the property. The sea cliff was observed from the rock platform below (Photo 11). It consists mainly of massive competent Medium Strength Sandstone with some, alternating thinly bedded shale/laminite layers. The cliff face below the property displays no significant undercutting or other significant geological defects that could affect its stability. The rock platform has a covering of dislodged sandstone boulders at the cliff base.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. There is a band of sandstone underlying the entire uphill side of the property that extends through the otherwise shale-dominated profile.

4. Subsurface Investigation

Nine Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to bedrock. The locations of the tests are shown on the site plan attached. 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. However, excavation and foundation budgets should always allow for the possibility that the interpreted ground conditions in this report vary from those encountered during excavations. See the appended “Important information about your report” for a more comprehensive explanation. The results are as follows:

DCP TEST RESULTS – Dynamic Cone Penetrometer									
Equipment: 9kg hammer, 510mm drop, conical tip.								Standard: AS1289.6.3.2 - 1997	
Depth(m) Blows/0.3 m	**DCP 1** (~RL48.5)	**DCP 2** (~RL47.9)	**DCP 3** (~RL47.5)	**DCP 4** (~RL46.6)	**DCP 5** (~RL45.2)	**DCP 6** (~RL44.3)	**DCP 7** (~RL44.6)	**DCP 8** (~RL41.0)	**DCP 9** (~RL41.0)
0.0 to 0.3	9	4	Rock Exposed at Surface	Rock Exposed at Surface	Rock Exposed at Surface	Rock Exposed at Surface	Rock Immediately Below	Rock Exposed at Surface	Rock Exposed at Surface
0.3 to 0.6	#	12							
0.6 to 0.9		9							
0.9 to 1.2		#							
	Refusal on Rock @ 0.3m	Refusal on Rock @ 0.9m							

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

DCP Notes:

DCP1 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, white, brown, and orange sandstone fragments on dry tip.
DCP2 – Refusal on rock @ 0.9m, DCP bouncing off rock surface, brown clay on dry tip.
DCP3 – Medium Strength Sandstone exposed at the surface.
DCP4 – Medium Strength Sandstone exposed at the surface.
DCP5 – Medium Strength Sandstone exposed at the surface.
DCP6 – Medium Strength Sandstone exposed at the surface.
DCP7 – Medium Strength Sandstone immediately below surface (~0.1m).
DCP8 – Medium Strength Sandstone exposed at the surface.
DCP9 – Medium Strength Sandstone exposed at the surface.

5. Geological Observations/Interpretation

The surface features of the block are controlled by the outcropping and underlying sandstone bedrock that steps up the property forming sub-horizontal benches between the steps. Where the grade is steeper, the steps are larger, and the benches narrower. Where the slope eases, the opposite is true. We note this is a relatively thick band of sandstone within the shale-dominated Narrabeen Group. These bands of sandstone are common immediately

adjacent to the sea cliffs. The vertical extent of the band is not known; however, the sandstone was observed to be outcropping and was encountered in the ground testing across the entire footprint of the proposed house. Where the rock is not exposed, it is overlain by natural sandy soils and firm to very stiff sandy clays that fill the bench step formation. In the test locations, where it was not exposed, rock was encountered at depths of between 0.3 to 0.9m below the current surface. The exposed sandstone across the site is estimated to be Medium Strength and a similar strength rock is expected to underly the entire site. 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.

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

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. As the property encompasses the crest of the hill, any surface flows will be generated on the property and will flow away from the property.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above or beside the property. The gentle to moderately graded slope that rises across the property and continues below is a potential hazard (**Hazard One**). The vibrations from the proposed excavations are a potential hazard (**Hazard Two**). A loose boulder, wedge, or similar geological defect toppling onto the work site during the excavation process is a potential hazard (**Hazard Three**). The sea cliff face that falls from the top of the property is a potential hazard (**Hazard Four**).

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The gentle to moderate slope that rises across the site and continues below failing and impacting on the proposed works.	The vibrations produced during the proposed excavations impacting on the sea cliff and supporting walls of the neighbouring houses.
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	5.5×10^{-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 **Section 12** are to be followed.

RISK ANALYSIS SUMMARY CONTINUED ON NEXT PAGE

HAZARDS	Hazard Three	Hazard Four
TYPE	A loose boulder, wedge, or similar geological defect toppling onto the work site during the excavation process.	The long-term stability of the sea cliff on the property impacting the property taking into consideration the allowance for erosion/weathering of the cliff and of St Michael's Cave as calculated by Horton Coastal Engineering in the next 100 years (Photo 11).
LIKELIHOOD	'Possible' (10^{-3})	'Rare' (10^{-5})
CONSEQUENCES TO PROPERTY	'Medium' (20%)	'Major' (40%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Low' (6×10^{-5})
RISK TO LIFE	6.2×10^{-4}/annum	9.96×10^{-6}/annum
COMMENTS	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.	The base of the cliff is ~10m seaward of the proposed house. However, the rock platform continues seaward at the base of the cliff over a distance of ~15m and Horton Coastal Engineering has provided a 7 to 12mm/year allowance for erosion of the cliff. As such, the cliff is not a significant risk to the property for well over 100 years. This level of risk is 'ACCEPTABLE'.

(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 Marine Parade. Roof water from the development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

11. Excavations

An excavation to a maximum depth of ~5.0m is required to construct the proposed house. Another excavation to a maximum depth of ~1.5m is required to construct the proposed pool. The excavations are expected to be through a thin sandy soil with Medium Strength Sandstone expected to be encountered at depths of between 0.3 to 0.9m below the current surface where it is not exposed at the surface. We note the vertical extent of the band is not known; however, the sandstone was observed to be outcropping and was encountered in the ground testing across the entire footprint of the proposed house. As such, Medium Strength Sandstone is expected to be encountered through the entirety of the excavation through bedrock.

It is envisaged that excavations through sandy soil can be carried out with a bucket and excavations through rock will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through sandy soils will be below the threshold limit for building damage.

Excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the neighbouring structures and to the sea cliff. Allowing for backwall-drainage, the excavation will be set back ~1.4m from the N neighbouring garage, ~3.4m from the N neighbouring house, and ~2.7m from the S neighbouring house. The excavation for the pool will be set back ~10m from the edge of the sea cliff.

Dilapidation reporting carried out on the N and S neighbouring properties is recommended prior to the excavation works commencing.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the sea cliff and property boundaries. Vibration monitoring will be required to verify this is achieved. The vibration monitoring equipment must include a light/alarm so the operator knows if vibration

limits have been exceeded. It also must log and record vibrations throughout the excavation works.

In Medium Strength Rock or better, techniques to minimise vibration transmission will be required. These include:

- Rock sawing the excavation perimeter to at least 1.0m deep prior to any rock breaking with hammers, keeping the saw cuts below the rock to be broken throughout the excavation process.
- Limiting rock hammer size.
- Rock hammering in short bursts so vibrations do not amplify.
- Rock breaking with the hammer angled away from the nearby sensitive structures.
- Creating additional saw breaks in the rock where vibration limits are exceeded.

Following these recommendations, no adverse impacts to the neighbouring properties and to the sea cliff are expected. It is worth noting that vibrations that are below thresholds for building damage may still be felt by the occupants of the neighbouring houses.

13. Excavation Support Requirements

Bulk Excavation for Proposed House

The excavation is expected to reach a maximum depth of ~5.0m. The majority of the excavation is sufficiently set back from the common boundaries. However, a small portion of the N and S sides of the proposed excavation will be taken close to flush with the N and S common boundaries. The N neighbouring garage is set back ~1.4m from the common boundary in this location. As such, due to the exposed/shallow depth to Medium Strength Sandstone encountered in this location, only the N and S common boundaries will be within the zone of influence of the proposed excavation. In this instance, the zone of influence is the area above a theoretical 30° line through soil from the top of Medium Strength Sandstone towards the surrounding structures and boundaries.

Where the excavation depth through soil exceeds 0.6m, the cut through soil is to be permanently or temporarily supported along the N and S sides before the excavation through rock commences. The support is to be installed systematically as the excavation progresses to ensure the integrity of the neighbouring properties into the future. If the support is temporary, it is to remain in place until the retaining wall is built as a sacrificial-type system.

Where the excavation depth through soil tapers to less than 0.6m, and along all other sides, the soil portions of the cut batters are to be battered temporarily at 1.0 Vertical to 2.0 Horizontal (30°) until the retaining walls are in place. We note due to the depth of the excavation, the soil is to be scraped back from the footprint of the excavation at least 0.5m and then battered. Medium Strength Sandstone or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant. All excavation boundaries are to be cut with a rock saw prior to any breaking with pneumatic hammers.

During the excavation process, the geotechnical consultant is to inspect the cut faces in 1.5m intervals as they are lowered or after encountering softer sections of rock, while the machine is on site to ensure the ground materials are as expected and no wedges or other geological defects are present that could require additional support. Should any weak sections of rock or adverse jointing be encountered, works are to stop until temporary or permanent support such as rock anchors, bolts, sprayed concrete, or similar support designed by the structural engineer in consultation with the geotechnical consultant, is installed.

Upon completion of the excavations, it is recommended all cut faces be supported with retaining walls to prevent any potential future movement of joint blocks in the cut faces that can occur over time, when unfavourable jointing is obscured behind the excavation faces. Additionally, retaining walls will help control seepage and to prevent minor erosion and sediment movement.

Bulk Excavation for Proposed Pool

No structures or boundaries will be within the zone of influence of the excavation. In the location of the proposed pool, rock is expected at shallow depths of ~0.9m or less.

The soil portions of the cut for the pool are expected to 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 day before the pool construction commences, they are to be supported with typical pool shoring such as braced form ply, until the pool structure is in place. Excavations through Medium Strength Sandstone or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant.

Advice Applying to Both Excavations

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. Unsupported cut batters through soil 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. The materials and labour to construct the retaining walls/pool structure are to be organised so on completion of the excavations they can be constructed as soon as possible. The excavations are to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

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

14. Retaining Structures

For cantilever or singly-propped retaining structures, it is suggested the design be based on a triangular 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
Sandy Soil	20	0.40	0.55
Medium Strength Sandstone	24	0.00	0.10

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.

15. Foundations

Concrete slabs supported directly off Medium Strength Sandstone are suitable footings for the proposed house. This material is expected to be exposed across most of the base of the excavations. Where it is not exposed, and where the footprint of the proposed house does not fall over the excavation, piers will be required to maintain a uniform bearing material.

The proposed pool is expected to be partially seated in Medium Strength Sandstone. Where sandstone is not exposed at the base of the excavation, the pool is to be supported on shallow piers taken to the underlying Medium Strength Sandstone.

As the area around the pool will periodically become saturated with pool use, to prevent excessive settlement it is recommended any paving be laid on a concrete slab supported on Medium Strength Sandstone.

A maximum allowable bearing pressure of 600kPa can be assumed for footings on Medium Strength Sandstone.

Naturally occurring vertical cracks known as joints commonly occur in sandstone. These are generally filled with soil and are the natural seepage paths through the rock. They can extend to depths of several metres and are usually relatively narrow but can range between 0.1 to 0.8m wide. If a pad footing falls over a joint in the rock, the construction process is simplified if with the approval of the structural engineer the joint can be spanned or, alternatively, the footing can be repositioned so it does not fall over the joint.

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. Geotechnical Review

The structural plans are to be checked and certified by the geotechnical consultant as being in accordance with the geotechnical recommendations. On completion, a Form 2B will be issued. This form is required for the Construction Certificate to proceed.

17. 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.

- During the excavation process, the geotechnical consultant is to inspect the cut faces as they are lowered in 1.5m intervals to ensure ground materials are as expected and that there are no wedges or other defects present in the rock that may require additional support.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment and contractors are 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

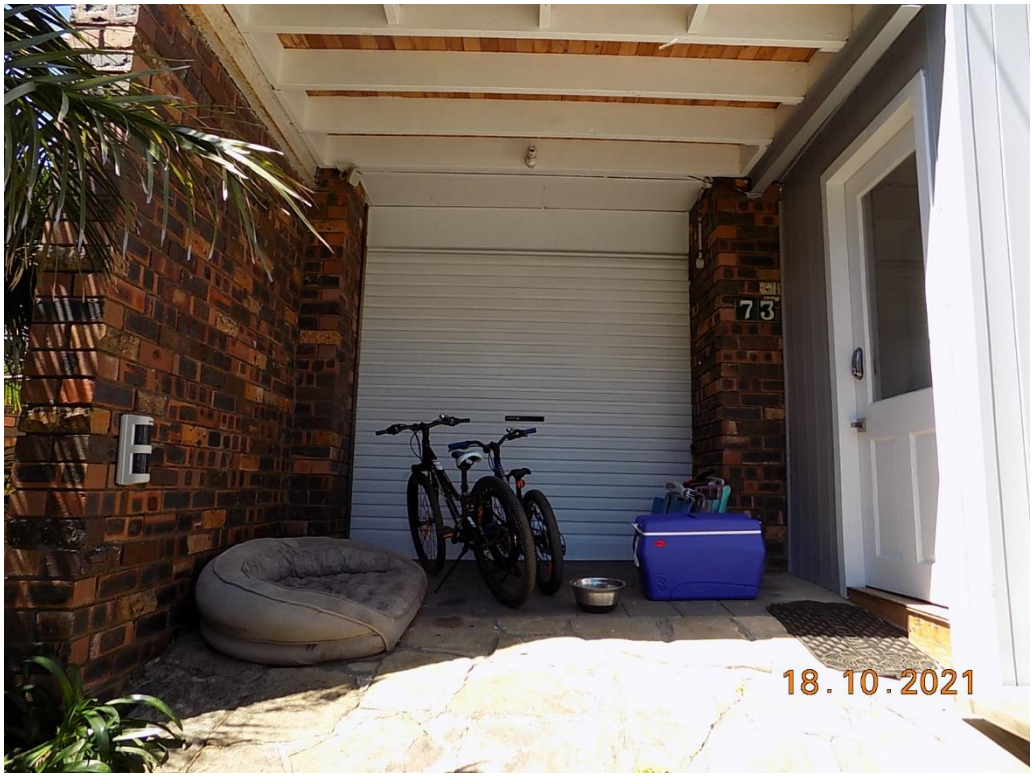


Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

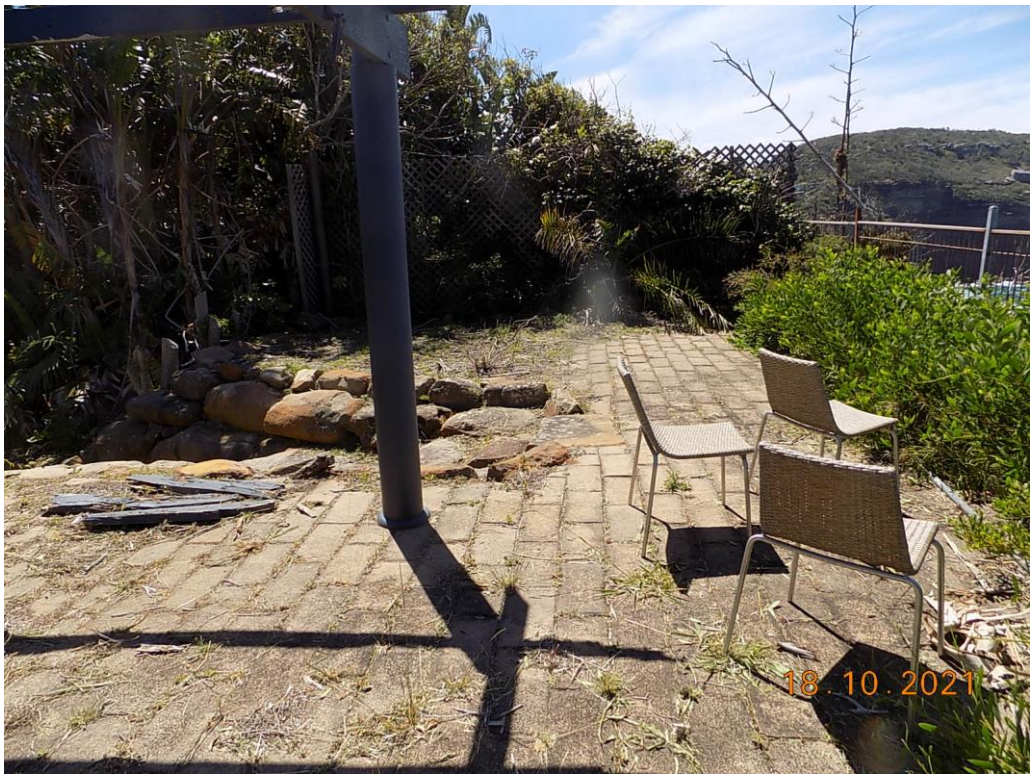


Photo 9

Photo 10

Photo 11

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.

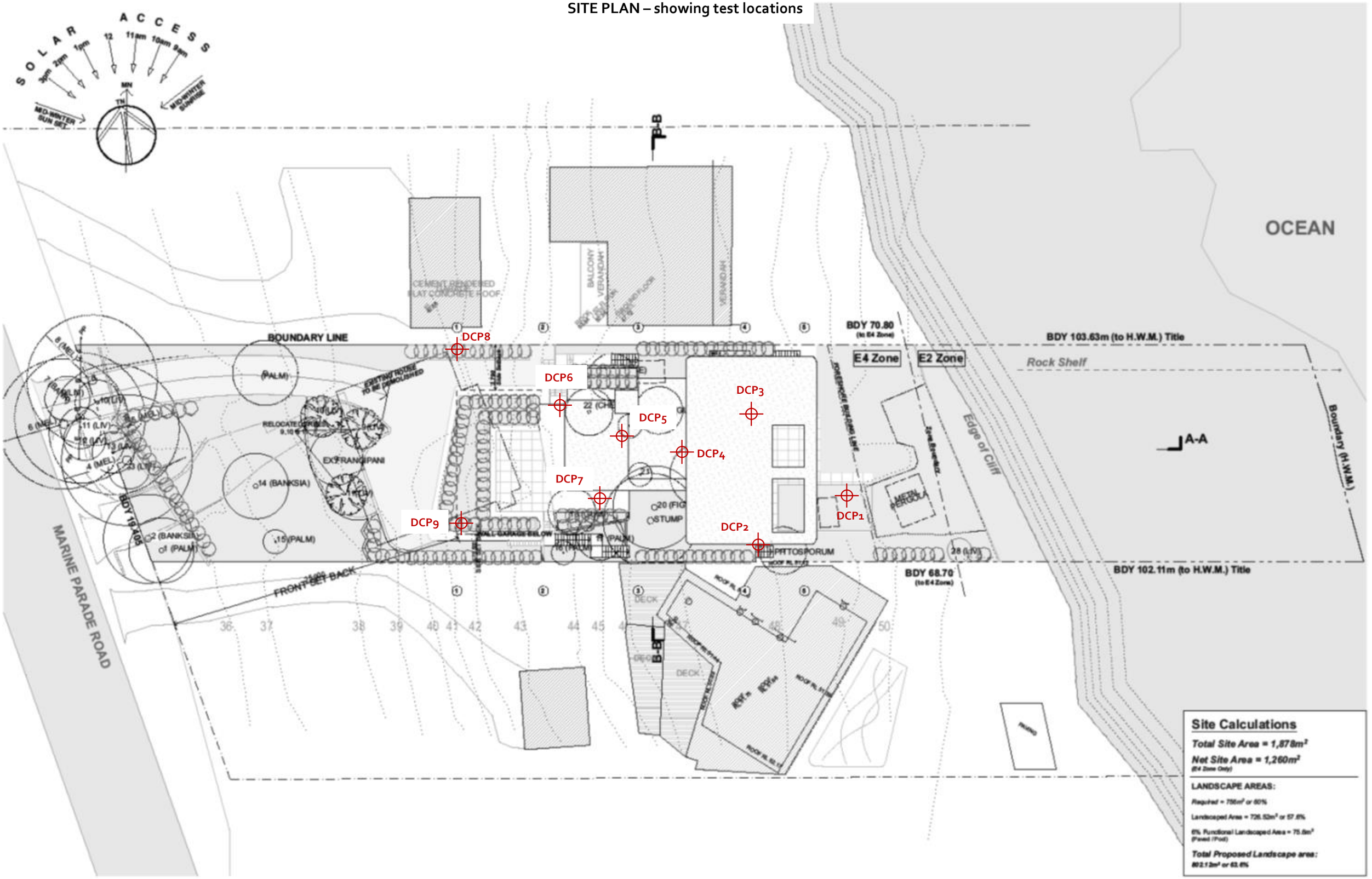
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



Site Calculations

Total Site Area = 1,878m²

Net Site Area = 1,260m²
(E4 Zone Only)

LANDSCAPE AREAS:

Required = 756m² or 60%

Landscaped Area = 726.52m² or 57.6%

6% Functional Landscaped Area = 75.8m²
(Paved / Pool)

Total Proposed Landscape area:
802.12m² or 63.6%

GARTNERTROVATO
ARCHITECTS

DATE	REV	DESCRIPTION
13/1/22	A	DA

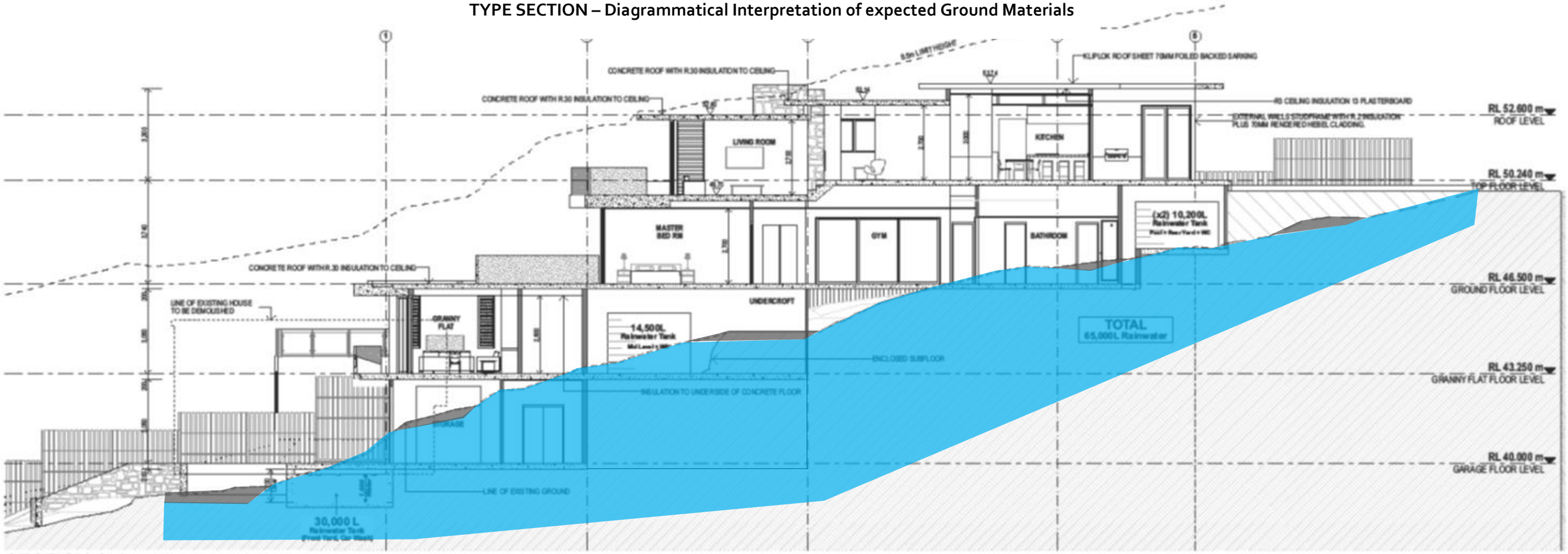
PROJECT
NEW HOUSE
73 MARINE PARADE, AVALON BEACH
LOT 114, DP 8394

FOR **COURTNEY FAMILY**

DRAWING TITLE
SITE PLAN + SITE ANALYSIS

PROJECT NO.	DRAWN BY	PLOT DATE
2137	SG / AB	13/1/22
SCALE	DRAWING NO.	REVISION
1:200 @ A2	A-01	A

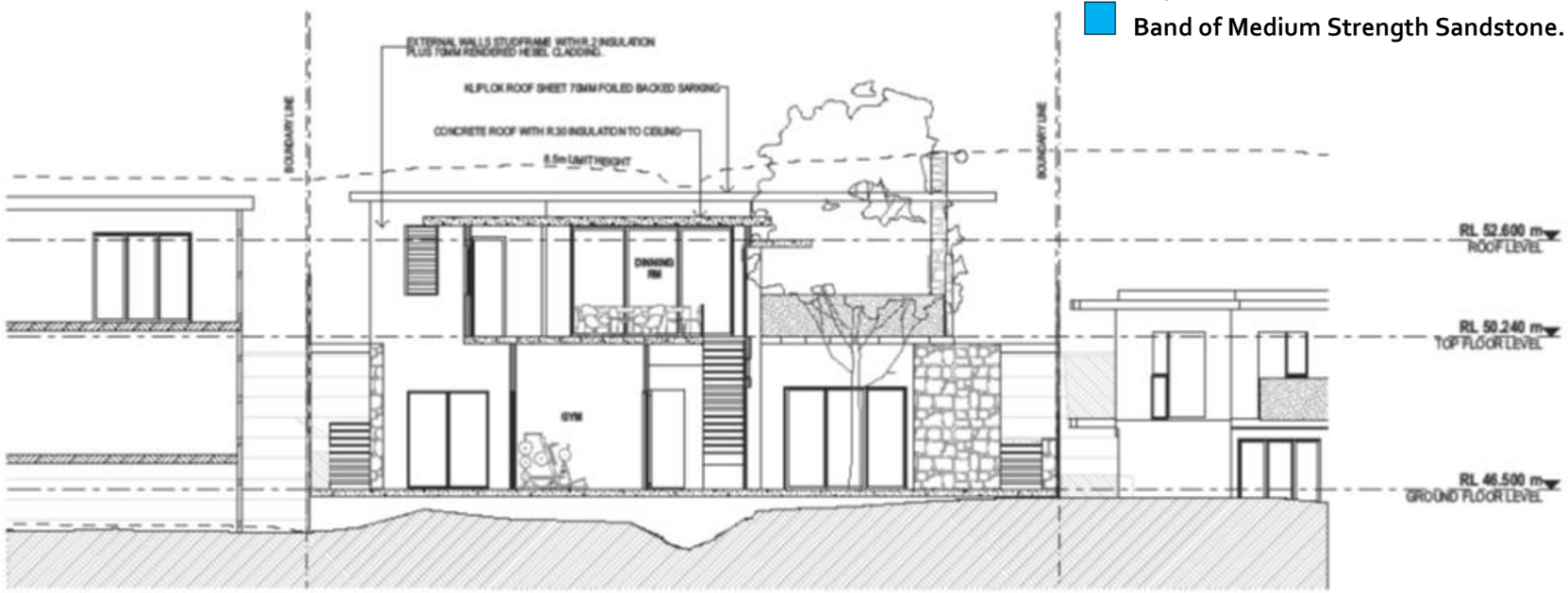
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Topsoil

Band of Medium Strength Sandstone. Extent of band is not known.

SECTION A-A



SECTION B-B

Basix Notes

- Metal roof with 75mm foil lined blanket (roof a medium colour)
- R3.0 insulation batts to all ceilings adjacent to metal & concrete roof
- 250mm concrete slabs all levels
- R3.0 insulation under concrete slabs adjacent to outdoor air and subfloor
- R2.0 insulation under slabs adjacent to ground (except garage)
- R3.0 insulation to garage ceiling
- Garage/subfloor external walls concrete block/stone clad
- All other external walls 75mm babel cladding/framed & to include R2.5 insulation
- R2.5 insulation to all internal walls
- All louvre windows aluminium framed/SG U=5.4 SHGC=0.58 (+/-10%)
- All other windows & glass doors double glazed U=3.6 SHGC=0.54 (+/-10%)
- External blinds to W02,W13,W27,W02 & W38
- All windows/doors are weather sealed
- All sub-soil fans sealed
- All recessed downlights sealed and to allow for uninterrupted ceiling insulation
- Ceiling fans to all bedrooms (minimum 1200mm diameter)

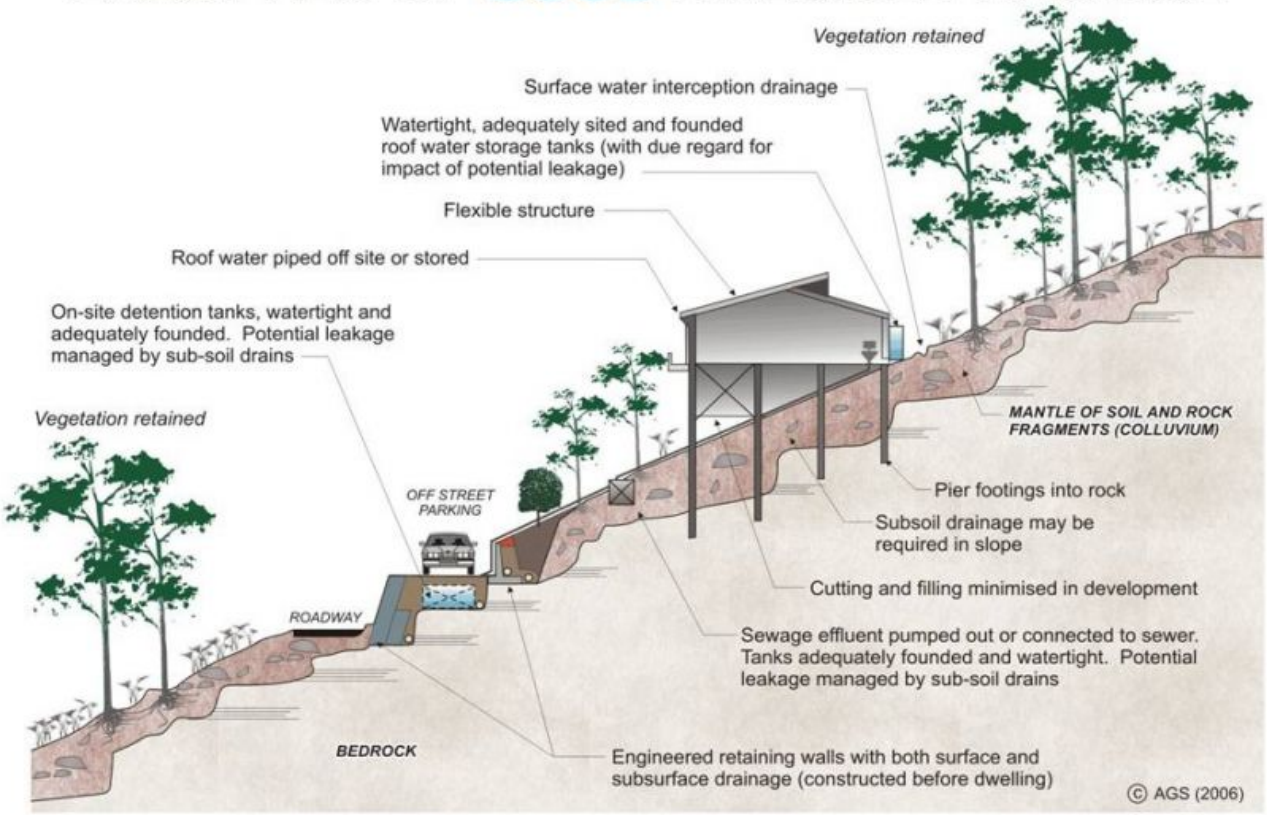
GARTNERTROVATO ARCHITECTS

DATE	REV	DESCRIPTION
13/1/22	A	DA

PROJECT: NEW HOUSE
73 MARINE PARADE, AVALON BEACH
LOT 114, DP 8394
FOR COURTNEY FAMILY

DRAWING TITLE: SECTIONS A + B
PROJECT NO.: 2105
DRAWN BY: SG / AB
PLOT DATE: 13/1/22
SCALE: 1:100 @ A2
DRAWING NO.: A-08
REVISION: A

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE