

## **GROUND TESTING:**

Alterations and Additions and New Cellar at **5 Marine Parade, Avalon**

### **1.0 Scope**

The aim of this assessment is to determine the nature of the ground materials in the location of the proposed works and to provide foundation advice.

The site was inspected on the 3<sup>rd</sup> of June, 2025.

### **2.0 Proposed Development**

- 2.1** Construct a cellar in the existing foundation space of the house by excavating to a maximum depth of ~1.1m.
- 2.2** Minor Internal and external alterations and addition to the house, including the demolition of existing walls.
- 2.3** Convert the existing outbuilding on the uphill side of the property into a secondary dwelling by extending to the E with floor above.
- 2.4** Details of the proposed development are shown on 15 drawings prepared by Rachel Hudson Architect, job number 204, drawings numbered DA-00 to DA-15. All issue A. All dated June 2025.

### **3.0 Geology**

The Sydney 1:100 000 Geological Sheet indicates the site is underlain by the Narrabeen Group of Rocks with the contact point of modern marine and estuarine beach sands further seaward. Ground testing indicates that the property is underlain by deep sediments over rock. The Narrabeen Group of Rocks are described as interbedded laminite, shale and quartz to lithic quartz sandstone. Modern marine and estuarine beach sands are described as coarse quartz sand, varying amounts of shell fragments.

## 4.0 Subsurface Investigation

One hand Auger Hole (AH) was put down to identify the soil materials. Four Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative densities of the sands throughout the profile and the depth to rock. 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 natural rock surface. This is not expected to have been an issue for this site. But due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in the excavation and foundation budget to account for this. We refer to the appended "Important Information about Your Report" to further clarify. The results are as follows:

### AUGER HOLE 1 (~RL7.3) – AH1 (Photo 1)

Depth	Material Encountered
0.0 to 0.5	<b>TOPSOIL</b> , silty sandy soil, brown, Medium Dense, dry, fine to medium grained.
0.5 to 1.9	<b>AEOLIAN SEDIMENT</b> , clean quartz sand, shell fragments included, brown to yellow, Medium Dense, dry, coarse grained.

Refusal @ 1.9m auger grinding on inferred rock. No water table encountered.

## DCP TEST RESULTS ON THE NEXT PAGE

DCP TEST RESULTS – Dynamic Cone Penetrometer				
Equipment: 9kg hammer, 510mm drop, conical tip.			Standard: AS1289.6.3.2 - 1997	
Depth(m) Blows/0.3m	DCP 1 (~RL7.3)	DCP 2 (~RL6.4)	DCP 3 (~RL9.3)	DCP 4 (~RL11.1)
0.0 to 0.3	5	4	3	4
0.3 to 0.6	8	7	5	6
0.6 to 0.9	13	14	7	11
0.9 to 1.2	13	14	10	14
1.2 to 1.5	22	8	11	15
1.5 to 1.8	18	#	7	18
1.8 to 2.1	9		5	17
2.1 to 2.4	#		8	21
2.4 to 2.7			12	24
2.7 to 3.0			17	24
3.0 to 3.3			22	21
3.3 to 3.6			23	30
3.6 to 3.9			27	#
3.9 to 4.2			33	
4.2 to 4.5			11	
4.5 to 4.8			#	
	Refusal @ 1.9m	Refusal @ 1.3m	Refusal @ 4.3m	End of Test @ 3.6m

#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 inferred Rock @ 1.9m, DCP bouncing off rock surface, white impact dust and yellow sandy clay on dry tip.

DCP2 – Refusal on inferred Rock @ 1.3m, DCP thudding on rock surface, white and yellow impact dust on dry tip.

DCP3 – Refusal on inferred Rock @ 4.3m, DCP bouncing off rock surface, white impact dust and yellow sandy clay on dry tip.

DCP4 – End of test @ 3.6m, DCP still very slowly going down, brown sandy clay on dry tip.

## 5.0 Geological Observations and Interpretations

In the location of the proposed works, the site is underlain by a thin sandy topsoil and deep Aeolian sediment. To summarise the test results, a Medium Dense sandy topsoil occupies the top ~0.5m of the profile, that overlies sands of variable density that range from Loose to Dense at depths of between ~1.3m and ~4.3m. DCP test 4 was terminated at depth due to a very high blow count in inferred dense sand. DCP tests 1, 2 and 3 are interpreted to have refused on Narrabeen group bedrock. The underlying bedrock is interpreted as Very Low to Medium Strength Rock. See the Type Section attached for a diagrammatical representation of the expected ground materials.

## 6.0 Site Classification

The site classification in accordance with AS2870-2011 is Class P due to the location of the property within a coastal erosion zone. Foundation performance of the sediments underlying the property are expected to be in line with a Class A site (non-reactive, ys range 0mm).

## 7.0 Foundations

The cellar slab can be supported off the Medium Dense Sand at base of the excavation. Where the house is not supported off the cellar structure, and for any new footings for the proposed secondary dwelling, they are to be supported on spread footings taken at least 0.4m below the current surface and into the sands of the natural profile. A maximum allowable bearing pressure of 100kPa can be assumed for footings supported on the medium dense sands of the natural profile.

Care is to be taken not to exceed this depth as Very Low to Medium Strength rock is expected to be encountered close to the base of the proposed cellar at ~RL5.4.

If Very Low to Medium Strength rock is encountered, all foundations for the cellar will need to be taken to this material.

The foundations supporting the existing house are currently unknown. Given the age of the building and depth to rock encountered, they are unlikely to be founded on rock. Ideally, footings should be founded on the same footing material across the old and new portions of the structure. If the proposed cellar structure is founded on Very Low to Medium Strength Rock, construction joints or similar are to be installed to prevent differential settlement.

A maximum allowable bearing pressure of 600kPa can be assumed for footings on Very Low to Medium Strength Rock.

The base of the footing excavations in sand should be compacted as the excavation will loosen the upper sands. This can be carried out with a hand-held plate compactor. Water may be used to assist in compaction in sand but footing materials should be kept damp but not saturated. As a guide to the level of compaction required a density index of >85% is to be achieved.

All footing surfaces are to be cleaned of loose material just prior to the placing of steel and concrete.

The geotechnical consultant is to inspect and test the compacted base of the footings to ensure the required density has been achieved during compaction.

**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.

## 8.0 Inspections

The following inspections are recommended and if geotechnical certification is desired, they are a requirement.

- 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.



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Photo 1 – AH1 - downhole is top to bottom



## Important Information about Your Report

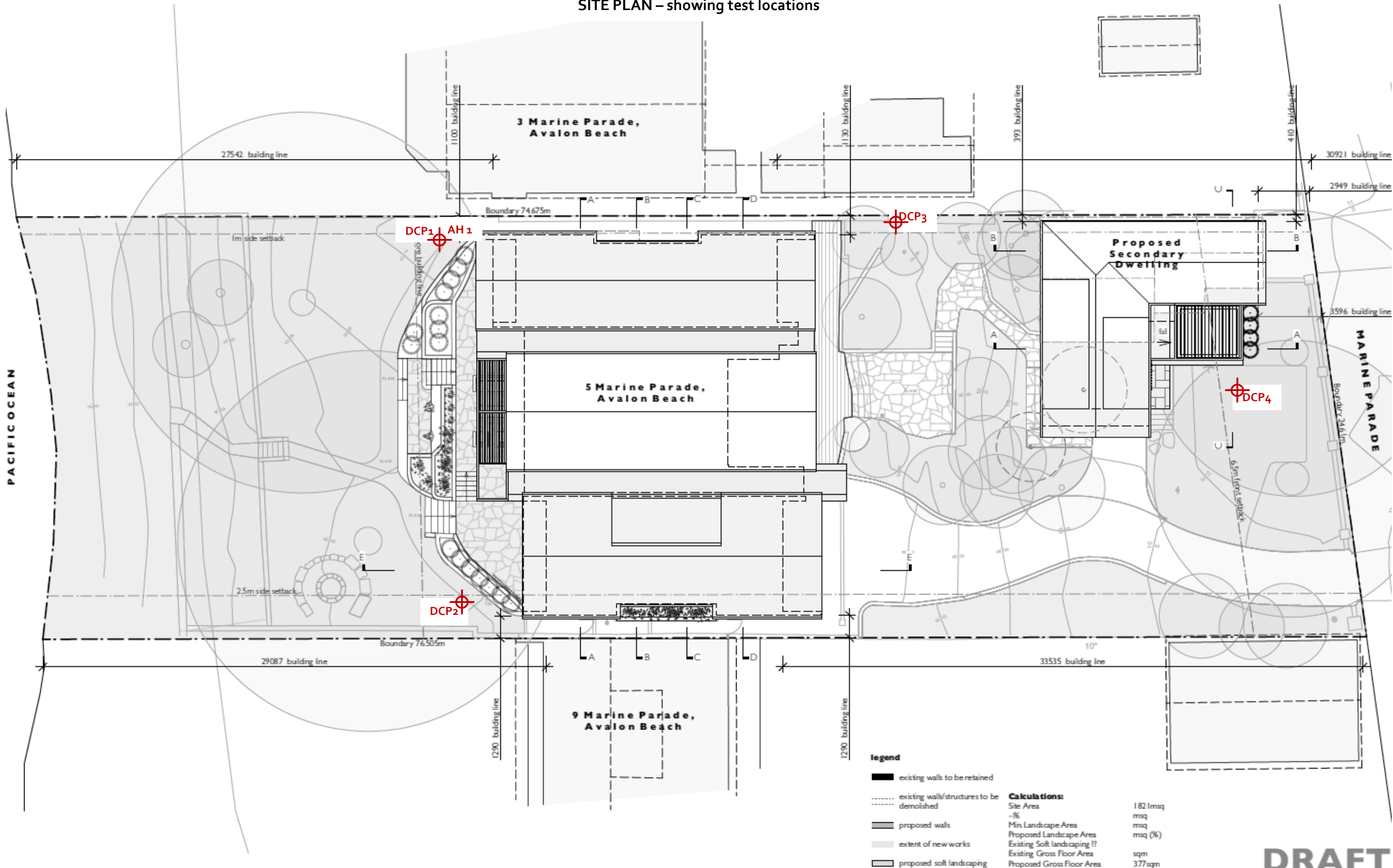
It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures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



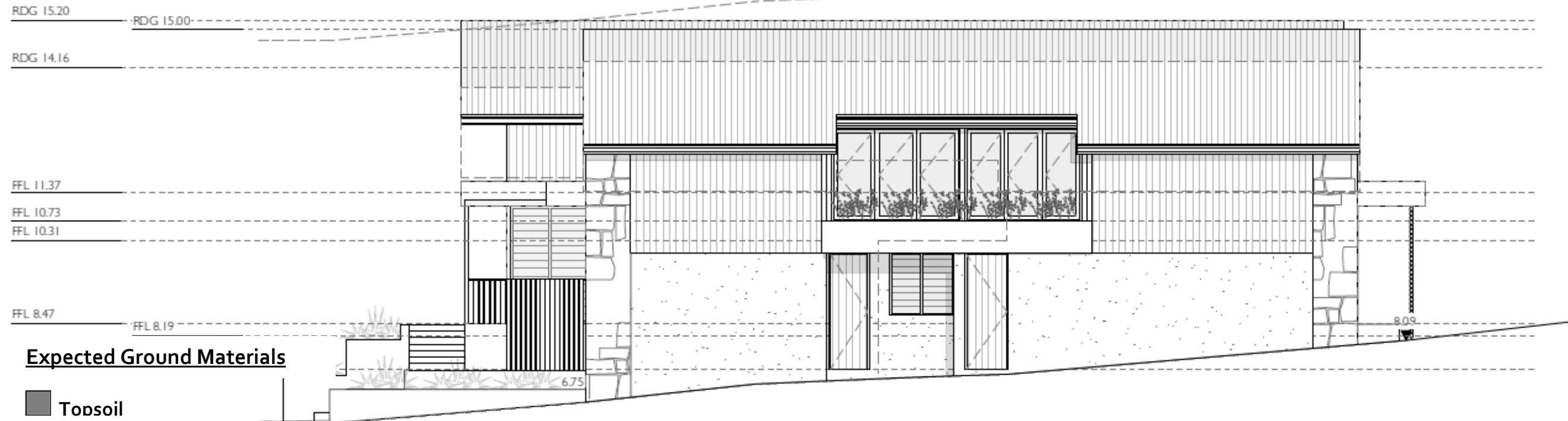
# SITE PLAN – showing test locations



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<b>RH/a</b> <small>rachel hudson architect</small> <small>0410 323 564</small> <small>www.rachelhudson.com.au</small> <small>rachel@rachelhudson.com.au</small>	 <small>This drawing is subject to copyright and is not to be used or reproduced for purposes other than construction of the subject building on the subject site without the consent of RH/a. Figured dimensions take precedence. All dimensions are to be verified on site prior to ordering any materials and/or building elements and prior to commencing any of the affected works. Any discrepancies are to be reported to the authority immediately. This drawing not to be used for construction unless it is issued for construction and is marked in amended column and is approved and signed by RH/a.</small>	Revisions:			Drawing: <b>SITE PLAN</b>			Project: <b>ALTERATIONS + ADDITIONS</b> <b>5 Marine Parade</b> <b>Avalon Beach NSW 2107</b>  Client: <b>Joe + Margaret Grech</b>
		Issue:	Date:	Amendment:	Job Number:	Lot No. 18	Drawing Number:	
		A	.25	Development Application	<b>204</b>	DP 12979	<b>DA - 02</b>	
						Scale: <b>1:200 @ A3</b>	Issue: <b>A</b>	

# TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

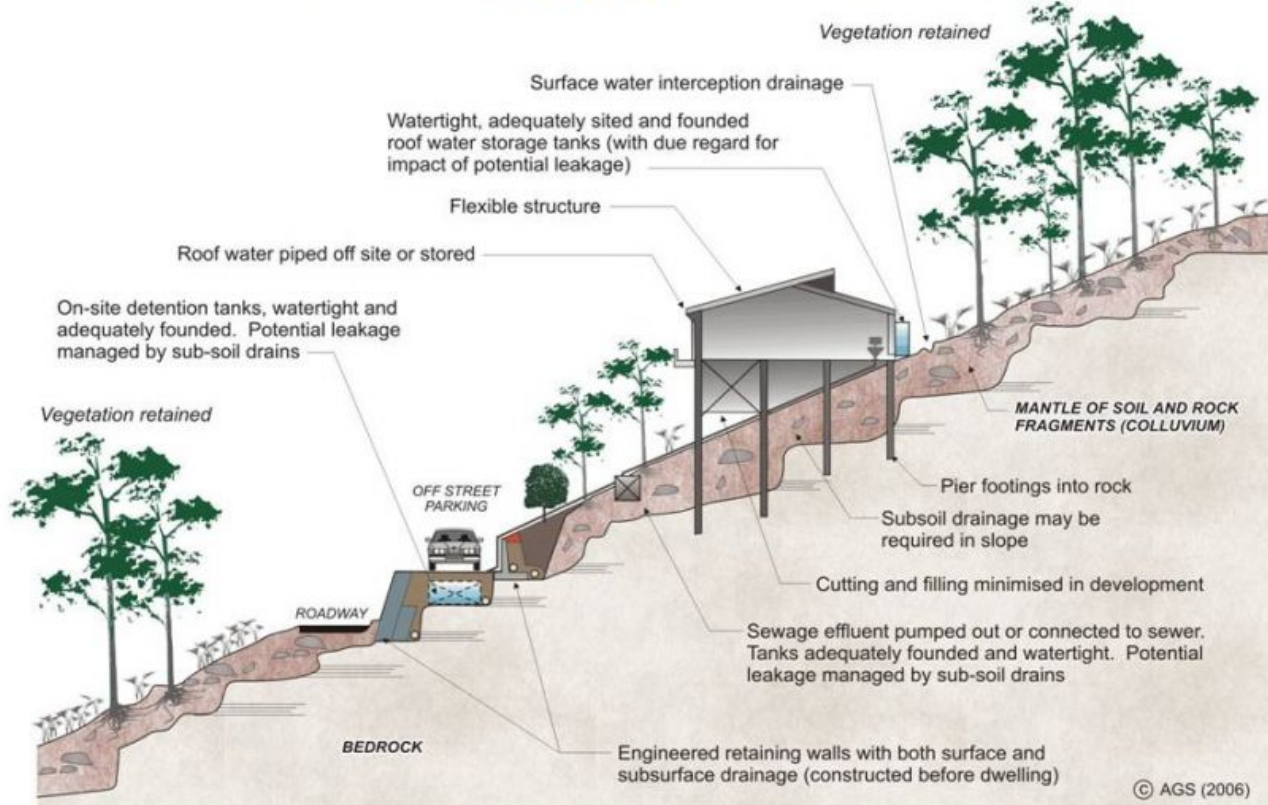


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<b>RH/a</b> rachel hudson architect 0410 323 564 www.rachelhudson.com.au rachel@rachelhudson.com.au	Revisions:			Drawing: ELEVATIONS			Project: <b>ALTERATIONS + ADDITIONS</b> <b>5 Marine Parade</b> <b>Avalon Beach NSW 2107</b>  Client: <b>Joe + Margaret Grech</b>
	Issue:	Date:	Amendment:	Job Number:	Lot No. 18 DP 12979	Drawing Number:	
	A	..25	Development Application	204	Scale: 1:100 @ A3	DA - 07	

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# EXAMPLES OF **GOOD** HILLSIDE PRACTICE



# EXAMPLES OF **POOR** HILLSIDE PRACTICE

