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

**Development Application for** _____
Name of Applicant

**Address of site** 16 Powderworks Road, North Narrabeen

*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 16/8/19 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 **16 Powderworks Road, North Narrabeen**

Report Date: 16/8/19

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** 16 Powderworks Road, North Narrabeen

*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 **16 Powderworks Road, North Narrabeen**

Report Date: 16/8/19

Author: BEN WHITE

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

**Please mark appropriate box**

☒ Comprehensive site mapping conducted **15/6/19**
(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 **15/6/19**

☒ 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:

Alterations and Additions at **16 Powderworks Road, North Narrabeen**

## 1. Proposed Development

**1.1** Construct a new addition to the uphill side of the existing secondary dwelling by excavating to a maximum depth of ~0.5m into the slope.

**1.2** Details of the proposed development are shown on 11 drawings prepared by JJ Drafting, job number 727/19, drawings ladled DA.01 to DA.11, dated August 2019.

## 2. Site Description

**2.1** The site was inspected on the 15th August, 2019.

**2.2** This residential property is on the high side of the road and has a N aspect. It is located on the moderately to steeply graded lower reaches of a hillslope. From the road frontage to the upper boundary, the natural slope rises at an average angle of ~14°. The slope above the property continues at similar angles. The slope below the property gradually eases.

**2.3** A concrete driveway runs from the road frontage to a cut car port (Photo 1). The cut is supported by a 1.8m high sprayed concrete retaining wall that appears stable and runs the width of the block across the slope (Photo 2). Timber stairs and a concrete path run around the carport and over a steep turfed slope to the downhill side of the house. The part 2 storey timber framed and fibre board clad house is supported on stable masonry piers and walls (Photo 3 & 4). Lawn extends uphill either side of the house. Above the house a stable 1.2m high sandstone block retaining wall supports a cut for the house (Photo 5). Lawn continues uphill until reaching another stable 0.8m high sandstone block retaining wall used to level the backyard (Photo 6). A timber framed and clad studio is located on the slope above the retaining wall

(Photo 7). The studio is supported on treated pine posts that stand vertical (Photo 8). An uphill extension of the secondary dwelling is proposed and construction of a new larger deck to the E of the flat. Lawn extends at moderate to steep angles to the upper common boundary above the studio.

## 3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. It is described as interbedded laminite, shale and quartz to lithic quartz sandstone.

## 4. Subsurface Investigation

One auger hole was put down to identify soil materials. Three 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. 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** (~RL23.7) **–** AH1 (Photo 9)

| **Depth (m)** | **Material Encountered** |
|---|---|
| 0.0 to 0.5 | **TOPSOIL**, sandy silt, dark brown, fine grained, medium dense. |

End of test @ 0.5m. 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** (~RL23.7) | **DCP 2** (~RL25.7) | **DCP 3** (~RL25.2) |
| 0.0 to 0.3 | 3 | 14 | 14 |
| 0.3 to 0.6 | 18 | 24 | 24 |
| 0.6 to 0.9 | 40 | 22 | 22 |
| 0.9 to 1.2 | # | 40 | 40 |
| 1.2 to 1.5 | | # | # |
| | End of Test @ 0.8m | End of Test @ 1.1m | End of Test @ 1.15m |

#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 @ 0.8m, DCP still very slowly going down, clean dry tip.
DCP2 – End of test @ 1.1m, DCP still very slowly going down, maroon fragments on dry tip.
DCP3 – End of test @ 1.15m, DCP still very slowly going down, clean dry tip.

## 5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of a thin silty topsoil over stiff to hard clays. The clays merge into the underlying weathered rock at an average depth of ~0.9m below the current surface. The weathered zone is interpreted to be Extremely Low Strength Shale. 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 excavation.

## 7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The steeply graded slope that rises across the property and continues above is a potential hazard (**Hazard One**).

### Risk Analysis Summary

| HAZARDS | Hazard One |
|---|---|
| TYPE | The moderately to steeply graded slope that rises across the property and continues above is a potential hazard. |
| LIKELIHOOD | 'Unlikely' ($10^{-4}$) |
| CONSEQUENCES TO PROPERTY | 'Medium' (12%) |
| RISK TO PROPERTY | 'Low' ($2 \times 10^{-5}$) |
| RISK TO LIFE | $9.1 \times 10^{-7}$/annum |
| COMMENTS | 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 the street. 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 ~0.5m is required to construct the proposed addition. It is expected the excavation will be through a silty soil over stiff clay. It is envisaged the excavations through soil and clay can be carried out with a bucket and excavator and rock hammers will not be required.

## 12. Vibrations

No excessive vibrations will be generated by excavation through soil or clay.

## 13. Excavation Support Requirements

No structures or boundaries will be within the zone of influence of the proposed excavation.

Low cut batters of up to 0.5m through soil and firm to stiff clay will stand at near-vertical angles for short periods of time until the retaining walls are installed. Alternatively the cut can be battered permanently at angles of not more that 30° (1.0 vertical to 1.7 horizontal)

Excavation spoil is to be removed from the site following the NSW Environmental Protection Agency (EPA) Waste Classification Guidelines.

## 14. Retaining Walls

Retaining walls supporting soil and clay can be designed for a lateral earth pressure coefficient Ka of 0.35 and assume a bulk density of 20kN/$m^3$. It should be noted that this lateral earth pressure coefficient assumes the surface above the wall is near level, so slope surcharges need to be added.

Any surcharge loads that may act on the retaining walls are to be accounted for in the design.

All retaining walls are to have sufficient back-wall drainage and be backfilled immediately behind the wall 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 walls, likely hydrostatic pressures are to be accounted for in the retaining wall design.

## 15. Foundations

The proposed addition and deck can be supported on spread footings or shallow piers taken to a depth of at least 0.4m from the downhill side of the footing. A maximum allowable bearing pressure of 200kPa can be assumed for footings on the firm to stiff clay of the natural profile.

It is recommended 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 wet layer of 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. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide certification for the regulating authorities or the owner if the following inspections have not been carried out during the construction process.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.

Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist


*Photo 1*


*Photo 2*


*Photo 3*


*Photo 4*


*Photo 5*

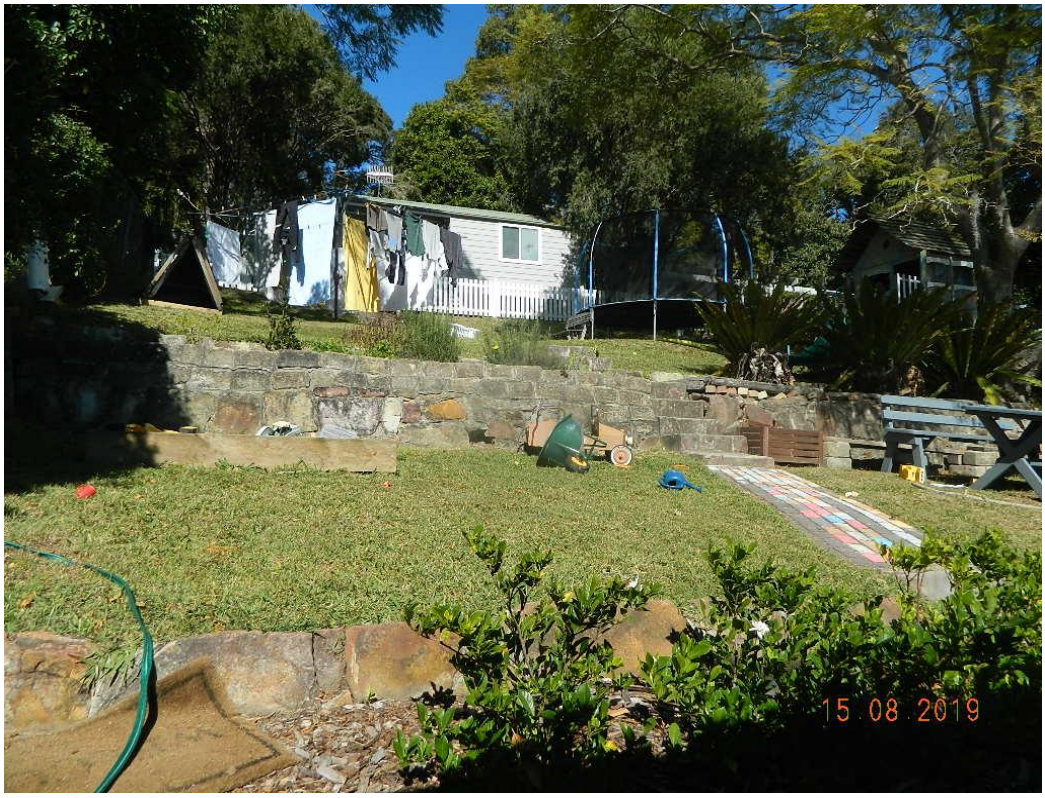



*Photo 6*


*Photo 7*


*Photo 8*


*Photo 9 – AH1*

## 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.

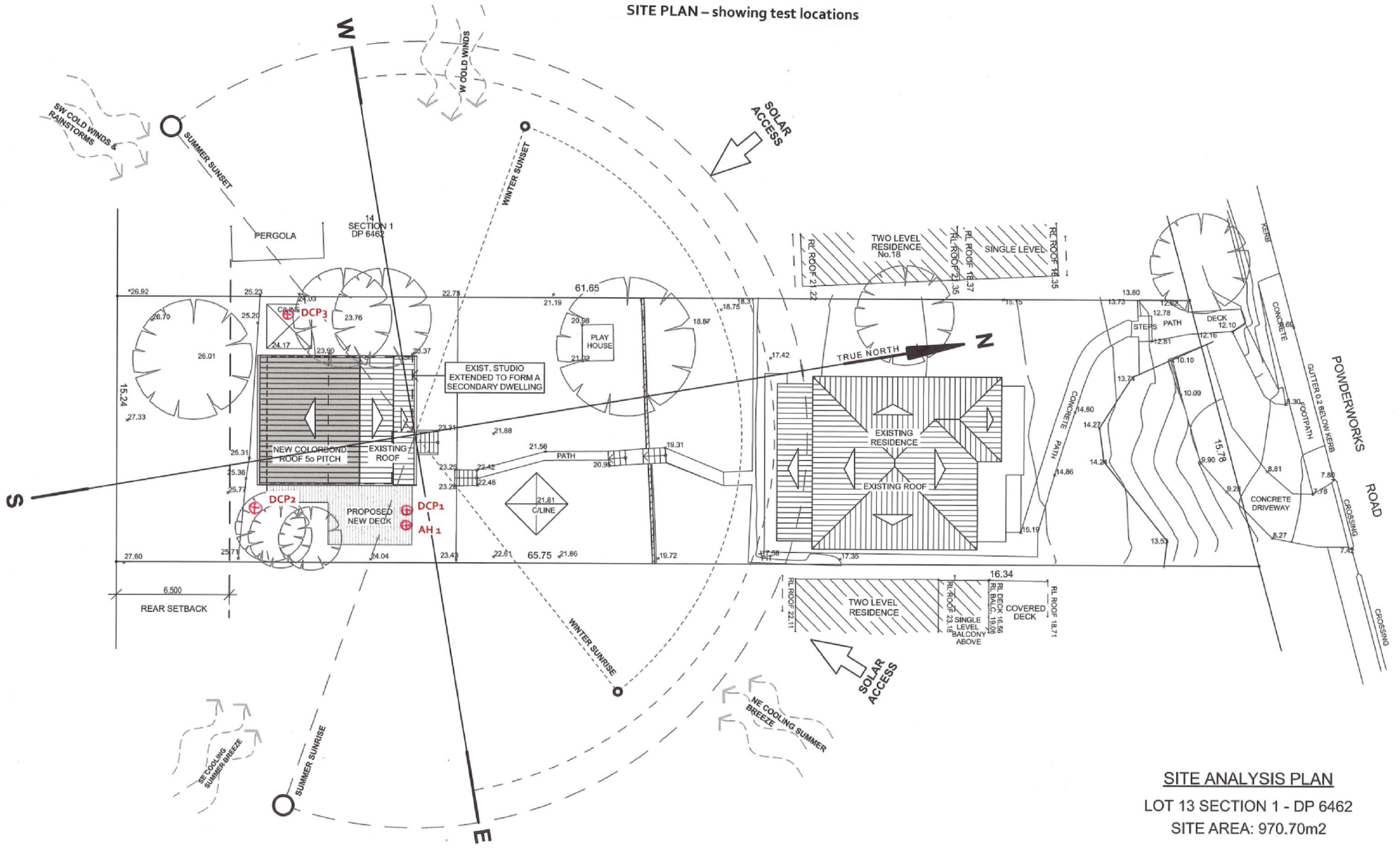
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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 ANALYSIS PLAN

LOT 13 SECTION 1 - DP 6462

SITE AREA: 970.70m2

TRUE NORTH:

NOTES:
- All structures including stormwater & drainage to engineer's details.
- Do not obtain dimensions by scaling drawings.
- All dimensions are to be checked on site prior to starting work.
- These drawings are to be read in conjunction with all other consultant's drawings and specifications.
- All workmanship & materials shall be in accordance with the requirements of current editions including amendments of the relevant SAA Codes of Practice, the Building Code of Australia and local council requirements.
- New materials are to be used throughout unless otherwise noted.
- Concrete footings, slab, structural beams or any other structural members are to be designed by a practicing engineer.


*JJ Drafting*
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Email. jjdraft@tpg.com.au
www.jjdrafting.com.au


| REV: | DATE: | DESCRIPTION: |
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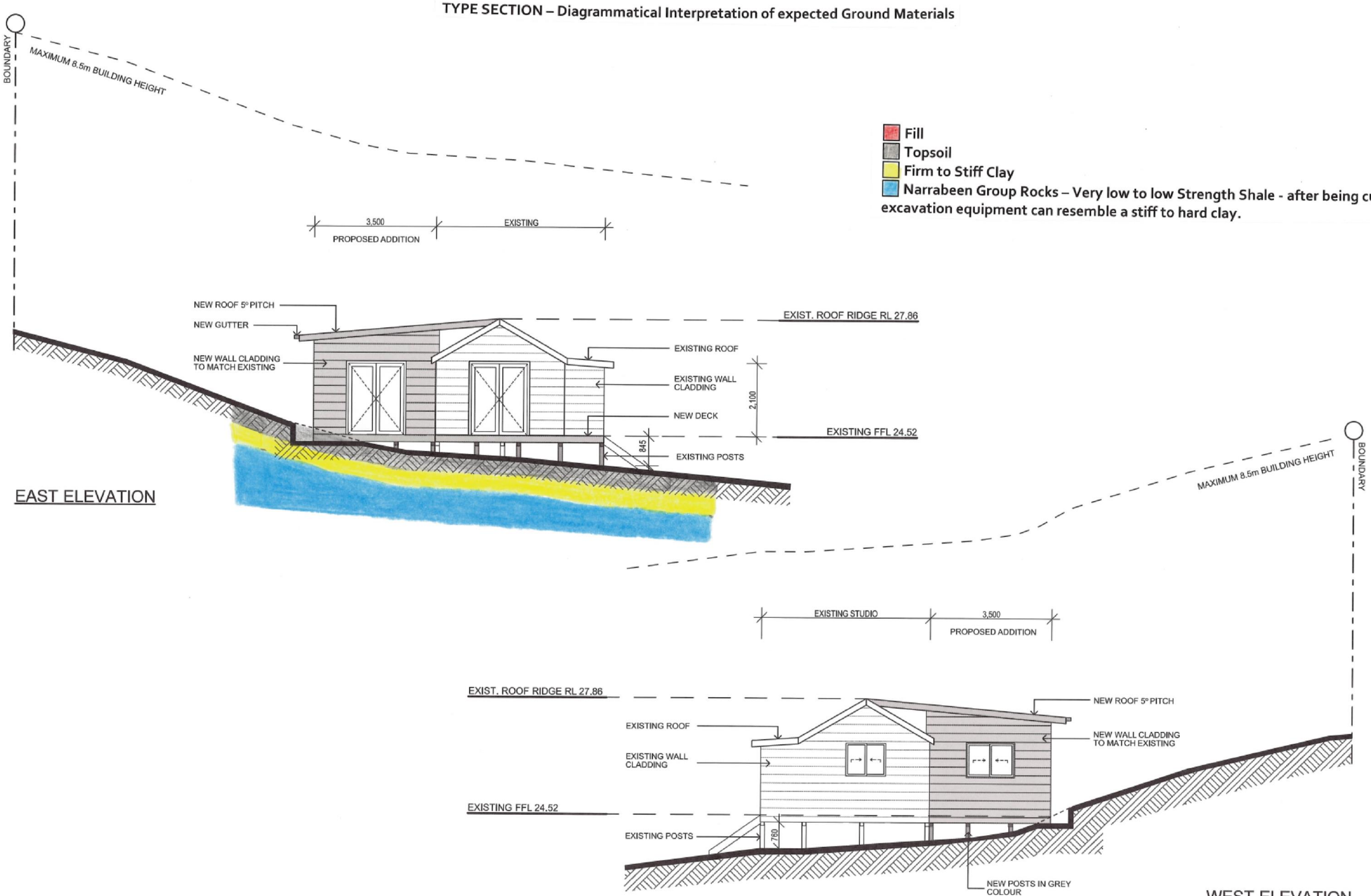
|---|---|---|---|
| PROJECT DETAILS: PROPOSED ALTERATIONS AND ADDITIONS 16 Powderworks road - North Narrabeen | DATE: AUGUST/2019 | DRAWN BY: LB | SCALE: 1:200 @ A3 |
| DRAWING TITLE: SITE ANALYSIS PLAN | JOB No: 727/19 | CHECKED BY: JJ | DRAWING No: **DA.01** |

## TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

- Fill
- Topsoil
- Firm to Stiff Clay
- Narrabeen Group Rocks – Very low to low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

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| REV: | DATE: | DESCRIPTION: |
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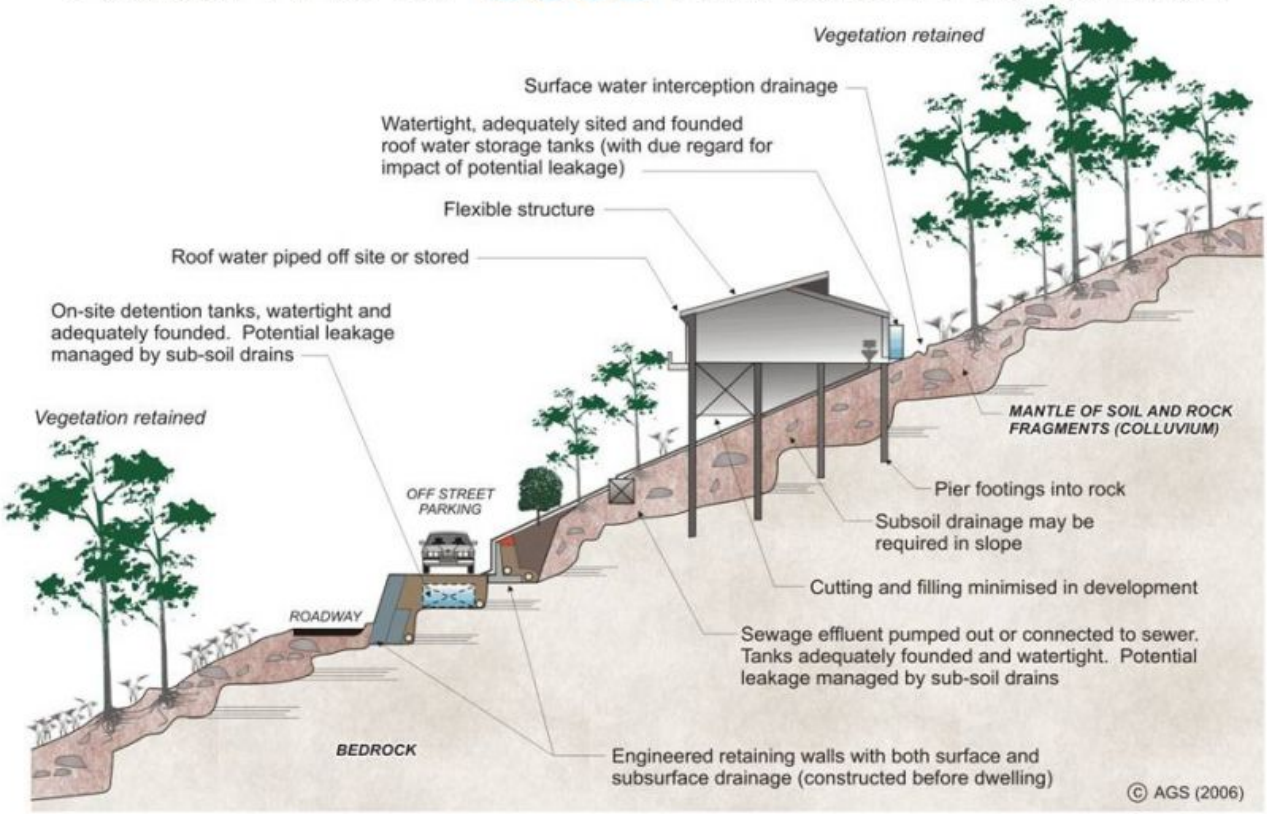
PROJECT DETAILS:
PROPOSED ALTERATIONS AND ADDITIONS
16 Powderworks road - North Narrabeen

DRAWING TITLE:
EAST & WEST ELEVATION

| DATE: | DRAWN BY: | SCALE: |
|---|---|---|
| AUGUST/2019 | LB | 1:100 @ A3 |
| JOB No: 727/19 | CHECKED BY: JJ | DRAWING No: **DA.05** |

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE