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

**Development Application for** _____
Name of Applicant

**Address of site** 25 Alleyne Avenue, 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 15/12/21 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 **25 Alleyne Avenue, North Narrabeen**
Report Date: 15/12/21

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** 25 Alleyne Avenue, 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 **25 Alleyne Avenue, North Narrabeen**

Report Date: 15/12/21

Author: BEN WHITE

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

**Please mark appropriate box**

- ☒ Comprehensive site mapping conducted **15/11/21** (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 **15/11/21**
- ☒ 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 at **25 Alleyne Avenue, North Narrabeen**

## 1. Proposed Development

**1.1** Demolish the existing house.

**1.2** Construct a new part three storey house with garage, secondary dwelling and above ground pool attached by excavating to a maximum depth of ~4.3m.

**1.3** Construct a new driveway requiring minor levelling.

**1.4** Details of the proposed development are shown on 12 drawings prepared by Daniel Raymond. Drawings numbered DA-000, DA-001, DA-100 to DA102 and DA-503 are dated 14/10/21. Drawings numbered DA-300 to DA-303, DA-400 and DA-401 are dated 18/10/21.

## 2. Site Description

**2.1** The site was inspected on the 15th November, 2021.

**2.2** This residential property is on the low side of the road and has a N aspect. It is located on the moderate to steeply graded upper middle reaches of a hillslope. The natural slope falls across the property at an average angle of ~17°. The slope below the property continues at similar angles. The slope above the property continues at similar angles before easing at the crest of the slope.

**2.3** At the road frontage, a gravel driveway runs to a gravel parking area (Photo 1). Fill provides a level platform for the parking area. The fill is supported by a timber retaining wall ~1.5m high (Photo 2). The wall is tilting at up to ~6.3° downslope, but will be demolished as part of the proposed works. A lawn area extends off the downhill side of the retaining wall. A sandstone and timber retaining wall up to ~1.9m high supports the fill for the lawn and a cut for a stone paved area below (Photo 3). The

wall is bulging slightly, but will be demolished as part of the proposed works. The old single storey weatherboard clad house is supported by sandstone block walls, sandstone block piers and timber posts (Photos 4 & 5). The supporting walls and piers stand vertical and show no significant signs of movement (Photo 6). Lawn and garden areas extend off the downhill side of the house (Photos 5 & 7). Fill provides level platforms in the slope for the lawn and garden areas. The upper fills are supported by low sandstone block retaining walls. The lower fill is unsupported but is battered at stable angles. No signs of slope instability were observed on the property. The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

## 3. Geology

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

## 4. Subsurface Investigation

One hand auger hole (AH) was put down to identify the soil materials. Four Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. 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 for DCP3. 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** (~RL38.5) **–** AH1 (photo 8)

| Depth (m) | Material Encountered |
|---|---|
| 0.0 to 0.4 | **TOPSOIL**, sandy soil, dark brown, moist, fine to medium grained. |
| 0.4 to 0.5 | **SANDY CLAY**, orange, firm to stiff, dry to moist. |

End of Test @ 0.5m in firm to stiff sandy clay. No watertable encountered.

**DCP TEST RESULTS – Dynamic Cone Penetrometer**

Equipment: 9kg hammer, 510mm drop, conical tip. Standard: AS1289.6.3.2 -1997

| Depth(m) Blows/0.3m | DCP 1 (~RL38.5) | DCP 2 (~RL37.1) | DCP 3 (~RL33.3) | DCP 4 (~RL33.0) |
|---|---|---|---|---|
| 0.0 to 0.3 | 7 | 4 | 4 | 3 |
| 0.3 to 0.6 | 13 | 6 | 5 | 4 |
| 0.6 to 0.9 | 18 | 8 | 7 | 3 |
| 0.9 to 1.2 | 23 | 13 | # | 7 |
| 1.2 to 1.5 | 20 | 12 | | 12 |
| 1.5 to 1.8 | 9 | 15 | | 23 |
| 1.8 to 2.1 | 19 | # | | 22 |
| 2.1 to 2.4 | # | | | 20 |
| 2.1 to 2.7 | | | | 48 |
| 2.7 to 3.0 | | | | # |
| | Refusal on rock @ 2.1m | Refusal on rock @ 1.7m | Refusal @ 0.8m | End of Test @ 2.7m |

#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 @ 2.1m, DCP bouncing off rock surface, white rock fragments on dry tip.

DCP2 – Refusal on rock @ 1.7m, DCP bouncing off rock surface, white rock fragments on dry tip.

DCP3 – Refusal @ 0.8m, DCP bouncing, orange and white rock fragments and orange clay on moist tip.

DCP4 – End of Test @ 2.7m, DCP still very slowly going down, white rock fragments and orange clay on 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 fill and topsoil over firm to stiff sandy clays. Fill to a maximum depth of ~1.5m provides a level platform for the parking area and level platforms for lawn and garden areas across the property. The clays merge into the weathered zone of the under lying rock at depths from between ~1.7m to ~2.1m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low Strength Shale. It is to be noted that this material is a soft rock and can appear as a mottled stiff clay when it is cut up by excavation equipment. 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 in the rock.

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

## 7. Surface Water

No evidence of surface flows were observed on the property during the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system for Alleyne Avenue above.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The moderate to steep slope that falls across the property and continues above and below is a potential hazard

(**Hazard One**). The proposed excavation is a potential hazard until retaining structures are in place (**Hazard Two**).

**Geotechnical Hazards and Risk Analysis - Risk Analysis Summary**

| HAZARDS | Hazard One | Hazard Two |
|---|---|---|
| **TYPE** | The moderate to steep slope that falls across the property and continues above and below failing and impacting on the property. | The proposed excavation for the house collapsing onto the worksite, impacting the neighbouring properties and undercutting the W neighbouring house, W neighbouring pergola and E neighbouring house during the excavation process. |
| **LIKELIHOOD** | 'Unlikely' ($10^{-4}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (12%) | 'Medium' (25%) |
| **RISK TO PROPERTY** | 'Low' ($2 \times 10^{-5}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-7}$/annum | $3.7 \times 10^{-5}$/annum |
| **COMMENTS** | This level of risk is 'ACCEPTABLE'. | 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. |

(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

It is recommended a drainage easement be obtained from the downhill neighbouring property and all stormwater or drainage runoff from the proposed development be piped to

the street below. If this option is not feasible, the stormwater engineer can refer to council stormwater policy for suitable options. All stormwater is to be piped through any tanks that may be required by the regulating authorities.

## 11. Excavations

An excavation to a maximum depth of ~4.3m is required to construct the proposed new house. The storage room and W portion of the lower ground floor excavation reach maximum depths of ~2.9m and ~2.1m respectively. A stepped excavation to a maximum combined depth of ~4.3m is required for the E portion of the lower ground floor and the proposed pathway on the uphill side of the lower ground floor. The upper and low steps reach maximum depth of ~1.5m and ~3.6m respectively. The bench between the two steps is ~1.0m wide.

The excavation is expected to be through fill, topsoil and sandy clay, with Extremely Low Strength Shale expected at depths from between ~1.7m to ~2.1m below the current surface. Excavations through fill, soil, clay and rock up to Low Strength can be carried out with an excavator and bucket.

## 12. Vibrations

It is expected the proposed excavation will be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

If Medium Strength Rock or better is encountered, excavations through Medium Strength Rock or better are to be carried out to minimise the potential to cause vibration damage to the neighbouring properties.

Allowing for backwall drainage, the proposed excavation is set back ~1.3m from the W neighbouring house, ~7.0m from the W neighbouring pool and ~3.3m from the E neighbouring house.

Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the property boundaries. Vibration monitoring will be required to verify this is achieved. Vibration monitoring must include a light/alarm so the operator knows if vibration limits have been exceeded the equipment is to log and record vibrations throughout the excavation works.

If a milling head is used to grind the rock, or if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, before a rock hammer up to 300kg is used to break the rock it is likely the peak particle velocity will not be exceeded provided the saw cuts are kept well below the rock to be broken.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the neighbouring properties.

## 13. Excavation Support Requirements

An excavation to a maximum depth of ~4.3m is required to construct the proposed new house. Allowing for backwall drainage, the setbacks are as follows:

- Flush with the existing parking area and timber retaining wall (Photo 2), however the timber retaining wall and part of the parking area will be demolished as part of the proposed works.
- ~0.5m from the W common boundary and ~1.5m from the W neighbouring house and pergola.
- Flush with the E common boundary and ~2.7m from the E neighbouring house.

The W and E common boundaries, W neighbouring house, W neighbouring pergola and E neighbouring house will be within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 30° line through fill/soil and a theoretical

45° line through clay/shale from the base of the excavation towards the surrounding structures and boundaries.

The existing ~1.5m high timber retaining wall supporting the fill for the parking area (Photo 2) and existing sandstone block retaining wall (Photo 3) are to be demolished from the top down prior to the excavation commencing. The fill, soil and clay behind the walls is to be battered at 1.0 Vertical to 1.7 Horizontal (30°) as the walls are demolished. The upper ~0.8m of the parking area fill will be excavated for the proposed new driveway. The remainder of the fill is to be removed or battered at 1.0 Vertical to 2.0 Horizontal (26°) prior to the excavation for the house commencing.

Due to the depth of the excavation and its proximity to the surrounding structures and boundaries, all sides of the excavation will require ground support installed prior to the commencement of the excavation. See the Lower Ground Floor and Ground Floor plans attached for the minimum extent of the required shoring shown in blue.

For ease of design and construction it is recommended the stepped portion of the excavation be excavated as a single cut face taken from the uphill side of the proposed pathway to the base of the lower ground floor.

A spaced pile retaining wall is one of the suitable methods of support. Pier spacing is typically ~2.0m but can vary between 1.6 to 2.4m depending on the design. As the excavation is lowered in 1.5m lifts infill sprayed concrete panels or similar are added between the piers to form the wall. Drainage is installed behind the panels. To drill the pier holes for the walls, a pilling rig that can excavate through Medium to High Strength Rock will be required. The piers can be temporarily supported by embedment below the base of the excavation or with a combination of embedment and propping. The walls are to be tied into the storage room slab and lower ground floor slab of the proposed house to provide permanent bracing after which any temporary bracing can be released.

The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all pier holes/excavations installed for ground support purposes.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other suitable diversion works. 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 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' $K_0$ | Passive |
| Fill and Topsoil | 20 | 0.40 | 0.55 | N/A |
| Residual Clays | 20 | 0.35 | 0.45 | Kp = 2.0 ultimate |
| Extremely Low Strength Shale | 22 | 0.25 | 0.35 | Kp = 2.5 ultimate |

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. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. Passive pressures are 'ultimate' so should have a suitable safety factor

applied. 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 then full hydrostatic pressures are to be accounted for in the retaining structure design.

## 15. Foundations

The uphill portion of the proposed driveway can be supported off the natural surface after any organic matter has been stripped. A maximum allowable bearing pressure of 100kPa can be assumed for soil of the natural surface. The downhill portion of the driveway will be excavated ~0.8m into the existing parking area fill. It is recommended this portion of the driveway be supported on piers taken below the fill and embedded into the firm to stiff clays of the natural profile. A maximum allowable bearing pressure of 200kPa can be assumed for footings supported on firm to stiff clay. Where the foundation material across the driveway structure changes, expansion joints are to be installed to separate the different foundation materials and to accommodate minor differential movement. Alternatively the entire driveway can be supported on piers taken to clay.

The proposed storage room and lower ground floor are expected to be seated in Extremely Low Strength Shale on the uphill side. This is a suitable foundation material. On the downhill side where the shale drops away with the slope, piers taken to shale will be required to maintain a uniform foundation material across the structure. This ground material is expected at depths from between ~1.7m to ~2.1m below the current surface. It should be noted that this material is a soft rock and a rock auger will cut through it so the builders should not be looking for refusal to end the footings. A maximum allowable bearing pressure of 600kPa can be assumed for footings supported on Extremely Low Strength Shale.

As the bearing capacity of shale and clay reduces when it is wet we recommend the footings be dug, inspected and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained and the soft layer of shale or clay 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 professional 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 engineer 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.

**REQUIRED INSPECTIONS ON NEXT PAGE**

## 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 Occupation Certificate if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect the ground materials while the first pile for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations. All finished pier holes for piled wall/excavations for ground support are to be inspected and measured before concrete is placed.

- 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: AH1 – 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.

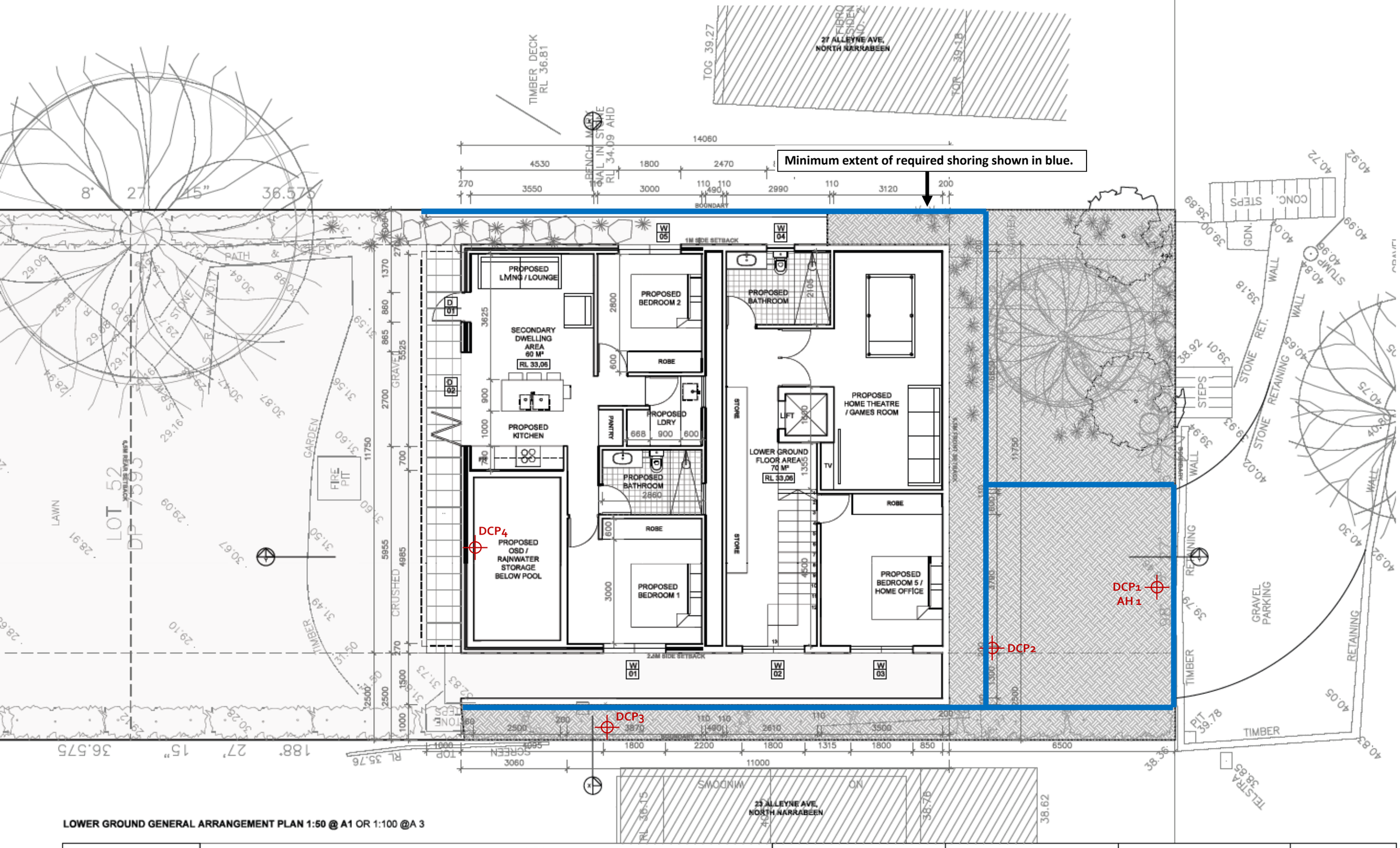
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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.

# LOWER GROUND FLOOR PLAN – showing test locations




**LOWER GROUND GENERAL ARRANGEMENT PLAN 1:50 @ A1** OR 1:100 @A 3

NORTH

**LEGEND:**

- 7.03 — DENOTES EXISTING SPOT LEVEL
- RL 7.10 — DENOTES PROPOSED LEVEL
- DENOTES PROPOSED WALLS
- DENOTES OUTLINE OF EXISTING TO BE DEMOLISHED

NOTE: THESE DRAWINGS ARE NOT FOR CONSTRUCTION, FOR DA APPROVAL ONLY.
NOTE: DO NOT SCALE OFF THIS DRAWING
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE B.C.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE BASIX REQUIREMENTS

**KEY:**

- DENOTES PROPOSED STRUCTURES
- DENOTES OUTLINE OF EXISTING STRUCTURES TO BE DEMOLISHED
- DENOTES AREA OF SOFT LANDSCAPING

**PROJECT:** PROPOSED NEW DWELLING HOUSE

**CLIENT:** TROY CARTER

**LOCATION:** 25 ALLEYNE AVE, NORTH NARRABEEN, 2101, NSW

**PROJECT STAGE:** DA

**DRAWING TITLE:** LOWER GROUND GENERAL ARRANGEMENT PLAN

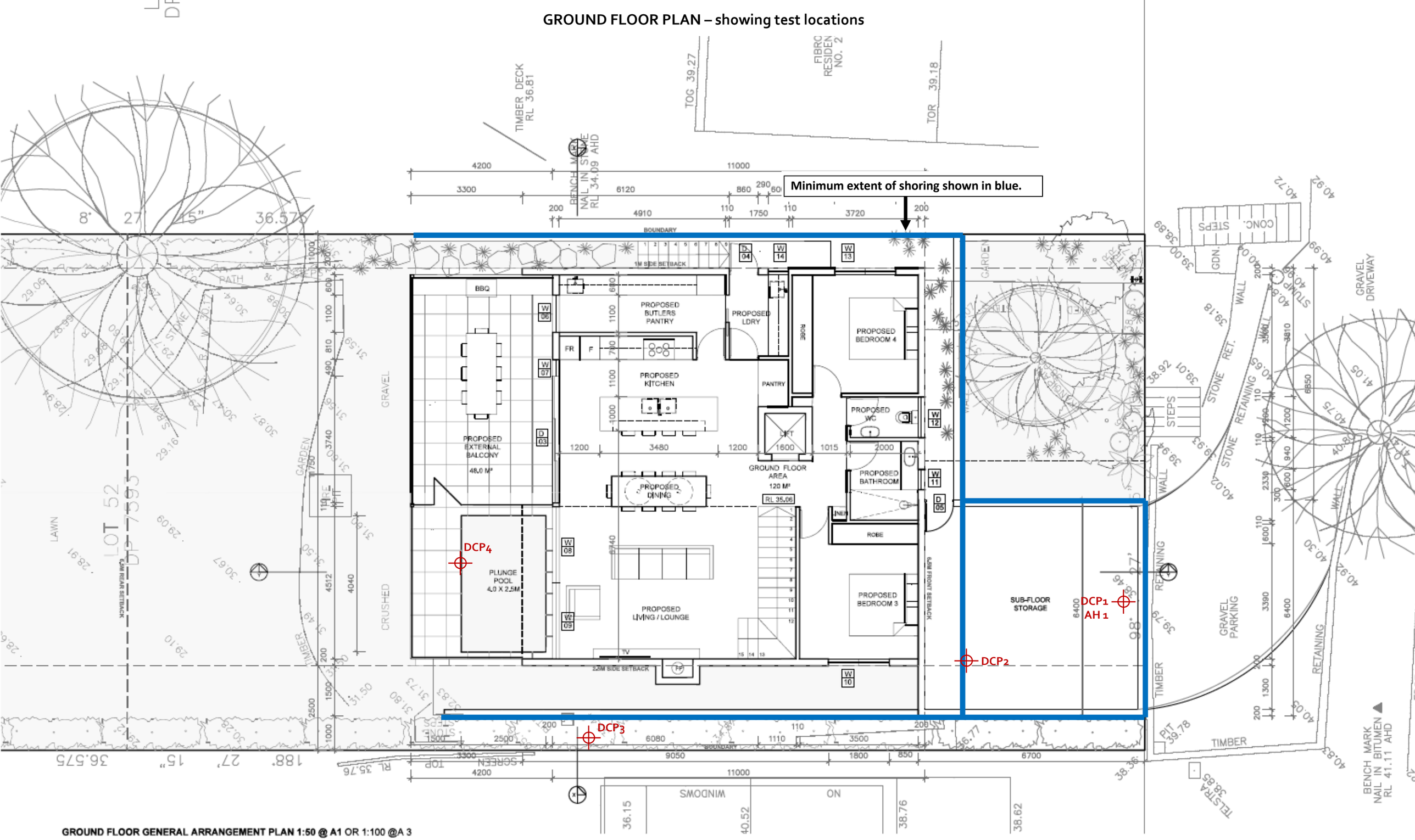
**SCALE:** 1:100 @ A3

**DATE OF ISSUE:** 14.10.2021

**DRAWING NO.** DA-100

**REVISION:** -

# GROUND FLOOR PLAN – showing test locations




**GROUND FLOOR GENERAL ARRANGEMENT PLAN 1:50 @ A1** OR 1:100 @A 3

NORTH

**LEGEND:**

- 7.03 — DENOTES EXISTING SPOT LEVEL
- RL 7.10 — DENOTES PROPOSED LEVEL
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**KEY:**

- DENOTES PROPOSED STRUCTURES
- DENOTES OUTLINE OF EXISTING STRUCTURES TO BE DEMOLISHED
- DENOTES AREA OF SOFT LANDSCAPING

**PROJECT:** PROPOSED NEW DWELLING HOUSE

**CLIENT:** TROY CARTER

**LOCATION:** 25 ALLEYNE AVE, NORTH NARRABEEN, 2101, NSW

**PROJECT STAGE:** DA

**DRAWING TITLE:** GROUND FLOOR GENERAL ARRANGEMENT PLAN

**SCALE:** 1:100 @ A3

**DATE OF ISSUE:** 14.10.2021

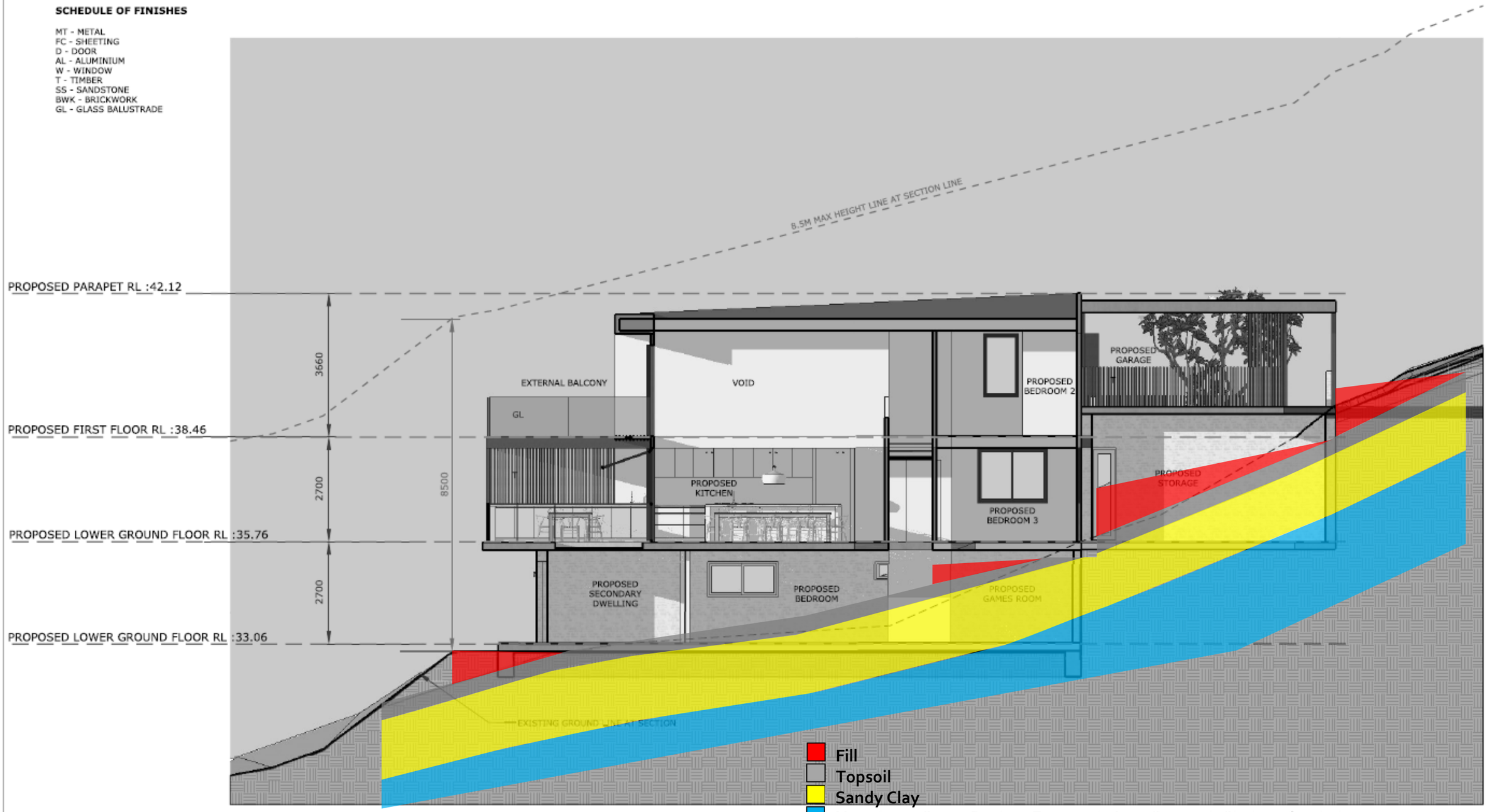
**DRAWING NO.** DA-101

**REVISION:** -

# TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

**SCHEDULE OF FINISHES**

MT - METAL
FC - SHEETING
D - DOOR
AL - ALUMINIUM
W - WINDOW
T - TIMBER
SS - SANDSTONE
BWK - BRICKWORK
GL - GLASS BALUSTRADE




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

**SECTION Y 1:50 @ A1** OR 1:100 @ A3

**LEGEND:**

7.10 DENOTES EXISTING SPOT LEVEL
RL 7.10 DENOTES PROPOSED LEVEL

NOTE: THESE DRAWINGS ARE NOT FOR CONSTRUCTION. FOR DA APPROVAL ONLY.
NOTE: DO NOT SCALE OFF THIS DRAWING
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE B.C.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE RELAVANT STANDARDS
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE BASIX REQUIREMENTS

**KEY:**

DENOTES PROPOSED STRUCTURES
DENOTES EXISTING STRUCTURES TO REMAIN
DENOTES OUTLINE OF EXISTING STRUCTURES TO BE DEMOLISHED
DENOTES AREA OF SOFT LANDSCAPING

**PROJECT**
PROPOSED NEW DWELLING HOUSE

**CLIENT**
TROY CARTER

**LOCATION**
25 ALLEYNE AVE,
NORTH NARRABEEN, 2101, NSW

**PROJECT STAGE**
DA

**DRAWING TITLE**
SECTION SHEET 01

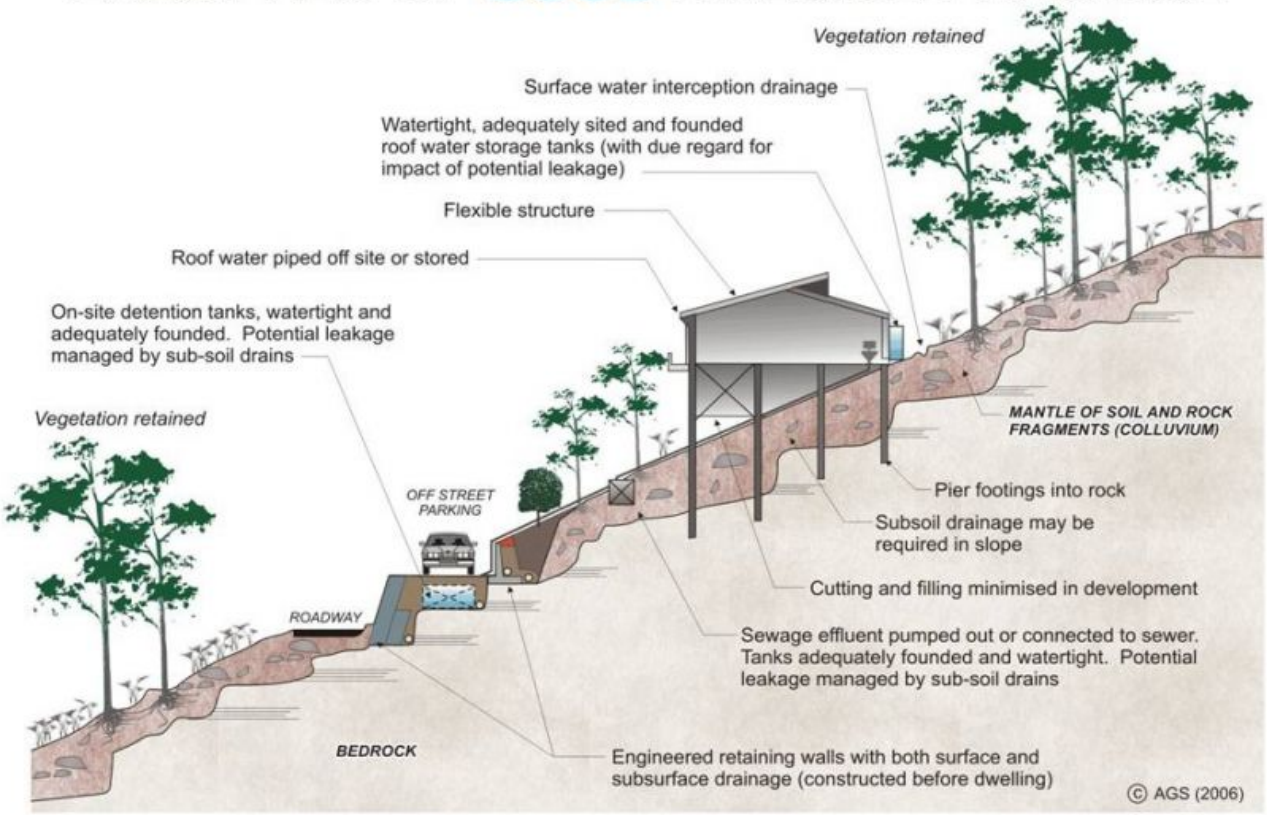
**SCALE**
1:100 @ A3

**DATE**
18.10.2021

**DRAWING NO.**
DA-400

**REVISION**
-

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE