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

**Development Application for** _____
Name of Applicant

**Address of site** 54 McCarrs Creek Road, Church Point

*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 19/4/21 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 **54 McCarrs Creek Road, Church Point**
Report Date: 19/4/21

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** 54 McCarrs Creek Road, Church Point

*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 **54 McCarrs Creek Road, Church Point**

Report Date: 19/4/21

Author: BEN WHITE

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

**Please mark appropriate box**

- ☒ Comprehensive site mapping conducted 6/4/21 (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 6/4/21
- ☒ 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:

Alterations and Additions at **54 McCarrs Creek Road, Church Point**

## 1. Proposed Development

**1.1** Construct a new lift on the E side of the house by excavating to a maximum depth of ~5.2m.

**1.2** Extend level 3 of the existing house over the footprint of the existing balcony.

**1.3** Other minor internal and external alterations to the existing house.

**1.4** Extend the existing terrace on the downhill side of the house.

**1.5** Install a new pool on the downhill side of the house requiring minor levelling.

**1.6** Construct a new enclosed link between the boathouse and bathroom outbuilding.

**1.7** Details of the proposed development are shown on 13 drawings prepared by Stewart Design Studio, drawings numbered 202006/DA01 to 202006/DA13, dated 10/2/21.

## 2. Site Description

**2.1** The site was inspected on the 6th of April, 2021.

**2.2** This waterfront residential property is on the low side of the road and has a SW aspect. It is located on the steeply graded lower reaches of a hillslope. The natural slope falls across the property at an average angle of ~27°. The slope above the property continues at similar steep angles for ~70m before gradually easing.

**2.3** Sandstone bedrock is outcropping on the uphill side of the road (Photo 1). At the road frontage, a concrete right of carriageway (ROW) runs to a garage attached to level 3 of the house (Photo 2). The three storey rendered masonry house is supported

by rendered masonry walls and a concrete slab (Photos 3 & 4). The external supporting walls show no significant signs of movement. Levels 1 and 2 of the house are cut into the slope. A stable sandstone block retaining wall up to ~2.4m high supports a cut and fill on the downhill side of the ROW (Photo 5). A paved area is located downhill of the wall (Photos 5 & 6).

Fill provides level platforms for lawn and garden areas on the downhill side of the house (Photos 7 & 8). The fills are supported by sandstone block and concrete retaining walls up to ~1.9m high (Photos 8, 9 & 10). The sandstone block retaining walls are in good condition. The concrete retaining wall (Photo 10) displays fine cracking but no deflection and is considered to be stable. A rendered masonry outbuilding is located beside the concrete retaining wall. A rendered masonry boathouse, timber ramp and pontoon are located at the waterfront (Photo 11). A stable concrete retaining wall up to ~2.2m high supports a cut and fill on the SE side of the boathouse (Photo 12). 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 slope materials are underlain by the Narrabeen Group of Rocks which are described as interbedded laminite, shale, and quartz to lithic quartz sandstone.

## 4. Subsurface Investigation

Five 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 not expected to be an issue for the testing

on 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:

**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** (~RL14.7) | **DCP 2** (~RL14.7) | **DCP 3** (~RL9.2) | **DCP 4** (~RL8.0) | **DCP 5** (~RL8.0) |
|---|---|---|---|---|---|
| 0.0 to 0.3 | 6 | # | 6 | 5 | 3 |
| 0.3 to 0.6 | 7 | | 9 | 6 | 3 |
| 0.6 to 0.9 | 12 | | 7 | 7 | 4 |
| 0.9 to 1.2 | 12 | | 14 | 18 | 2 |
| 1.2 to 1.5 | # | | 15 | 12 | 4 |
| 1.5 to 1.8 | | | 18 | 12 | 7 |
| 1.8 to 2.1 | | | 34 | 15 | 26 |
| 2.1 to 2.4 | | | # | 30 | 22 |
| 2.4 to 2.7 | | | | # | 30 |
| 2.7 to 3.0 | | | | | # |
| | Refusal on Rock @ 1.1m | End of Core @ 0.4m in concrete slab | End of Test @ 2.1m | End of Test @ 2.4m | 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 @ 1.1m, DCP bouncing off rock surface, orange rock fragments on wet tip.

DCP2 – End of Core @ 0.4m, still drilling through concrete slab. Note: drill piece ends at 0.4m.

DCP3 – End of Test @ 2.1m, DCP still very slowly going down, orange rock fragments on moist tip.

DCP4 – End of Test @ 2.4m, DCP still very slowly going down, orange rock fragments on moist tip.

DCP5 – End of Test @ 2.7m, DCP still very slowly going down, red and maroon rock fragments on damp 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 a sandy topsoil over sandy clays. Fill to a maximum depth of ~1.9m provides level platforms for lawn and garden areas on the downhill side of the house. The clays merge into the weathered zone of the under lying rock at a depths from between ~1.1m to ~2.7m below the current surface, being deeper in the filled areas. The underlying rock is interpreted as Extremely Low to Medium Strength Rock. Most of the site is expected to be underlain by Extremely Low Strength Rock. DCP1 hit refusal and bounced off the rock which indicates Medium Strength Rock may be present. Sandstone bedrock was observed on the uphill side of the road and at the base of existing cut for the house. These are expected to be sandstone bands in an otherwise shale dominated profile. We note Medium Strength Rock in the shale dominated profile is often discontinuous. 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 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 proposed excavation.

## 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 McCarrs Creek Road above.

## 8. Geotechnical Hazards and Risk Analysis

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

The proposed excavation is a potential hazard until retaining structures are in place (**Hazard Two**). The proposed excavation undercutting the subject house and nearby steps and sandstone block retaining walls (Photos 5 & 6) is a potential hazard (**Hazard Three**). The vibrations produced during the proposed excavation impacting on the subject house is a potential hazard (**Hazard Four**). The additional surcharge loads from the proposed pool structure is a potential hazard to the existing sandstone block retaining wall (Photo 7) (**Hazard Five**).

## Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

| HAZARDS | Hazard One | Hazard Two |
|---|---|---|
| **TYPE** | The steeply graded slope that falls across the property and continues above failing and impacting on the property. | The proposed excavation for the lift (up to a depth of ~5.2m) collapsing onto the worksite and impacting the neighbouring properties before retaining walls are in place. |
| **LIKELIHOOD** | 'Unlikely' ($10^{-4}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (12%) | 'Medium' (15%) |
| **RISK TO PROPERTY** | 'Low' ($2 \times 10^{-5}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-7}$/annum | $8.3 \times 10^{-4}$/annum |
| **COMMENTS** | This level of risk is 'ACCEPTABLE', provided the recommendations in **Section 16** are carried out. | 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)

**RISK ANALYSIS CONTINUES ON NEXT PAGE**

| HAZARDS | Hazard Three | Hazard Four | Hazard Five |
|---|---|---|---|
| **TYPE** | The proposed excavation for the lift undercutting the subject house and nearby steps and sandstone block retaining walls (Photos 5 & 6). | The vibrations produced during the proposed excavation for the lift impacting on the subject house. | The additional surcharge loads from the pool structure transferring onto the existing retaining wall that leads to damage and instability (Photo 7). |
| **LIKELIHOOD** | 'Possible' ($10^{-3}$) | 'Possible' ($10^{-3}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (35%) | 'Medium' (15%) | 'Medium' (35%) |
| **RISK TO PROPERTY** | 'Moderate' ($2 \times 10^{-4}$) | 'Moderate' ($2 \times 10^{-4}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-6}$/annum | $5.3 \times 10^{-7}$/annum | $5.6 \times 10^{-5}$/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. | This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Sections 11 & 12** are to be followed. | This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels the recommendations in **Section 15** 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

The fall is to McCarrs Creek. All stormwater from the proposed development is to be piped to the waterfront below through any tanks that may be required by the regulating authorities.

## 11. Excavations

An excavation to maximum depth of ~5.2m will be required to construct the proposed new lift. The excavation is expected to be through the existing pavement slab (~0.3m to ~0.5m thick), topsoil and sandy clay with Extremely Low to Medium Strength Rock expected at a depth of ~1.1m below the current surface. The excavation through the pavement slab will require rock sawing to minimise potential vibration damage.

The excavation is expected to be carried out using a small excavator craned on to the pavement below the driveway (Photo 6) and hand tools such as rock saws and jack hammers.

If machines are used and if Medium Strength Rock or better is encountered, excavations to be carried out with rock saws or grinders. Machine-mounted rock hammers are not to be used should Medium Strength Rock or better be encountered to minimise vibration from the works.

## 12. Vibrations

Possible vibrations generated during excavations through soil, clay and rock up to Low Strength will be below the threshold limit for building damage.

Rock sawing through the existing slab (~0.3m to ~0.5m thick) will be required to minimise the potential to cause vibration damage to the subject house and sandstone block retaining walls (Photo 5).

Excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the subject house. The excavation is set back sufficiently from the neighbouring houses. The excavation comes flush with the subject 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 subject house. 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.

Where machines are used to excavate through the Medium Strength Rock or better, provided rock grinders are to be used or alternatively the rock portion of the cut is sawn up into segments with rock saws, so the rock can be 'picked out' without the use of pneumatic hammers, vibrations will be less than a peak particle velocity to 5mm/sec at the adjoining structures.

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

## 13. Excavations Support Requirements

As this job is considered technically complex and due to the depth and narrow width of the excavation, we recommend it be carried out by builders and contractors who are well-experienced in similar work and can provide a proven history of completed work. We recommend a pre-construction meeting between the structural engineer, the builder, and the geotechnical consultant to discuss and confirm the excavation plan and to ensure suitable excavation equipment will be on site.

An excavation to maximum depth of ~5.2m will be required to construct the proposed new lift. The excavation comes flush with the SE house wall and allowing for backwall-drainage the excavation is set back ~0.3m from the NE house wall (Photo 6), ~2.1m from the nearby steps (Photo 5), ~3.4m from the ~2.4m high NE sandstone block retaining wall supporting a cut and fill (Photo 5), ~2.4m from the downhill portion of the SE sandstone block retaining wall supporting a cut (Photo 5) and the SE and ~2.6m from the SE common boundary. The subject house walls, steps, sandstone block retaining walls and SE common boundary will be within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 45° line through weathered rock from the base of the excavation or the top of Medium Strength Rock, whichever comes first, towards the surrounding boundaries or structures.

It is envisaged that the top portion of the excavation be carried out using a small excavator craned on to the pavement below the driveway (Photo 6). The existing NE house wall that is flush with the excavation can be demolished and propped as the excavation is lowered to provide access from the side and from where the excavation can be continued from. Hand tools such as rock saws and jack hammers can be used to excavate from the inside of the house.

Due to the depth of the excavation and its proximity to nearby structures, the NE, SE and SW cuts through soil, clay and rock up to Low Strength are to be supported by sprayed concrete retaining walls or a similar suitable support installed in stages as the excavation progresses. The shoring is to designed/approved by the structural engineer so that not more than a depth of 1.2m of excavation face is left unsupported before shoring is installed. See the site plan attached for the minimum required extent of the shoring shown in blue.

Medium Strength Rock or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant. To ensure no defects or unstable cut faces are present that require temporary support, the geotechnical consultant is to inspect the excavation as it is lowered in not more than 1.2m intervals or on encounter of softer sections of rock, whichever occurs first. This is particularly relevant to this job as anyone working below the excavation in the lift will be in a very confined space surrounded by high cut faces. A failure could engulf them. Should any weak sections of rock be encountered, works are to stop until temporary or permanent support is in place. Our office is to be informed of any unexpected changes in the ground conditions.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

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

## 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, Soil and Residual Clays | 20 | 0.40 | 0.55 | N/A |
| Extremely Low to Very Low Strength Rock | 22 | 0.25 | 0.35 | Kp 2.5 ultimate |
| Low Strength Rock | 24 | 0.20 | 0.35 | 1000kPa ultimate |
| Medium Strength Rock | 24 | 0.00 | 0.01 | 2.0MPa 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. It should be noted that passive pressure is an ultimate value and should have an appropriate safety factor applied. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. 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 full hydrostatic pressures are to be accounted for in the retaining structure design.

## 15. Foundations

The proposed lift is expected to be seated in Extremely Low Strength Rock or better. This is a suitable foundation material. The proposed pool and any new footings that may be required for the terrace extension are to be supported on piers taken to and embedded not less than 0.6m into Extremely Low Strength Rock or better. This ground material is expected at depths from between ~2.1m to ~2.7m below the current surface so total required pier depths from the downhill side of the footing are expected to be in the range of 2.7m to 3.3m deep. Provided the footings are taken to and embedded into this ground material no surcharge loads from the proposed structure will be transferred onto the existing retaining wall (Photo 7). A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Rock or better.

As the bearing capacity of weathered rock 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 wet weathered rock 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. Ongoing Maintenance

Where slopes are steep and approach or exceed 30°, such as on this site, it is prudent for the owners to occasionally inspect the slope (say annually or after heavy rainfall events, whichever occurs first). Should any of the following be observed: movement or cracking in retaining walls, cracking in any structures, cracking or movement in the slope surface, tilting or movement in established trees, leaking pipes, or newly observed flowing water, or changes in the erosional process or drainage regime, then a geotechnical consultant should be engaged to assess the slope. We can carry out these inspections upon request.

The risk assessment in **Section 8** is subject to this ongoing maintenance being carried out.

## 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.

- During the excavation process, the geotechnical consultant is to inspect the cut faces in 1.2m intervals or on encounter of softer sections of rock, whichever occurs first, as they are lowered 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 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.

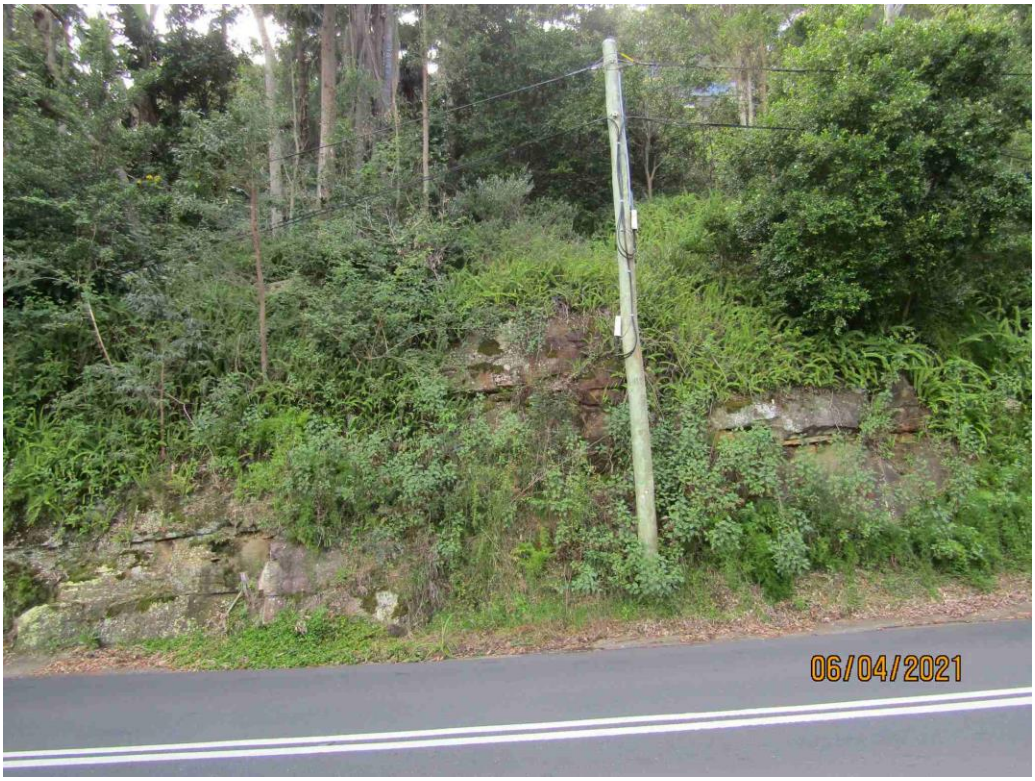



*Photo 1*

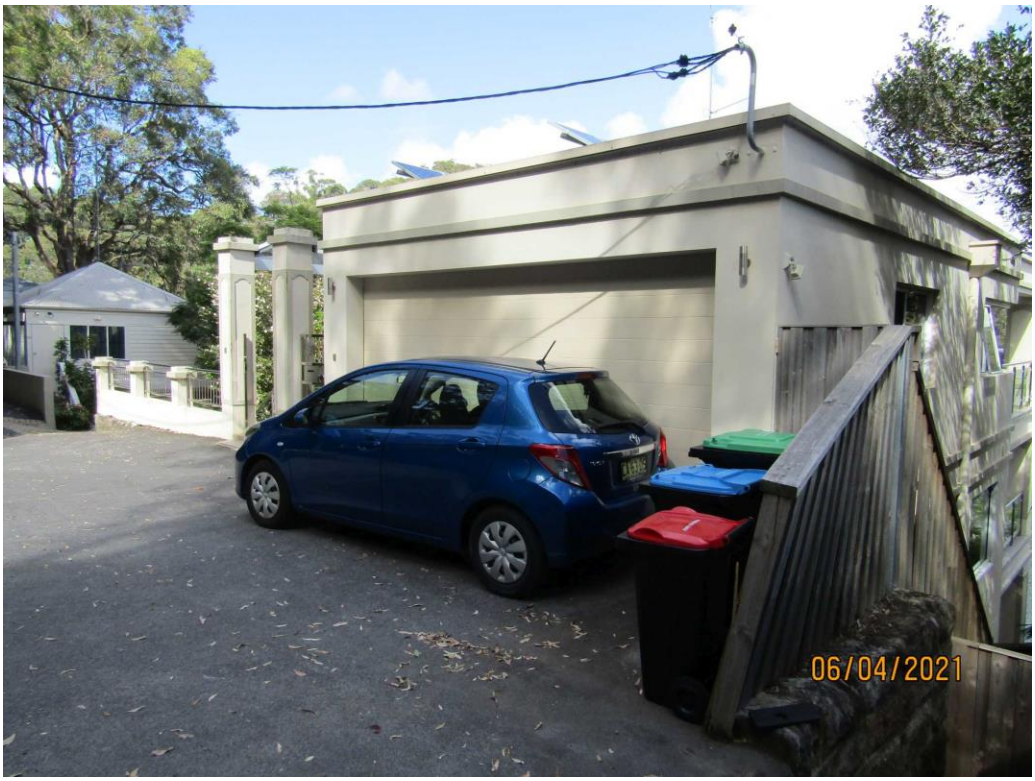



*Photo 2*


*Photo 3*


*Photo 4*

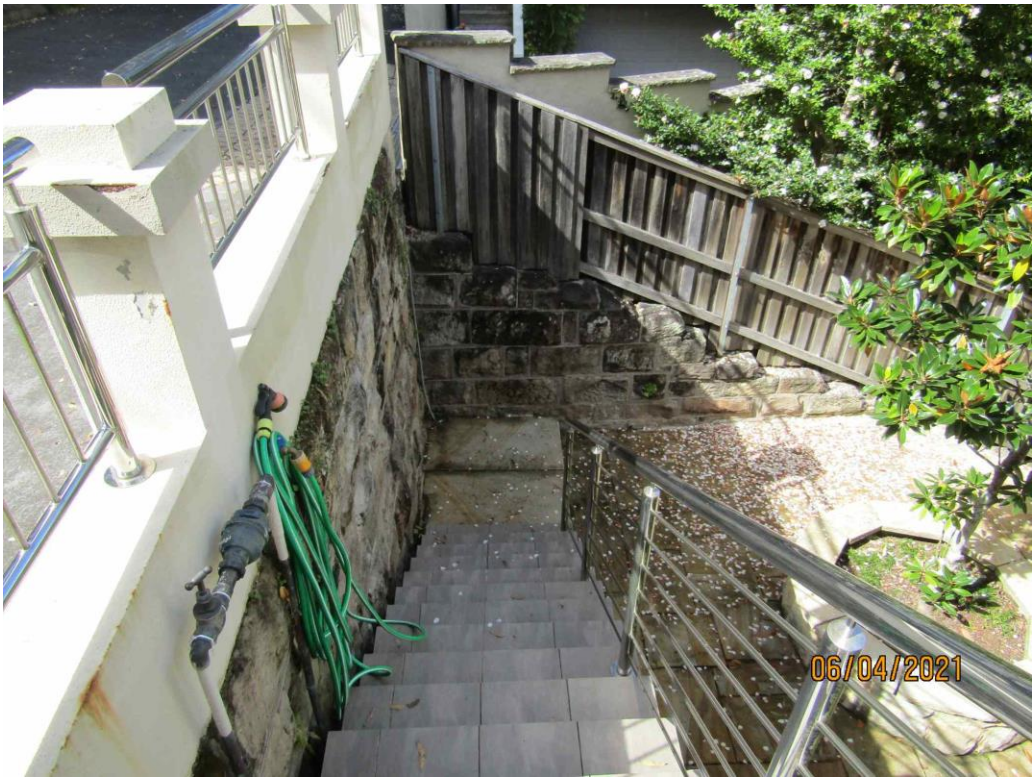



*Photo 5*


*Photo 6*


*Photo 7*

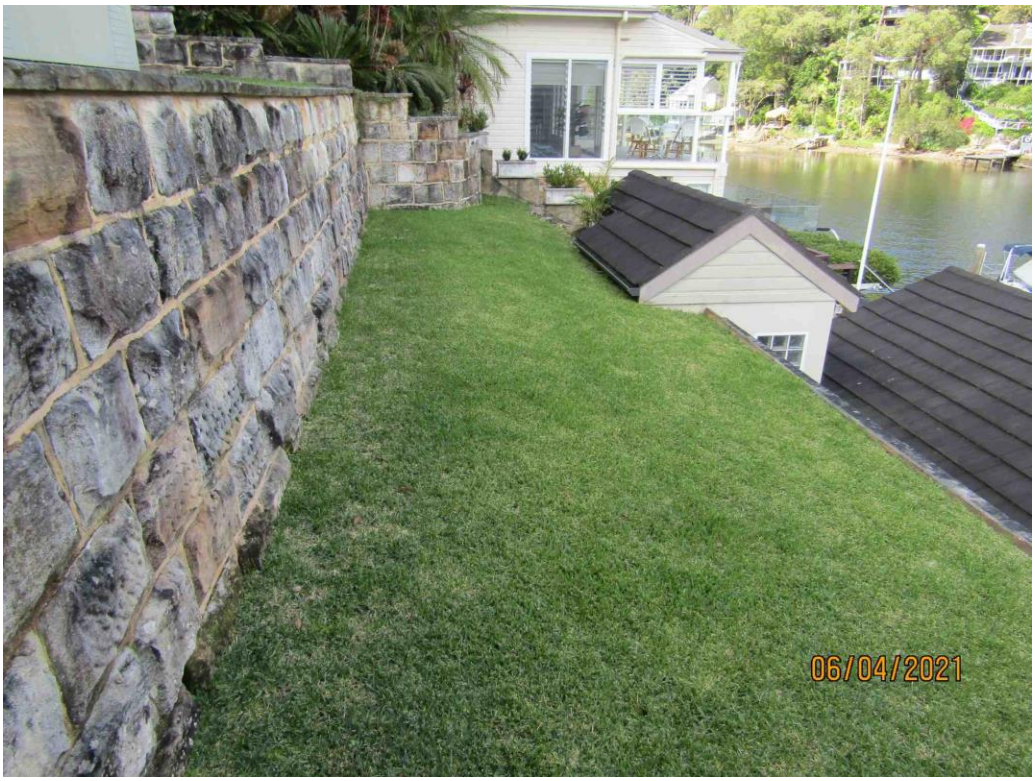



*Photo 8*

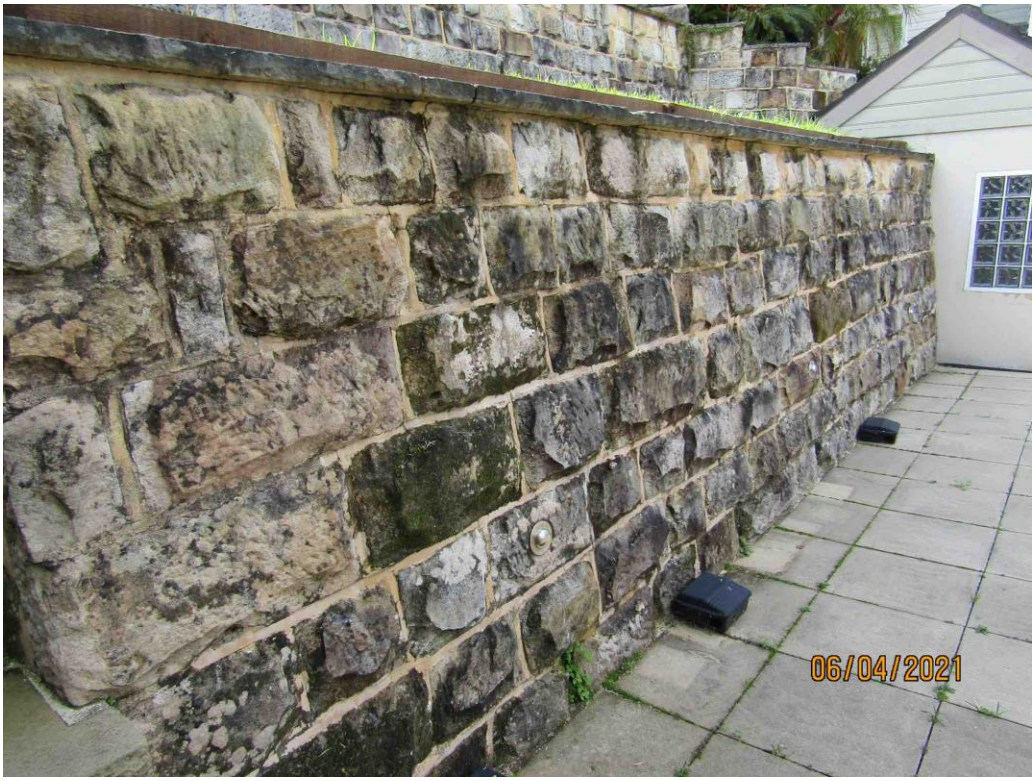



*Photo 9*

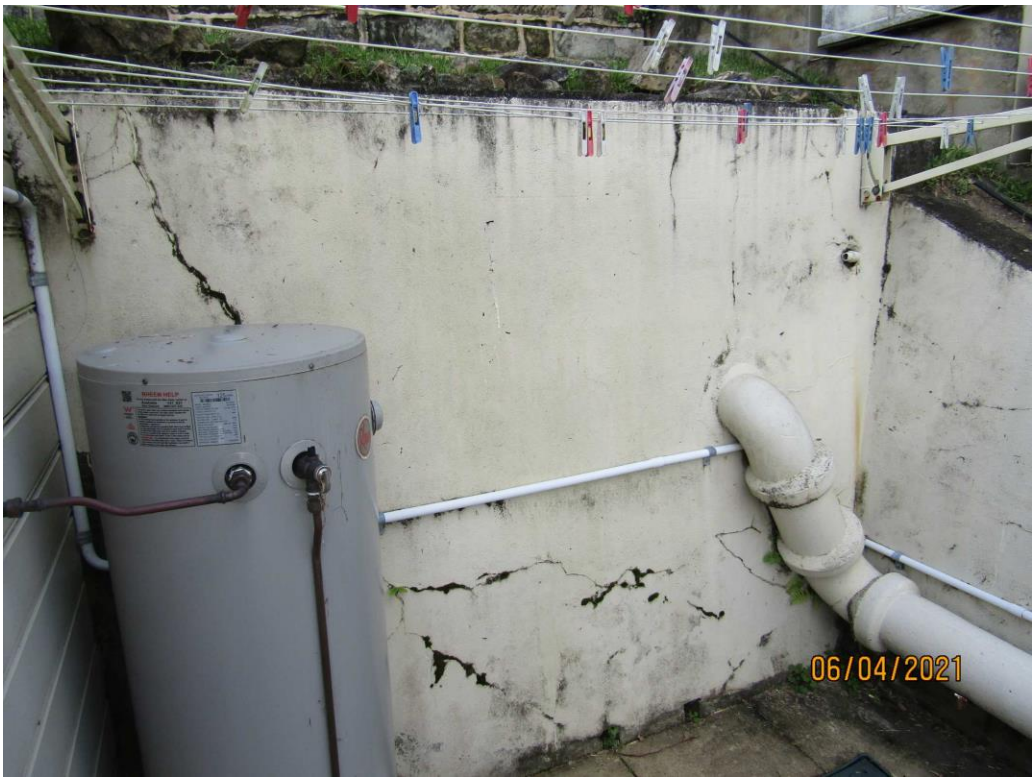



*Photo 10*


*Photo 11*


*Photo 12*

## 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.

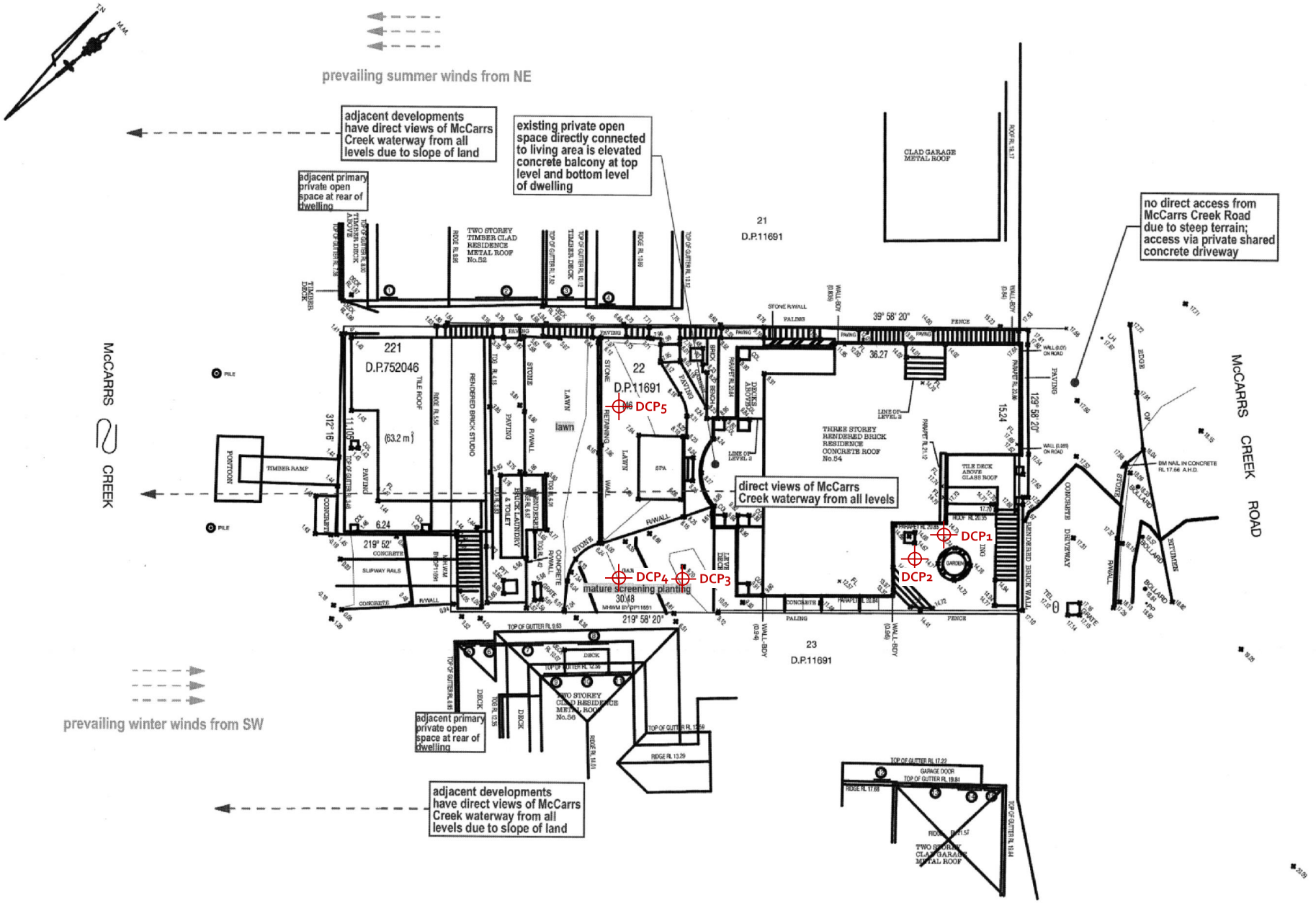
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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

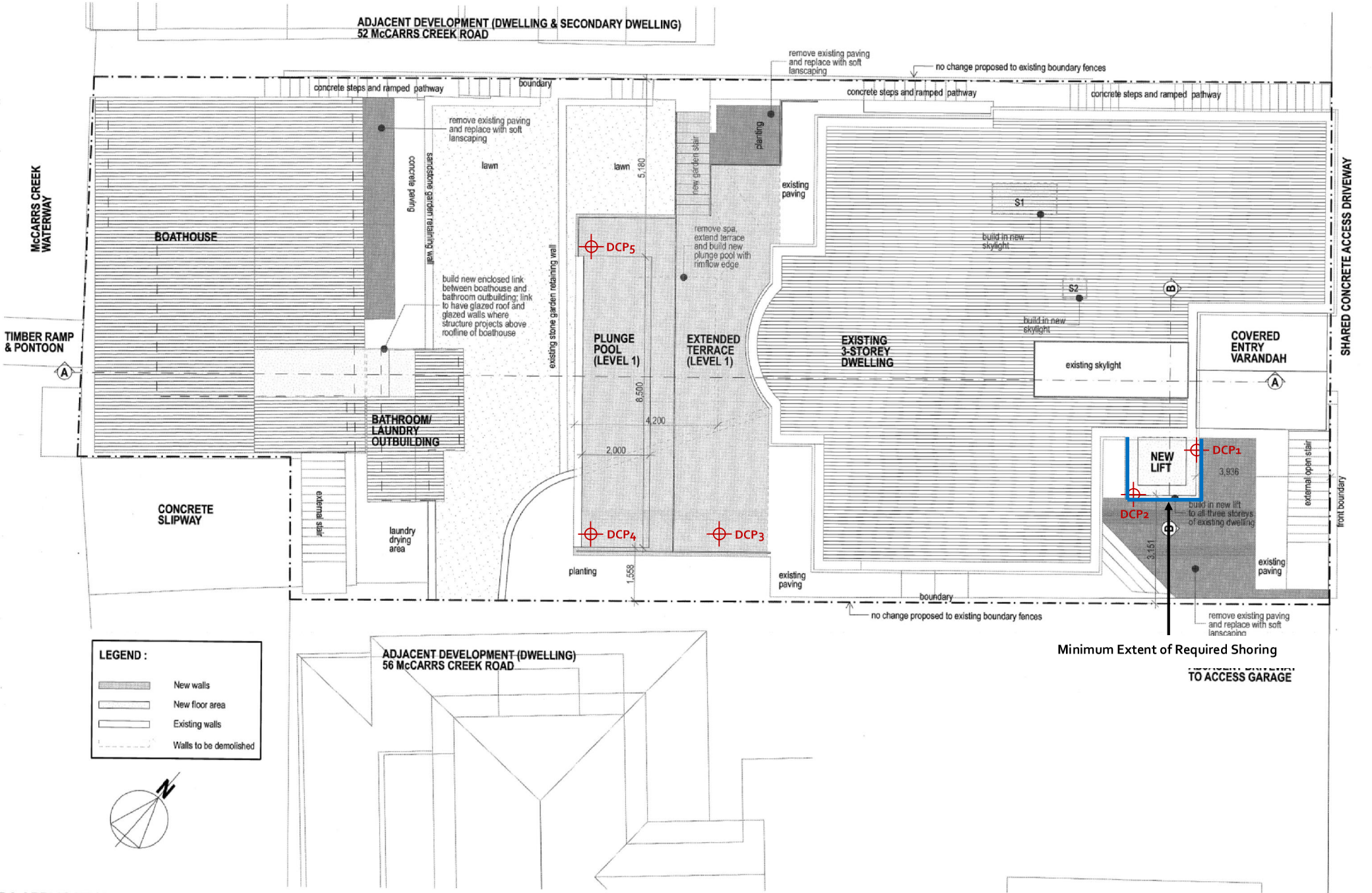



**DA APPLICATION :** **SITE ANALYSIS PLAN** **PROPOSED ALTERATIONS AND ADDITIONS TO EXISTING DWELLING AT 54 McCARRS CREEK ROAD, CHURCH POINT**


Stewart DESIGN STUDIO
1 LAKESIDE ROAD, NARRABEEN, NSW, 2101 • TELEPHONE 02 99849836 / 0403069606 • EMAIL jsa@bigpond.net.au


| Date: Feb 2021 | Scale: 1:200 | Drawing No: **202006/DA02** | Plot Date: 10/2/21 |
|---|---|---|---|

# SITE PLAN – showing test locations




**DA APPLICATION :** **SITE PLAN** **PROPOSED ALTERATIONS AND ADDITIONS TO EXISTING DWELLING AT 54 McCARRS CREEK ROAD, CHURCH POINT**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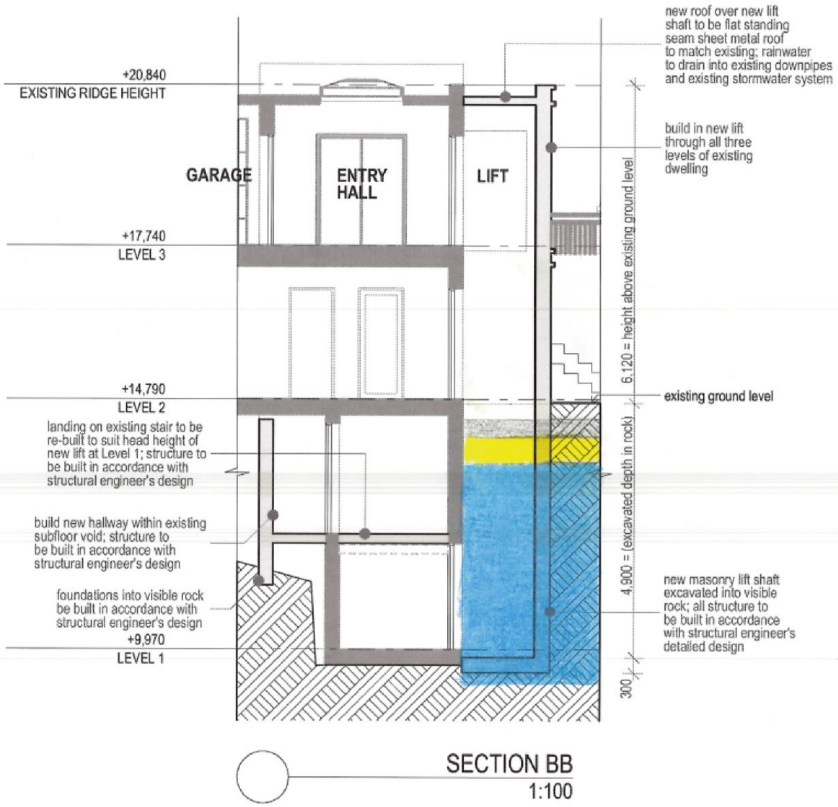
| Date: Feb 2021 | Scale: 1:100 | Drawing No: 202006/DA03 | Plot Date: 10/2/21 |
|---|---|---|---|

# TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials




Topsoil
Sandy Clay
Narrabeen Group Rocks – Extremely Low to Medium Strength Rock

**DA APPLICATION :** **SECTIONS SHEET 2** **PROPOSED ALTERATIONS AND ADDITIONS TO EXISTING DWELLING AT 54 McCARRS CREEK ROAD, CHURCH POINT**

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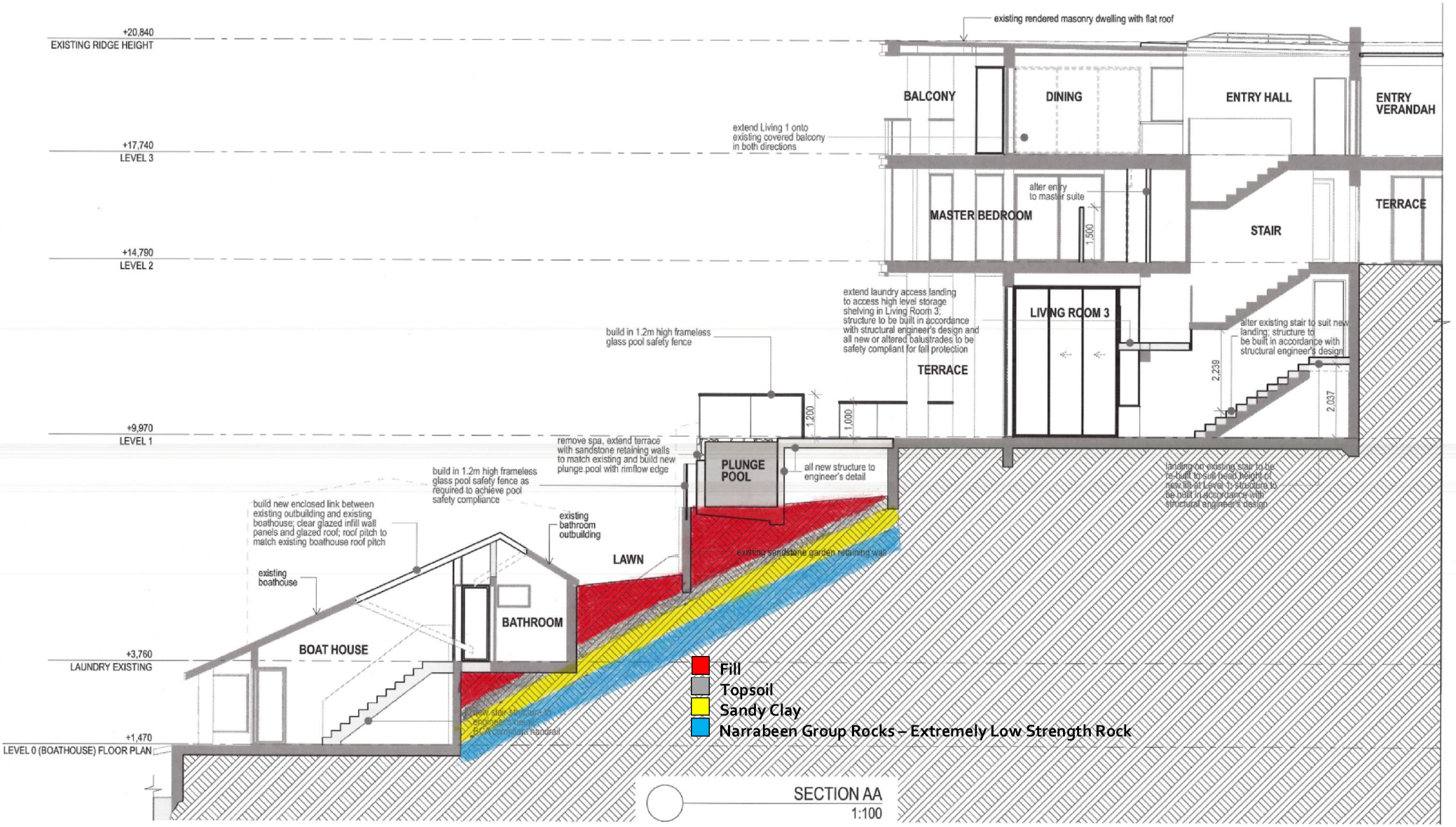
| Date: Feb 2021 | Scale: 1:100 | Drawing No: **202006/ DA09** | Plot Date: 10/2/21 |
|---|---|---|---|

**TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials**




**DA APPLICATION :** **SECTIONS SHEET 1** **PROPOSED ALTERATIONS AND ADDITIONS TO EXISTING DWELLING AT 54 McCARRS CREEK ROAD, CHURCH POINT**

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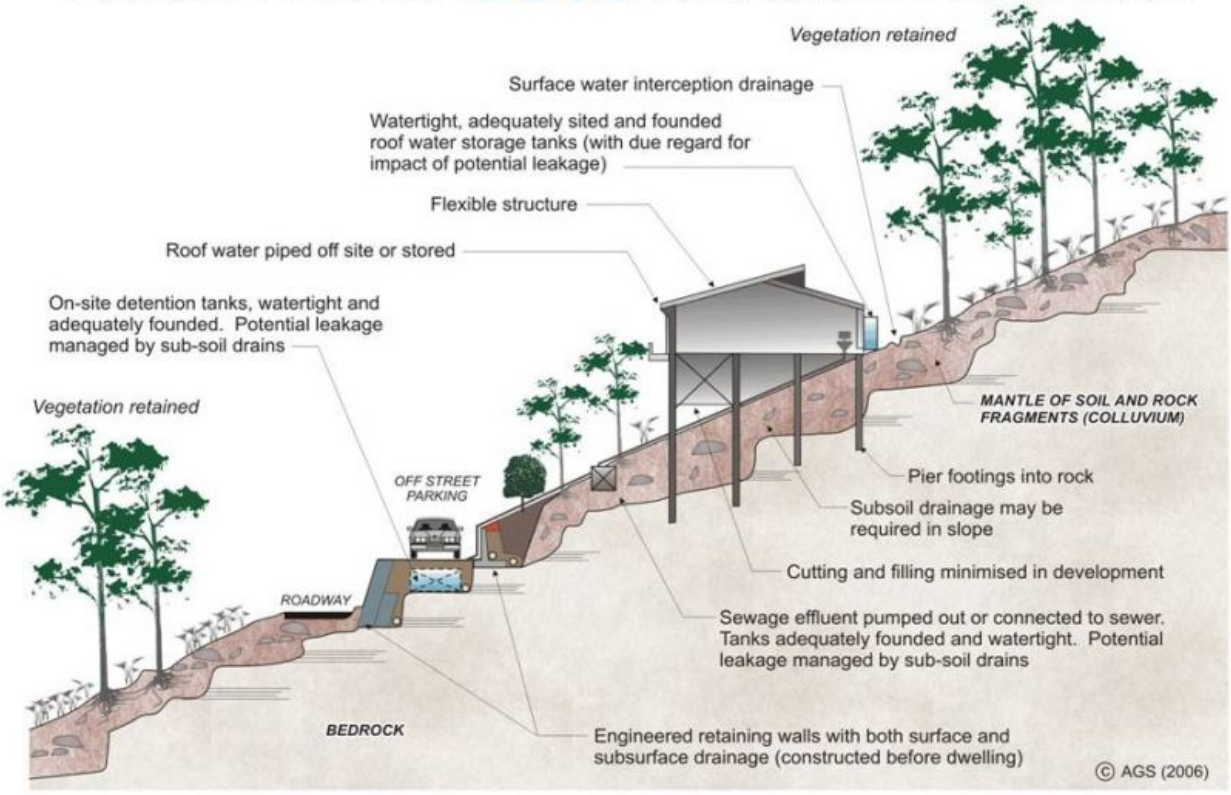
| Date: Feb 2021 | Scale: 1:100 | Drawing No: **202006/ DA08** | Plot Date: 10/2/21 |
|---|---|---|---|

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE