12th April, 2017

Chief Executive Officer
Mackay Regional Council
PO Box 41
Mackay, Q, 4740

Application Type:

Material Change of Use Application – Code Assessed
Development on Steep Land overlay

Project:            Existing Dwelling & Existing Class 10A Structures
Address:           66 Rutlands Road, Kuttabul
Property Description:      Lot 2 on RP900267
Planning Zone:       Rural

Dear Sir / Madam,

On behalf of the applicant a development permit for a material change of use is sought for an existing dwelling house & existing class 10A structures at 66 Rutlands Road, Kuttabul.

**Development Proposal**

We request approval for an existing dwelling house & existing class 10A structures.

Mackay Regional Council has issued a Show Clause Notice for the subject premises, requiring the owner to obtain building approvals for the existing structures on the site.

The subject site is a rural property. An existing 160sqm dwelling house and associated class 10A structures have already been constructed within the steep land overlay area at this site.

A slope stability risk assessment has been carried out for the property. The report concludes that the site is suitable for the existing development and has a ‘very low risk’ to land instability.

**Division 10 – Assessment Criteria for Development on Steep Land overlay Code**

The proposed development is affected by Development on steep land Code. Assessment requirements for this code are as follows.

**For Assessable Development**

- **P1** The structures have been built on a stable building pad.
- **P2** The structures have been engineered to suit the site.
- **P3** Not Applicable
- **P4** Slope Stability Report provided – Very Low risk assessment
- **P6** No retaining walls located on site. All cut slope batters have been constructed in accordance with the required slope ratio.
- **P7** Access driveways follow the natural contours of the site
- **P8** All surface water is managed sufficiently
State Development Assessment Provisions
The report generated within the state mapping system lists the matter of interest for the property are as follows:
1. MSES – Regulated Vegetation
2. Climatic regions – stormwater management design objectives
3. Flood hazard area – Local government flood mapping area
4. Bushfire hazard area

The development does not require further state assessment for items 1-3 above. Item No. 4 will be assessed during the building approval process.
The state mapping system report is included within the appendix documentation.

Supporting Documentation
Included as part of this application is the following supporting documentation compiled into one appendix PDF document.

A. Registered Survey Plan
B. Site Images
C. Design Drawings
D. IDAS Forms
E. Slope Stability Report
F. State Planning Maps

Application Fee & Payment Method
The Council Application Fee has been calculated for the application as:-
The owner of the property, Mark Dreghorn – 0458556326 will be making payment for the application.

Conclusion
The proposed development meet the acceptable and probable solutions of the steep land Overlay Code within Mackay Regional councils Planning Scheme, therefore we anticipate a favourable decision. If you have any queries regarding this application, please don’t hesitate to contact our office.

Yours faithfully
Whitsunday Design & Drafting Pty. Ltd.

R. Pace

Richard Pace
(Manager)
SUPPORTING DOCUMENTATION FOR

Re: Material Change of Use Application for Development in a Steep Land Overlay Area

Applicant: Whitsunday Design & Drafting
Proposal: Dwelling House and Shed/ Carport
Address: 66 Rutlands Road, Kuttabul
Property Description: Lot 2 on RP900267

APPENDIX

A. REGISTERED SURVEY PLAN
B. SITE IMAGES
C. DESIGN DRAWINGS
D. IDAS FORMS
E. SLOPE STABILITY REPORT
F. STATE PLANNING MAPS
APPENDIX A

REGISTERED SURVEY PLAN
PLAN OF

Lots 1 & 2

Cancelling Lot 1 on RP868862

IMPORTANT MARKS

PERMANENT MARKS

LINE BEARING DIST
3-4 255°40' 63.55
4-5 79°40' 32.635
5-6 79°40' 7.294

TRAVERSES ETC

3.043 ha

20.35 ha

REFERENCE MARKS

Original information compiled from RP688862 in the Department of Lands.

Copyright protects the plans being ordered by you. Unauthorised reproduction or amendment is not permitted. Contact the surveyor or Spatial Queensland Ltd for information.
701734655

$181.00

31/12/1996 15:24

MY 400 PLAN OF SURV ORIG

Lodged by

MICROSTARK AUS.

(Microstark Australia Pty Ltd)

Particulars entered in the Register on the Titles listed below.

Title Reference Description

500203/13 Lot 1 on RP868862

New Lot

LDT... 50155381

2...50155381

Signed...

Signature of Owner/s * Lessee/s

This Plan is subject to...

MACKAY CITY COUNCIL certifies that all the requirements of this Council, the Local Government Act 1993, the Local Government (Planning and Environment) Act 1990 and all Local Laws, # and the City of Brisbane Act 1924 and all Ordinances Resembling, have been complied with and approves this plan of Subdivision, SUBJECT TO:

Dated this

1st November 1996

May

Chieff Executive officer

For Additional Plan & Document Noting Refer to GIS

No. 14/1-97-66.

F.O.L.R

REFERENCES

Lands File 900267

Local Government Reference

Surveyors Reference

SIGNED:

PLAN 900267

SURVEY EXAMINATION

Exam. Fee $130

Receipt No. 886-004

Date 11/11/96

Deposited... 11/11/96

Examined 27/11/96 5.45 PM

Passed 27/11/96 5.45 PM

REFS

ORIGINAL GRANT

CHARTING

Charted

LODGEMENT FEES

Survey Exam

Ldy, Exam & Ass

New Titles

Photocopy

Postage

TOTAL

F.O.L.R

900267
APPENDIX B

SITE IMAGES
66 Rutlands Road, Kuttabul – Existing Site Images

6x6 SHED/ CARPORT

DWELLING HOUSE

DWELLING HOUSE
APPENDIX C

DESIGN DRAWINGS
Client: Mark Dreghorn

Project: As Constructed Residence at Lot 2 Rutlands Road Kuttabul Qld 4741

Ref. No: 12-160

Soil Classification: Type 'S'

Wind Classification: 'C2' (W50C)

Revision: 'A'
LEGEND

- EXISTING SITE STRUCTURES
- EXISTING SITE ACCESS

GENERAL NOTES

- DO NOT SCALE FROM DRAWING
- BUILDER SHALL VERIFY ALL SITE DIMENSIONS, BUILDING DIMENSIONS, SITE LEVELS AND CONSTRUCTION DETAILS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES OR AMBIGUITY TO THE BUILDING DESIGNER.
- WHERE NOT SHOWN, ALL CONSTRUCTION AND MATERIALS MUST COMPLY WITH THE BUILDING CODE OF AUSTRALIA CLASS 1 & 10 AS WELL AS THE RELEVANT AUSTRALIAN STANDARDS
APPENDIX D

IDAS FORMS
IDAS form 1—Application details
(Sustainable Planning Act 2009 version 4.3 effective 5 December 2016)

This form must be used for ALL development applications.

You MUST complete ALL questions that are stated to be a mandatory requirement unless otherwise identified on this form.

For all development applications, you must:
• complete this form (IDAS form 1—Application details)
• complete any other forms relevant to your application
• provide any mandatory supporting information identified on the forms as being required to accompany your application.

Attach extra pages if there is insufficient space on this form.

All terms used on this form have the meaning given in the Sustainable Planning Act 2009 (SPA) or the Sustainable Planning Regulation 2009.

This form and any other IDAS form relevant to your application must be used for development applications relating to strategic port land and Brisbane core port land under the Transport Infrastructure Act 1994 and airport land under the Airport Assets (Restructuring and Disposal) Act 2008. Whenever a planning scheme is mentioned, take it to mean land use plan for the strategic port land, Brisbane core port land or airport land.

PLEASE NOTE: This form is not required to accompany requests for compliance assessment.

### Mandatory requirements

**Applicant details** (Note: the applicant is the person responsible for making the application and need not be the owner of the land. The applicant is responsible for ensuring the information provided on all IDAS application forms is correct. Any development permit or preliminary approval that may be issued as a consequence of this application will be issued to the applicant.)

| Name/s (individual or company name in full) | Mark Anthony Dreghorn C/ Whitsunday Design & Drafting |
| For companies, contact name | Richard Pace |
| Postal address | 31 Gregory Street |
| Suburb | Mackay |
| State | QLD |
| Postcode | 4740 |
| Country | Australia |
| Contact phone number | (07) 49531040 |
| Mobile number (non-mandatory requirement) | |
| Fax number (non-mandatory requirement) | |
### Email address (non-mandatory requirement)
office@wdd.net.au

### Applicant’s reference number (non-mandatory requirement)
4213

### 1. What is the nature of the development proposed and what type of approval is being sought?

<table>
<thead>
<tr>
<th>Table A—Aspect 1 of the application (If there are additional aspects to the application please list in Table B—Aspect 2.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a)</strong> What is the nature of the development? (Please only tick one box.)</td>
</tr>
<tr>
<td>☒ Material change of use</td>
</tr>
<tr>
<td><strong>b)</strong> What is the approval type? (Please only tick one box.)</td>
</tr>
<tr>
<td>☐ Preliminary approval under s241 of SPA</td>
</tr>
<tr>
<td><strong>c)</strong> Provide a brief description of the proposal, including use definition and number of buildings or structures where applicable (e.g. six unit apartment building defined as a <em>multi-unit dwelling</em>, 30 lot residential subdivision etc.)</td>
</tr>
<tr>
<td>Dwelling house &amp; Residential Storage Shed</td>
</tr>
<tr>
<td><strong>d)</strong> What is the level of assessment? (Please only tick one box.)</td>
</tr>
<tr>
<td>☐ Impact assessment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table B—Aspect 2 of the application (If there are additional aspects to the application please list in Table C—Additional aspects of the application.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a)</strong> What is the nature of development? (Please only tick one box.)</td>
</tr>
<tr>
<td>☐ Material change of use</td>
</tr>
<tr>
<td><strong>b)</strong> What is the approval type? (Please only tick one box.)</td>
</tr>
<tr>
<td>☐ Preliminary approval under s241 of SPA</td>
</tr>
<tr>
<td><strong>c)</strong> Provide a brief description of the proposal, including use definition and number of buildings or structures where applicable (e.g. six unit apartment building defined as a <em>multi-unit dwelling</em>, 30 lot residential subdivision etc.)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>d)</strong> What is the level of assessment?</td>
</tr>
<tr>
<td>☐ Impact assessment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table C—Additional aspects of the application (If there are additional aspects to the application please list in a separate table on an extra page and attach to this form.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Refer attached schedule</td>
</tr>
</tbody>
</table>
2. **Location of the premises** (Complete Table D and/or Table E as applicable. Identify each lot in a separate row.)

**Table D**—Street address and lot on plan for the premises or street address and lot on plan for the land adjoining or adjacent to the premises (Note: this table is to be used for applications involving taking or interfering with water.) (Attach a separate schedule if there is insufficient space in this table.)

- **Street address and lot on plan (All lots must be listed.)**
- **Street address and lot on plan for the land adjoining or adjacent to the premises (Appropriate for development in water but adjoining or adjacent to land, e.g. jetty, pontoon. All lots must be listed.)**

<table>
<thead>
<tr>
<th>Lot</th>
<th>Unit no.</th>
<th>Street no.</th>
<th>Street name and official suburb/locality name</th>
<th>Post-code</th>
<th>Lot no.</th>
<th>Plan type and plan no.</th>
<th>Local government area (e.g. Logan, Cairns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td></td>
<td>66</td>
<td>Rutlands Road</td>
<td>2</td>
<td>RP 900267</td>
<td>Mackay Regional Council</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Planning scheme details** (If the premises involves multiple zones, clearly identify the relevant zone/s for each lot in a separate row in the below table. Non-mandatory)

<table>
<thead>
<tr>
<th>Lot</th>
<th>Applicable zone / precinct</th>
<th>Applicable local plan / precinct</th>
<th>Applicable overlay/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Rural Zone/ O'Connell River and Northern Streams Precinct</td>
<td></td>
<td>Steep Land Overlay Bushfire management Overlay</td>
</tr>
<tr>
<td>ii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table E**—Premises coordinates (Appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay.) (Attach a separate schedule if there is insufficient space in this table.)

<table>
<thead>
<tr>
<th>Coordinates</th>
<th>Zone reference</th>
<th>Datum</th>
<th>Local government area (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Note: place each set of coordinates in a separate row)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easting</td>
<td>Northing</td>
<td>Latitude</td>
<td>Longitude</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**3. Total area of land on which the development is proposed** (indicate square metres)

203500sqm

**4. Current use/s of the premises** (e.g. vacant land, house, apartment building, cane farm etc.)

Dwelling house and storage shed
5. Are there any current approvals (e.g. a preliminary approval) associated with this application? (Non-mandatory requirement)

- [ ] No
- [ ] Yes—provide details below

<table>
<thead>
<tr>
<th>List of approval reference/s</th>
<th>Date approved (dd/mm/yy)</th>
<th>Date approval lapses (dd/mm/yy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Is owner’s consent required for this application? (Refer to notes at the end of this form for more information.)

- [ ] No
- [ ] Yes—complete either Table F, Table G or Table H as applicable

**Table F**

<table>
<thead>
<tr>
<th>Name of owner/s of the land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

I/We, the above-mentioned owner/s of the land, consent to the making of this application.

Signature of owner/s of the land

Date

**Table G**

<table>
<thead>
<tr>
<th>Name of owner/s of the land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

The owner’s written consent is attached or will be provided separately to the assessment manager.

**Table H**

<table>
<thead>
<tr>
<th>Name of owner/s of the land</th>
<th>Mark Anthony Dreghorn, Melissa Rose-Ann Dreghorn, Ashley Dean Newton</th>
</tr>
</thead>
</table>

By making this application, I, the applicant, declare that the owner has given written consent to the making of the application.

7. Identify if any of the following apply to the premises (Tick applicable box/es.)

- [ ] Adjacent to a water body, watercourse or aquifer (e.g. creek, river, lake, canal)—complete Table I
- [ ] On strategic port land under the Transport Infrastructure Act 1994—complete Table J
- [ ] In a tidal water area—complete Table K
- [ ] On Brisbane core port land under the Transport Infrastructure Act 1994 (No table requires completion.)
- [ ] On airport land under the Airport Assets (Restructuring and Disposal) Act 2008 (No table requires completion)
- [ ] Listed on either the Contaminated Land Register (CLR) or the Environmental Management Register (EMR) under the Environmental Protection Act 1994 (No table requires completion)

**Table I**

<table>
<thead>
<tr>
<th>Name of water body, watercourse or aquifer</th>
</tr>
</thead>
</table>
Table J
Lot on plan description for strategic port land | Port authority for the lot

Table K
Name of local government for the tidal area (if applicable) | Port authority for the tidal area (if applicable)

8. Are there any existing easements on the premises? (e.g. for vehicular access, electricity, overland flow, water etc)
   - No
   - Yes—ensure the type, location and dimension of each easement is included in the plans submitted

9. Does the proposal include new building work or operational work on the premises? (Including any services)
   - No
   - Yes—ensure the nature, location and dimension of proposed works are included in plans submitted

10. Is the payment of a portable long service leave levy applicable to this application? (Refer to notes at the end of this form for more information.)
   - No—go to question 11
   - Yes

10a. Has the portable long service leave levy been paid? (Refer to notes at the end of this form for more information.)
   - No
   - Yes—complete Table L and submit, with this application, the local government/private certifier’s copy of the accepted QLeave form

Table L
Amount paid | Date paid (dd/mm/yy) | QLeave project number (6 digit number starting with A, B, E, L, P or S)

11. Has the local government agreed to apply a superseded planning scheme to this application under section 96 of the Sustainable Planning Act 2009?
   - No
   - Yes—please provide details below

| Name of local government | Date of written notice given by local government (dd/mm/yy) | Reference number of written notice given by local government (if applicable) |
12. List below all of the forms and supporting information that accompany this application (Include all IDAS forms, checklists, mandatory supporting information etc. that will be submitted as part of this application)

<table>
<thead>
<tr>
<th>Description of attachment or title of attachment</th>
<th>Method of lodgement to assessment manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>4213R001 – Development Report</td>
<td>email</td>
</tr>
<tr>
<td>Registered Survey Plan</td>
<td>email</td>
</tr>
<tr>
<td>Site Images</td>
<td>email</td>
</tr>
<tr>
<td>Design Drawings</td>
<td>email</td>
</tr>
<tr>
<td>IDAS form 5</td>
<td>email</td>
</tr>
<tr>
<td>Slope Stability Report</td>
<td>email</td>
</tr>
<tr>
<td>State Planning Maps</td>
<td>email</td>
</tr>
</tbody>
</table>

13. Applicant’s declaration

☒ By making this application, I declare that all information in this application is true and correct (Note: it is unlawful to provide false or misleading information)

Notes for completing this form

- Section 261 of the Sustainable Planning Act 2009 prescribes when an application is a properly-made application. Note, the assessment manager has discretion to accept an application as properly made despite any non-compliance with the requirement to provide mandatory supporting information under section 260(1)(c) of the Sustainable Planning Act 2009

Applicant details

- Where the applicant is not a natural person, ensure the applicant entity is a real legal entity.

Question 1

- Schedule 3 of the Sustainable Planning Regulation 2009 identifies assessable development and the type of assessment. Where schedule 3 identifies assessable development as “various aspects of development” the applicant must identify each aspect of the development on Tables A, B and C respectively and as required.

Question 6

- Section 263 of the Sustainable Planning Act 2009 sets out when the consent of the owner of the land is required for an application. Section 260(1)(e) of the Sustainable Planning Act 2009 provides that if the owner’s consent is required under section 263, then an application must contain, or be accompanied by, the written consent of the owner, or include a declaration by the applicant that the owner has given written consent to the making of the application. If a development application relates to a state resource, the application is not required to be supported by evidence of an allocation or entitlement to a state resource. However, where the state is the owner of the subject land, the written consent of the state, as landowner, may be required. Allocation or entitlement to the state resource is a separate process and will need to be obtained before development commences.

Question 7

- If the premises is listed on either the Contaminated Land Register (CLR) or the Environmental Management Register (EMR) under the Environmental Protection Act 1994 it may be necessary to seek compliance assessment. Schedule 18 of the Sustainable Planning Regulation 2009 identifies where compliance assessment is required.

Question 10

- The Building and Construction Industry (Portable Long Service Leave) Act 1991 prescribes when the portable long service leave levy is payable.
- The portable long service leave levy amount and other prescribed percentages and rates for calculating the levy are prescribed in the Building and Construction Industry (Portable Long Service Leave) Regulation 2013.
**Question 10a**

- The portable long service leave levy need not be paid when the application is made, but the *Building and Construction Industry (Portable Long Service Leave) Act 1991* requires the levy to be paid before a development permit is issued.
- Building and construction industry notification and payment forms can be completed on the QLeave website at www.qleave.qld.gov.au. For further information contact QLeave on 1800 803 481.

**Privacy**—The information collected in this form will be used by the Department of Infrastructure, Local Government and Planning (DILGP), assessment manager, referral agency and/or building certifier in accordance with the processing and assessment of your application. Your personal details should not be disclosed for a purpose outside of the IDAS process or the provisions about public access to planning and development information in the *Sustainable Planning Act 2009*, except where required by legislation (including the *Right to Information Act 2009*) or as required by Parliament. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002*.

---

**OFFICE USE ONLY**

Date received  | Reference numbers
--- | ---

**NOTIFICATION OF ENGAGEMENT OF A PRIVATE CERTIFIER**

To  | Council. I have been engaged as the private certifier for the building work referred to in this application
--- | ---

<table>
<thead>
<tr>
<th>Date of engagement</th>
<th>Name</th>
<th>BSA Certification license number</th>
<th>Building classification/s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**QLEAVE NOTIFICATION AND PAYMENT**  (For completion by assessment manager or private certifier if applicable.)

<table>
<thead>
<tr>
<th>Description of the work</th>
<th>QLeave project number</th>
<th>Amount paid ($)</th>
<th>Date paid</th>
<th>Date receipted form sighted by assessment manager</th>
<th>Name of officer who sighted the form</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

The *Sustainable Planning Act 2009* is administered by the Department of Infrastructure, Local Government and Planning. This form and all other required application materials should be sent to your assessment manager and any referral agency.
IDAS form 5—Material change of use assessable against a planning scheme

(Sustainable Planning Act 2009 version 3.1 effective 3 August 2015)

This form must be used for development applications for a material change of use assessable against a planning scheme.

You MUST complete ALL questions that are stated to be a mandatory requirement unless otherwise identified on this form.

For all development applications, you must:
- complete IDAS form 1—Application details
- complete any other forms relevant to your application
- provide any mandatory supporting information identified on the forms as being required to accompany your application.

Attach extra pages if there is insufficient space on this form.

All terms used on this form have the meaning given in the Sustainable Planning Act 2009 (SPA) or the Sustainable Planning Regulation 2009.

This form must also be used for material change of use on strategic port land and Brisbane core port land under the Transport Infrastructure Act 1994 and airport land under the Airport Assets (Restructuring and Disposal) Act 2008 that requires assessment against the land use plan for that land. Whenever a planning scheme is mentioned, take it to mean land use plan for the strategic port land, Brisbane core port land or airport land.

### Mandatory requirements

1. **Describe the proposed use.** (Note: this is to provide additional detail to the information provided in question 1 of IDAS form 1—Application details. Attach a separate schedule if there is insufficient space in this table.)

<table>
<thead>
<tr>
<th>General explanation of the proposed use</th>
<th>Planning scheme definition (include each definition in a new row) (non-mandatory)</th>
<th>No. of dwelling units (if applicable) or gross floor area (if applicable)</th>
<th>Days and hours of operation (if applicable)</th>
<th>No. of employees (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>House</td>
<td>Dwelling House</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shed</td>
<td>Residential Storage Shed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **Are there any current approvals associated with the proposed material change of use?**
   (e.g. a preliminary approval.)

- [ ] No
- [ ] Yes—provide details below

<table>
<thead>
<tr>
<th>List of approval reference/s</th>
<th>Date approved (dd/mm/yy)</th>
<th>Date approval lapses (dd/mm/yy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Does the proposed use involve the following? (Tick all applicable boxes.)

| The reuse of existing buildings on the premises | No | Yes |
| New building work on the premises | No | Yes |
| The reuse of existing operational work on the premises | No | Yes |
| New operational work on the premises | No | Yes |

Mandatory supporting information

4. Confirm that the following mandatory supporting information accompanies this application

<table>
<thead>
<tr>
<th>Mandatory supporting information</th>
<th>Confirmation of lodgement</th>
<th>Method of lodgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>All applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A site plan drawn to an appropriate scale (1:100, 1:200 or 1:500 are recommended scales) which shows the following:</td>
<td>Confirmed</td>
<td>Email</td>
</tr>
<tr>
<td>• the location and site area of the land to which the application relates (relevant land)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the north point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the boundaries of the relevant land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• any road frontages of the relevant land, including the name of the road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the location and use of any existing or proposed buildings or structures on the relevant land (note: where extensive demolition or new buildings are proposed, two separate plans [an existing site plan and proposed site plan] may be appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• any existing or proposed easements on the relevant land and their function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the location and use of buildings on land adjoining the relevant land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• all vehicle access points and any existing or proposed car parking areas on the relevant land. Car parking spaces for persons with disabilities and any service vehicle access and parking should be clearly marked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• for any new building on the relevant land, the location of refuse storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the location of any proposed retaining walls on the relevant land and their height</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the location of any proposed landscaping on the relevant land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the location of any stormwater detention on the relevant land.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A statement about how the proposed development addresses the local government's planning scheme and any other planning instruments or documents relevant to the application.</td>
<td>Confirmed</td>
<td>Email</td>
</tr>
<tr>
<td>A statement about the intensity and scale of the proposed use (e.g. number of visitors, number of seats, capacity of storage area etc.).</td>
<td>Confirmed</td>
<td>NA</td>
</tr>
<tr>
<td>Information that states:</td>
<td>Confirmed</td>
<td>Not applicable</td>
</tr>
<tr>
<td>• the existing or proposed floor area, site cover, maximum number of storeys and maximum height above natural ground level for existing or new buildings (e.g. information regarding existing buildings but not being reused)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• the existing or proposed number of on-site car parking bays, type of vehicle cross-over (for non-residential uses) and vehicular servicing arrangement (for non-residential uses).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A statement addressing the relevant part(s) of the State Development Assessment Provisions (SDAP).

| Confirmed | Not applicable | Email |

**When the application involves the reuse of existing buildings**

Plans showing the size, location, existing floor area, existing site cover, existing maximum number of storeys and existing maximum height above natural ground level of the buildings to be reused.

| Confirmed | Not applicable | Email |

**When the application involves new building work (including extensions)**

Floor plans drawn to an appropriate scale (1:50, 1:100 or 1:200 are recommended scales) which show the following:

- the north point
- the intended use of each area on the floor plan (for commercial, industrial or mixed use developments only)
- the room layout (for residential development only) with all rooms clearly labelled
- the existing and the proposed built form (for extensions only)
- the gross floor area of each proposed floor area.

| Confirmed | Email |

Elevations drawn to an appropriate scale (1:100, 1:200 or 1:500 are recommended scales) which show plans of all building elevations and facades, clearly labelled to identify orientation (e.g. north elevation).

| Confirmed | Email |

Plans showing the size, location, proposed site cover, proposed maximum number of storeys, and proposed maximum height above natural ground level of the proposed new building work.

| Confirmed | Not applicable | Email |

**When the application involves reuse of other existing work**

Plans showing the nature, location, number of on-site car parking bays, existing area of landscaping, existing type of vehicular cross-over (non-residential uses), and existing type of vehicular servicing arrangement (non-residential uses) of the work to be reused.

| Confirmed | Not applicable | Email |

**When the application involves new operational work**

Plans showing the nature, location, number of new on-site car parking bays, proposed area of new landscaping, proposed type of new vehicle cross-over (non-residential uses), proposed maximum new vehicular servicing arrangement (non-residential uses) of the proposed new operational work.

| Confirmed | Not applicable |

**Privacy**—Please refer to your assessment manager, referral agency and/or building certifier for further details on the use of information recorded in this form.

---

**OFFICE USE ONLY**

Date received

Reference numbers

The Sustainable Planning Act 2009 is administered by the Department of Infrastructure, Local Government and Planning. This form and all other required application materials should be sent to your assessment manager and any referral agency.
APPENDIX E

SLOPE STABILITY REPORT
REPORT ON SLOPE STABILITY RISK ASSESSMENT

66 Rutlands Road, Kuttabul

U24217

Prepared for
Mark Dreghorn

31 March 2017
Letter of Transmittal

Mark Dreghorn
66 Rutlands Road
Kuttabul  QLD 4741

Attention: Mr Dreghorn

Dear Sir,

We are pleased to present the results of the slope stability risk assessment undertaken by Cardno QLD Pty Ltd (Cardno) at the above site.

Site investigation was undertaken on the 23rd March 2017. The objective of this investigation was to establish the risk of instability at the site under current conditions, identify constraints to proposed development and effects of proposed development on stability of the site. The data collected is then used in the assessment and recommendation of mitigation measures where appropriate to comment on the suitability of the site for the proposed development. Assessments were undertaken with reference to:

- The Australian Geoguide for Slope Management and Maintenance
- AS2870-1996 “Residential Slabs & Footings”

The investigation was undertaken to satisfy Mackay Regional Council’s requirement of certifying a very low risk of instability with sites having slopes in excess of 15 percent (15%).

Thank you for your commission to undertake this investigation. Should you have any queries, please do not hesitate to contact me at our Mackay office.

Yours faithfully,

Trudie Bradbury  Andrew Williams
Principal Engineering Geologist  Senior Principal Engineering Geologist
BSc (Hons) MSc MMinRes FGS BSc (Hons) MEnvMgmt FGS CGeol for Cardno

for Cardno
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Figure 2 - Photograph showing cut driveway behind the house. Camber is towards the slope with an intercept drain, preventing water from running over the slope behind the house.
1 Introduction

The geotechnical investigation reported herein has been commissioned by Mark Dreghorn.

- The investigations undertaken comprised;
  - review of the relevant geological literature,
  - conducting onsite walkover survey and
  - Interrogation and analysis of the geotechnical data collected and preparation of this report.

The field investigations and laboratory testing were undertaken with reference to the following documentation:

- Australian Standards AS1289 – Methods of testing Soil for Engineering Purposes.

1.1 Details of Development

The site has been developed for a number of years; it appears that the house and shed presently on the block, along with associated driveway cuts were undertaken around 2009. At present the site contains a single storey residence with a small sediment dam, a shed and various hardstands. Four wheel drive access to the centre and rear of the block has been created by means of a cut in the slope behind the house. Location of the block is shown in Figure 1, below.

Figure 1 - Location of site
1.2 Site Location and Description

The subject site is located at 66 Rutlands Road, Kuttabul, also known as Lot 2 on RP900267. The site is located approximately 30km to the north-west of Mackay CBD.

The site covers approximately 20 hectares, with the development in question contained to approximately 1 hectare on the southern boundary of the site. The slope has been modified by means of a four wheel drive track which is cut into the slope behind the house. The majority of the site is covered in a dense growth of native trees and shrubs.

Located south of the house is a sediment dam, which is fed by the means of culverts and water diverted from the slope behind the house. A culvert is found to the west of the house and a diversion drain to the east, both feeding the sediment dam with water runoff from the slopes.

Rutlands Road runs along the southern boundary of the block.

The majority of the surrounding land comprises bush blocks, and no outside infrastructure or other residences are located immediately adjacent to the subject property.

The effluent disposal area is located to the east of the property.

1.3 Method and Scope of Investigation

The scope of works was to undertake a slope stability risk assessment of the site with respect to the steep lot overlay on the site.

The method of investigation included desktop study which involved the review of published geological maps and aerial images from Google Earth and Mackay Regional Council, MiMAPS. The aim was to collect background information and delineate areas of interest that may need particular attention during fieldwork.

Fieldwork involved geological mapping of the site; we had previously investigated the subsurface materials so no subsurface investigation was undertaken this time. Field observations were undertaken to assess existing terrain (slopes, natural features, landslip features, drainage) and confirm surface and subsurface material properties (lithology, groundwater, failure planes, foundation conditions), with regards to stability issues.

The findings are presented in this report along with recommendations.

The soil classification descriptions and field tests were undertaken with reference to the following Australian Standards:

- AS1726-1993 “Geotechnical Site Investigations”,
- AS2870-1996 “Residential Slabs and Footings”,

1.4 Qualifications of Responsible Individuals

This report has been provided by Cardno; a team comprising geotechnical engineers and engineering geologists with a combined experience of more than 50 years in slope stability and land development are involved in this project. Individuals in this group are also members of recognised engineering and earth sciences institutions, associations and societies.
2 Description of Existing Conditions

2.1 Geology
The 1:100 000 Geological Series, (Mackay Sheet 8755) denotes the typical geology of the area to consist of variable igneous and pyroclastic deposits, varying widely in age and chemistry, from the volcanolithic sandstones of the Permian Lizzie Creek Volcanic Group, through to tertiary rhyolite. Generally the area is characterised by a series of igneous intrusions and exposed rounded batholiths, penetrating lower-lying colluvial and alluvial deposits. Older deposits are commonly eroded and incised by creeks, locally with more resistant dykes forming scarps.

2.2 Topography
The topography of Kuttabul and The Leap area is characterised by low to medium hills and floodplain deposits, punctuated with occasionally steep igneous intrusions and elevated areas where resistant rock is encountered. On the whole, the topography is gentle to moderate slopes with localised scarps, and eroded areas associated with creeklines. The existing building platform is on a cut into natural slopes of around 15°, with the majority of the fall to the south. A moderate to steep hill is found behind the existing buildings, and a 4WD track has been cut into it, effectively terracing the lower parts of the slopes.

2.3 Surface Features
The block is roughly orientated north-south and covers approximately 20ha. The natural slope of the land is around 30 to 40 degrees, falling to the south, but this has been cut to create a building platform at the southern end of the block.

A small slope c.-2m high and around 35 degrees is found to the immediate rear (north) of the house, which exposes a finely bedded to laminar siltstone which shows signs of eroding and a small amount of undercutting through erosion at the western end of the slope. On top of this slope, and winding up the hill at the back of the house is a cut driveway some 3m wide, which appears to be entirely cut into the rock, with no fill other than that used to level it. An intercept drain has been placed against the cut face where water run-off is collected and diverted to drains leading to the sediment drain. No excess water runs down the slope behind the house.

The natural slopes are heavily vegetated with a mixture of mature trees and native shrubs. There does not appear to be any loose boulders, nor are there any signs of slope movement in the natural areas. A very small slump of less than 1m³ has fallen onto the cut driveway; this appears to be associated with an area of localised weathering and the higher quality rock slopes are themselves unaffected.

The effective terracing of the slope above the house means that any small to medium sized event will likely be attenuated by the terracing before it can reach the house.

Photographs of the site are included in Appendix A.
Google Earth and MiMaps images did not show any obvious signs of recent or past deep seated instability for the images viewed. This was subsequently confirmed during site inspection as discussed in this report. Prior to the inspection an extremely high rainfall event had occurred, with apparently no adverse effect on the slopes.

2.4 Subsurface Conditions

The subsurface profile encountered in the site, exposed in the slopes and encountered during the previous site classification can be summarised as follows:

- Topsoil
- Residual
- Extremely weathered rock / highly weathered rock

Surface material comprises superficial topsoil to 200 mm thick. Bouldery outcrops occur on the upper slope. Residual soil with weathered rock fragments occurs to a depth of 0.5 m. Below this depth is variably weathered bedrock, which for the most part appears to be moderately to distinctly weathered.

2.5 Groundwater

Free water was not encountered on the slopes at the time of investigation nor was there any natural seepage noted in the existing slopes. It is unlikely that a perched groundwater table would exist above the weathered rock due to the lack of potentially porous materials.

2.6 Surface Drainage

Surface drainage is controlled by the direction of natural sloping ground. Water will run off to the south downslope, where it is collected and diverted by the intercept drains. Beneath the house the water will
naturally run south towards Rutlands Road, and be collected in the sediment dam. High rainfall in the
month preceding the inspection did not appear to adversely affect the site other than cause some
loosening of the road surface and erosion of parts of the driveway. A small amount of weathered material
from the immediate slope behind the house had been loosened by the rain.

2.7 Vegetation
The vegetation located onsite was primarily mature trees and mature shrubs.

2.8 Existing Buildings and Structures
A house, shed and associated hardstand are already present. A small retaining wall some 300mm high is
partially constructed behind the house and we understand that the intention is to extend this wall to
prevent further material being shed from the small cut slope onto the access path behind the house.
3 Landslide Risk Assessment

3.1 General

Risk is the potential that an ‘event’ will occur and result in an ‘impact’. It can be defined in terms of

- the Probability of the event,
- the Potential Consequences, and
- the Conditional Probability (eg not every ‘event’ will result in the ‘consequence’)

The ‘event’ in this case is considered to be failure of the slope above the existing development. For this event to occur there must be a hazard (in this case the relatively steeply sloping hill slopes) and a trigger (eg seismic event, saturation of the slope, etc). A major failure of the slope was considered in this assessment. However, shallow failures or slumping were assumed, because although they are unlikely to have any significant impacts, the probability of them occurring is higher.

In terms of consequences, those likely to be impacted by a landslide event include the house and existing infrastructure, and any person/development downslope of the landslide. There does not appear to be any significant risk to people using Rutlands Road, given the distance from the slope and nature of the natural materials.

Conditional probability is considered in terms of whether 1) the landslide will impact a specified area (eg the existing building or the infrastructure to the south), 2) whether the area will be occupied at the time of impact, and 3) the vulnerability of the person to injury as a result of the event. A quantitative risk assessment was undertaken for the proposed development. The assessment was limited to consideration of landslides which are initiated on the upper hill and cut slopes; landslide on the lower lying ground is considered unlikely although development in this area could be impacted by landslides occurring further uphill. The potential for ‘loss of life’ and ‘damage to property’ are considered separately in the following sections. This is discussed following the methods of Landslide Risk Management (AGS 2007).

3.2 Risk - Loss of Life

3.2.1 Probability of Landslide Occurring (P(H))

The subsurface investigations indicate that the soil cover on upper slopes is relatively shallow and not greater than 0.5m. Based on the nature of the in-situ bedrock, it is unlikely that the natural slope will fail through this material.

The most likely area for failure is considered to be the soil cover and weathered rock to the immediate north of the house. Due to the rock likely present at depth, failure is more likely to occur in the overburden soils in the form of erosion, wash out or shallow slips.

No major signs of historical or active slope instability were visible on the residential property. The pad appears to have been created around 2012 from aerial photographs, and has been subject to numerous large rainfall and cyclonic events in that time.

Based on these observations, the probability of failure for the slope has been assessed as P (H) = 1.0 x 10^-3 (AGS 2007, C7, page 128, and Table CC1 & CC2 in Appendix E).

The probability of a landslide occurring on the site is considered to be low.

3.2.2 Probability of Spatial Impact (P(S:H))

The mode and direction in which the slope fails will be based on the slope geometry, the site constraints, and the nature of the slope materials.

Small scale slides are likely to occur where excavations are made into the rock and the bedding is favourably exposed.
It is considered more likely that the slope will fail in the soils above the bedrock. Due to composition and consistency of these materials, slope failures are likely to be shallow and of limited travel distance (metres to tens of metres).

Based on the site limits and engineering judgement, the estimated probability of impact, \( P(S:H) \) is assessed as follows:

- 0.4 for a landslide on the site which impacts on the proposed building and its occupants.
- 0.4 for a landslide on the site which impacts on the infrastructure (driveway).

### 3.2.3 Probability of Occupancy (Temporal Spatial Probability) \( P(S:T) \)

For a landslide event to cause injury or loss of life there must be a person located on the failing mass or located downslope of the failing mass. The probability that a person occupies this location at the time of failure is defined as the temporary spatial probability.

The temporal spatial probability \( P(S,T) \) of persons in the house, can be estimated based on the likely occupancy of the property. In this case no plans have been viewed for the proposed development. It has therefore been assumed that the property will be occupied on average no more than 15 hours/day, 365 days per year by the person most at risk. Correspondingly the Temporal Spatial Probability is estimated as follows:

\[
P(S,T) = \frac{15}{24} = 0.625
\]

The temporal spatial probability \( P(S,T) \) of a person or persons using the upslope infrastructure (such as road user) will be significantly less than that of the residential building. A \( P(S,T) \) of 0.1 is adopted for this case.

### 3.2.4 Vulnerability of Persons \( V(D:T) \)

The probability of loss of life resulting from landslide impact will depend on the following:

- the volume of slide
- type of slide, mechanism of slide initiation and velocity of sliding
- the thickness of the slide
- the locations of the person(s), whether in an open or enclosed vehicle or building during the landslide episode.

The vulnerability of a person is very high if the slide results in the complete collapse of the building or substantial burial by debris. However, the likelihood of the nature of the slide causing such an impact is deemed unlikely. The vulnerability of a person being killed or injured in an event of landslide on the property is therefore conservatively assessed as follows;

\[
V(D:T) = 0.4 \text{ for occupants of the proposed house onsite}
\]
\[
V(D:T) = 0.1 \text{ for someone upslope of the building within or outside the site limits, assuming the person is not buried by the debris}
\]

### 3.2.5 Risk Estimation \( P(LOL) \)

The annual probability of the person most at risk losing his / her life, \( P(LOL) \) was obtained by combining all the previous probabilities as shown below.

**Occupants of the proposed building**

\[
P(LOL) = P(H) \times P(S:H) \times P(S:T) \times V(D:T)
\]
\[
= (1.0 \times 10^{-3}) \times (0.4) \times (0.625) \times (0.4)
\]
\[
= 1.0 \times 10^{-4} \text{ per annum}
\]

**Down slope within and outside the site limits**

\[
P(LOL) = P(H) \times P(S:H) \times P(S:T) \times V(D:T)
\]
3.2.6 Risk Evaluation

AGS suggested a tolerable loss of life of $1 \times 10^{-5}$ per annum or lower for newly developed/constructed slope sites and $1 \times 10^{-4}$ or lower for existing slopes. Acceptable levels are usually an order of magnitude lower. The site is classed as an existing site, and consequently the risk level for the existing condition is within the tolerable range and can be said to be a low to very low risk in terms of loss of life. This is not to say that failure will never occur. However what it does mean is that if failure does occur, the consequences should be tolerable. To maintain the risk at the acceptable range for an existing site the risk management practices under section 3.4 should be implemented.

3.3 Risk - Damage to Property

3.3.1 General

Risk assessment for property loss was undertaken using the Risk Matrix according to AGS (2007). The Risk Matrix defines qualitative terminology for likelihood, consequence and risk.

3.3.2 Likelihood of Landslide Occurring

The potential for a landslide to occur is often expressed as an annualised probability. Likelihood can be estimated based on annualised probability with reference to AGS (2007), part of which has been reproduced in Table 3-1 below. For an approximate annual probability of $10^{-3}$ for the existing site (refer section 3.2.1), the AGS would suggest that the likelihood of the landslide occurring within the site is POSSIBLE. If the measures recommended in Section 3.4 are adopted, this likelihood can be reduced.

<table>
<thead>
<tr>
<th>Approximate Probability</th>
<th>Annual Recurrence Interval</th>
<th>Implied Indicative Landslide Recurrence Interval</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10^{-1}$</td>
<td>10 years</td>
<td>ALMOST CERTAIN</td>
<td></td>
</tr>
<tr>
<td>$10^{-2}$</td>
<td>100 years</td>
<td>LIKELY</td>
<td></td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>1,000 years</td>
<td>POSSIBLE</td>
<td></td>
</tr>
<tr>
<td>$10^{-4}$</td>
<td>10,000 years</td>
<td>UNLIKELY</td>
<td></td>
</tr>
<tr>
<td>$10^{-5}$</td>
<td>100,000 years</td>
<td>RARE</td>
<td></td>
</tr>
<tr>
<td>$10^{-6}$</td>
<td>1,000,000 years</td>
<td>BARELY CREDIBLE</td>
<td></td>
</tr>
</tbody>
</table>

3.3.3 Potential Consequence of Landslide occurring

According to AGS, 2007 (Appendix D, pg 86), any proposed residential dwellings on the allotment can be assigned an ‘Importance Level of Structure’ of 2. From data presented in AGS (2007), an approximate cost of damage resulting from a landslide is estimated to be in the order of 5% to 0.5% of the market value of the proposed property as shown in Table 3-2. For the existing site conditions, this can be based on the value of the land and proposed property. Data used for assessment of the consequence is reproduced below from AGS (2007).
Table 3-2  Consequence of Damage to Property from a Landslide

<table>
<thead>
<tr>
<th>Approximate Cost of Damage (Indicative Value)</th>
<th>Description</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.</td>
<td>MINOR</td>
</tr>
<tr>
<td>0.5%</td>
<td>Little damage. (Note for high probability event (Almost certain), this category may be subdivided at a notional boundary of 0.1%)</td>
<td>INSIGNIFICANT</td>
</tr>
</tbody>
</table>

3.3.4 Risk Estimation

The risk to the property can then be determined with reference to Table 3-3 below (ref: AGS 2007). For a likelihood of POSSIBLE and the consequence levels as determine above, the qualitative Risk Matrix indicates the level of risk for damage to property is MEDIUM TO VERY LOW.

Table 3-3 Risk Matrix

<table>
<thead>
<tr>
<th>LIKELIHOOD</th>
<th>CONSEQUENCE TO PROPERTY (with Indicative Approximate Cost of Damage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicative Value of Approximate Annual Probability</td>
</tr>
<tr>
<td>A – ALMOST CERTAIN</td>
<td>$10^{-1}$</td>
</tr>
<tr>
<td>B – LIKELY</td>
<td>$10^{-2}$</td>
</tr>
<tr>
<td>C – POSSIBLE</td>
<td>$10^{-3}$</td>
</tr>
<tr>
<td>D – UNLIKELY</td>
<td>$10^{-4}$</td>
</tr>
<tr>
<td>E – RARE</td>
<td>$10^{-5}$</td>
</tr>
<tr>
<td>F – BARELY CREDIBLE</td>
<td>$10^{-6}$</td>
</tr>
</tbody>
</table>

3.3.5 Risk Evaluation

The resulting Risk Level is described in AGS (2007) as follows:

- MEDIUM (M) – May be tolerated in certain circumstances but requires investigation, planning and implementation of treatment options to reduce the risk to Low
- VERY LOW RISK (VL) – Acceptable. Manage by normal slope maintenance procedures.

The risk assessment undertaken for existing conditions has demonstrated that the current risk level is Low to very low for the proposed Lots. For this level of risk to be maintained during and after development of the site, the recommendations in section 3.5 should be implemented.

3.4 Measures Recommended to Mitigate Impacts

3.4.1 General

This section discusses mitigating measures for issues identified under Section 2, 3 and 4. The measures provided are considered applicable to the proposed development.

We note Mackay Regional Council (MRC) requires the risk level to be certified as Very Low. The assessment is undertaken according to AGS (2007) where a low level risk is recommended throughout the life of the property. This can be achieved via good construction and maintenance practice and landscaping design.

To safeguard against instability and ensure the long term performance of the slopes and effectively maintain a Very Low Risk to Property and an Acceptable level to Risk to Loss of Life, consideration should be given to the recommendations in this section.

It is not always possible to remove all risk of landslide or slope failure, but it should be reduced or maintained to at least within a tolerable range. As this risk is tolerable, the approach we have adopted is to minimise the risk where it is efficient and cost effective to do so.
One of the ways of managing the risk of landslide is to identify potential trigger mechanisms for these events and put in place measures to control them. For example, stabilisation measures and drainage both assist in reducing the occurrence of slope failures by increasing the strength of the soil mass and reducing pore water pressures respectively.

Geotechnical constraints inferred from site observations and subsurface investigation are discussed below.

3.4.2 Earthworks

No major earthworks are proposed for the site. Maintenance of the small slope behind the house should be undertaken as it periodically sheds small amounts of rock onto the pathway which has to be cleared up. By extending the small retaining wall this will provide reinforcement to the toe of the slope and reduce the amount of maintenance needed.

The eastern end of the cut slope is locally over-steepened and slightly undercut, and this area should be cut back to the same angle as the rest of the slope (c. 30 degrees). Long term, slope protection such as vegetation is recommended to prevent further shedding of rock fragments.

Should any further cuts or buildings be proposed for the site at later dates, it should be noted that modification of the slope via earthworks may affect its stability. Any future earthworks on the slopes may require geotechnical input. It is recommended that any earthworks are undertaken in accordance with AS3798-1996 “Guidelines on Earthworks for Commercial and Residential Developments” and local authority requirements. It is recommended that the earthworks contractor be familiar with site conditions.

3.4.3 Vegetation

Grass and other vegetation cover should be encouraged on the slopes. Vegetation assists slope stability via root binding effects and control of moisture via evapotranspiration. Trees may assist with binding soils but when growing out of rock slopes can be detrimental through root jacking of the bedding. Any trees observed growing in cut rock areas should be removed.

3.4.4 Stormwater Control

One of the common triggers of landslides is the presence of water in slopes. Presently the site has been contoured to divert water away from the house and immediate slopes, and roof water is collected in storage tanks. A small amount of erosion was noted in the intercept drains upslope, and some form of protection or water-slowing measures put in place to control this long term. There does not appear to be any stability issues implicit in this erosion but it should be maintained in the longer term.

3.4.5 Wastewater (Treatment & Disposal)

Effluent is currently disposed of in a site to the east of the house and is not located in an area where it would likely cause failure of any slope. Should the disposal area require relocation in the future, the new area should also be located away from the house and not immediately downslope of infrastructure.

3.4.6 Surface Protection

Exposed soil should be protected from erosion, by means of directing surface water away from slopes and revegetating the surface with plants. It is important that the vegetation on slopes be maintained. Some plants assist slope stability by controlling soil moisture via evapotranspiration and root binding effects. They can also act as a barrier, trapping dislodged material and preventing it from slumping downslope.

3.4.7 Site Management

In order to minimise foundation movement, it is important that proper site management for the existing soil conditions are observed by both the builder at the time of the construction and the owner throughout the life of the proposed development.

We recommend that appropriate drainage be provided around houses to prevent scouring. It is also recommended that the ground around the building platform should slope away at 1 in 20 for 2m with surface water collected via surface drains and disposed of safely away from the slopes. Roof run-off
should be collected and piped to storage tanks or discharged a safe distance away from slopes and all retaining walls.

A regular check should be made on the slopes say every two years or after heavy rainfall to secure or clear loose material on the slope that are directly above the building footprint.

This report has been prepared based on the understanding that following the design and construction of the building, this document is passed onto the owner of the property, and that it is that person’s obligation to ensure that the document is passed onto future owners. In order to minimise foundation movement, it is important that proper site management for the existing soil conditions are observed by both the builder at the time of the construction and the owner throughout the life of the proposed development.

It is recommended that future shrubs and trees be planted at a distance at least equivalent to their mature height away from the building to avoid shrinkage movement in the in-situ soils.

### 3.5 Risk Evaluation for Proposed Mitigating Options

#### 3.5.1 Risk to Loss of Life and Property

It is assessed that the probability of a landslide will be $P(H) = 1.0 \times 10^{-4}$ following maintenance works on the existing development. The risk in relation to loss of life caused by a landslide event, is considered to be within the low to very low range.

Following remediation works, the updated assessment is:

$$P_{(LOL)} = P(H) \times P(S:H) \times P(S:T) \times V(D:T)$$

$$= (1.0 \times 10^{-4}) \times (0.4) \times (0.625) \times (0.4)$$

$$= 1.0 \times 10^{-5} \text{ per annum}$$

For the most at risk group, implementing the above measure will ensure that the risk does not change post development. The risk in terms of loss of life, with the measures implemented, will also remain within the acceptable range.

The consequence of failure for the property should also stay between minor (5%) to insignificant (0.5%) so longs as the recommended mitigation options are implemented. The risk to property damage should also remain with the low to very low range.
4 Summary and Conclusions

Findings and recommendations from our investigation are summarised as follows.

- From the site inspection no obvious past or recent instability was noted under static conditions within the study site.

- Surface run-off should be maintained as diverted away from the dwelling and exposed ground to prevent scouring, rilling and erosion. Some areas of the intercept drains should be lined to minimise ongoing maintenance but there does not appear to be any instability implicit in the existing drains.

- The area of undercutting and oversteepening east of the house should be cut back and the slope maintained. Extending the small wall along the base of this slope will reinforce the toe and reduce maintenance.

- It is assessed that the development does not alter the present state of stability of the subject land or have an adverse impact on adjoining land and structures, so long as the recommendations in the report are followed.

- It is the responsibility of the developer to ensure that all requirements of consenting and local authorities are met.

It is strongly recommended that all works performed on the slopes should be done according to AGS (2007) ‘Management and Maintenance of Sloping Sites’. A copy is attached in Appendix B.

From our site inspection and sub-surface analysis, we conclude the site is suitable for the proposed development and has a very low risk to land instability. This can be maintained throughout the life of the property by implementing recommendations outlined in this report.
5 Limitations

Geotechnical services are provided by Cardno Ullman & Nolan Geotechnic Pty Ltd (Cardno UNG) in accordance with generally accepted professional engineering and geological practice in the area where these services are rendered. The client acknowledges that the present standard in the engineering and geologic profession does not include a guarantee of perfection, and no other warranty, expressed or implied, is extended by Cardno UNG. It is the reader’s responsibility to verify the correct interpretation and intention of the recommendations presented herein. Cardno UNG assumes no responsibility for misunderstandings or improper interpretations that result in unsatisfactory or unsafe work products. It is the reader’s further responsibility to acquire copies of any supplemental reports, addenda or responses to public agency reviews that may supersede recommendations in this report.

The findings presented in this report have been based on the investigation described in this report. There are always some variations in subsurface conditions across the site, which cannot be fully defined by investigation. It is unlikely that the measurements and values obtained from sampling and testing during the investigation will represent the extremes of conditions that may exist within the site. Hence it is recommended that if any ground conditions other than those described in this report are encountered during construction, further advice should be immediately sought from Cardno UNG.

It is recommended that Cardno UNG be commissioned to provide a review of design and documentation to confirm that the intents of the geotechnical report are properly reflected in the designs. Similarly, inspection of the footing excavations is considered a prudent means of ensuring that ground conditions meet design expectations.

This report has been prepared specifically for M. Dreghorn. Information contained in this report should not be construed as appropriate for any other purposes or for other users.
APPENDIX A

Site Photos
Photo 1 – Cut slope immediately behind the house. Wall to right of image will be extended along the base of the slope

Photo 2. Rock in cut slope on 4WD track

Photo 3: House on cut platform. 4WD track above cut slope at rear of house
Photo 3, Small amount of erosion within drain

Photo 4, front of house on rock slope with water collection tank
APPENDIX B

AGS (2007) Management & Maintenance of Sloping Sites
EXAMPLES OF **GOOD** HILLSIDE PRACTICE

- Vegetation retained
- Surface water interception drainage
- Watertight, adequately sited and founded roof water storage tanks (with due regard for impact of potential leakage)
- Flexible structure
- Roof water piped off site or stored
- On-site detention tanks, watertight and adequately founded. Potential leakage managed by sub-soil drains
- Engineered retaining walls with both surface and subsurface drainage (constructed before dwelling)

EXAMPLES OF **POOR** HILLSIDE PRACTICE

- Discharges of roofwater soak away rather than conducted off site or to secure storage for re-use
- Structure unable to tolerate settlement and cracks
- Poorly compacted fill settles unevenly and cracks pool
- Inadequate walling unable to support fill
- Loose, saturated fill slides and possibly flows downslope
- Inadequately supported cut fills
- Saturated slope fails
- Vegetation removed
- Mud flow occurs
- Absence of subsoil drainage within fill
- Possble travel downslope which impacts other development downhill
APPENDIX F

STATE PLANNING MAPS
State Interests - consolidated list for all selected Lot Plans

- MSES - Regulated vegetation
- Climatic regions - stormwater management design objectives
- Flood hazard area* - Local Government flood mapping area
- Bushfire hazard area (Bushfire prone area)

State Interests listed for each selected Lot Plan

Lot Plan: 2RP900267 (Area: 203500 m²)

- BIODIVERSITY
  - MSES - Regulated vegetation
- WATER QUALITY
  - Climatic regions - stormwater management design objectives
- NATURAL HAZARDS RISK AND RESILIENCE
  - Flood hazard area* - Local Government flood mapping area
  - Bushfire hazard area (Bushfire prone area)
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Date: 12/04/2017
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