

Mr Vic Micallef
212 Hudson Parade
Clareville NSW 2070

Project 222043.00
16 January 2025
R.004.Rev0
DEM:kn

Attention: Vic Jayne
Email: vicjayne48@gmail.com

Geotechnical Assessment

Proposed Inclinor – 212 Hudson Parade, Clareville

1. Introduction

Reference is made to Douglas Partners Pty Ltd (DP) geotechnical report 222043.01.R.001.Rev0 dated 30 August 2023, which accompanied a Development Application (DA) for a new residence (currently under construction) at 212 Hudson Parade, Clareville.

DP has been asked to provide further comment on geotechnical issues relating to a new DA for a proposed inclinor at the property.

Design drawings IS-221220268-000-000 (Rev A-13 Nov 2024) and IS-223240175-000-001 (RevA-15 Nov 2024) by Inclinor Services have been provided for DP's review (also attached to this report).

2. Proposed development and site inspection

The proposed inclinor will be located near the south-eastern corner of the property, on the steep slope above the Pittwater foreshore and adjacent to (west of) an existing boatshed. The proposed structure will be located entirely within the property boundary.

The location of the proposed inclinor is indicated on Photographs 1 and 2 attached to this report.

The steep slope is approximately 7 m high and is generally well vegetated. Interbedded sandstone and siltstone bedrock of varying strength and weathering is exposed at various locations across the slope.

Very low strength, highly weathered siltstone is exposed through the vegetation cover beside the boatshed on the proposed inclinor alignment. Layers of medium to high strength sandstone are visible elsewhere on the slope and are also expected to lie below the inclinor alignment at relatively shallow depth.

3. Comments and recommendations

It is recommended that all foundations for the inclinator are taken down to and also be socketed into the in-situ bedrock of at least low strength on the slope.

A design allowable bearing pressure (ABP) of up to 1000 kPa is considered appropriate for bedrock (sandstone and siltstone) of at least low strength together with pile bond strengths of at least 100 kPa.

It is expected that any piers located within the highly weathered siltstone bedrock will need to be extended to socket within stronger underlying bedrock. Any highly weathered or fractured bedrock layers exposed on the slope will require support by a retaining structure or shotcrete protection to prevent future erosion.

Geotechnical inspection of footing excavations for the inclinator, prior to pouring of concrete, will be required to confirm that foundation strata of adequate bearing capacity and stability has been reached.

Geotechnical inspection will also be required to enable completion of a Pittwater Council GRMP Form 3 (Final Geotechnical Certificate – Post Construction Geotechnical Certificate) to obtain a final occupation and Building Certificate upon completion of the works.

4. Risk assessment

The hazards above, adjacent to and on the site have been assessed for risk to property and life using the general methodology outlined by the Australian Geomechanics Society - Landslide Risk Management Subcommittee, 2007.

Identified hazards are summarised in Table 1, together with a qualitative assessment of likelihood, consequence and slope instability risk to property after completion of the proposed development (assuming appropriate engineering design and construction works are adopted).

Table 1: Slope Instability Risk to Property Assessment for Proposed Development (after Construction)

Hazard	Likelihood	Consequence	Risk
Collapse of inclinator	Rare - if footings are adequately founded within in-situ bedrock in accordance with DP's recommendations	Major	Low
Gross slope instability beneath inclinator	Barely Credible – relatively shallow bedrock is expected and no evidence of past significant instability observed.	Major	Low

For loss of life, the individual risk can be calculated from:

$$R_{(LoL)} = P_{(H)} \times P_{(S:H)} \times P_{(T:S)} \times V_{(D:T)}$$

where:

$R_{(LoL)}$ is the risk (annual probability of loss of life (death) of an individual)

$P_{(H)}$ is the annual probability of the hazardous event (erosion/ wall failure)

$P_{(S:H)}$ is the probability of spatial impact by the hazard (e.g. of the failure reaching the residence, taking into account the distance from a given event)

$P_{(T:S)}$ is the temporal probability (e.g. of the adjacent area being occupied by the individual) given the spatial impact

$V_{(D:T)}$ is the vulnerability of the individual (probability of loss of life of the individual given the impact).

The assessed individual risk to life (person most at risk) resulting from slope instability is summarised in Table 2.

Table 2: Slope Instability Risk to Life Assessment for Proposed Development (after Construction)

Hazard	$P_{(H)}$	$P_{(S:H)}$	$P_{(T:S)}$	$V_{(D:T)}$	Risk $R_{(LoL)}$
Collapse of inclinators	10^{-5}	1	10^{-3}	1	1×10^{-8}
Gross slope instability	10^{-6}	1	10^{-3}	1	5×10^{-9}

When compared to the requirements of the AGS, it is considered that the proposed development will meet 'Acceptable Risk Management' criteria with respect to both property and life under current and foreseeable conditions.

Provided the construction is undertaken in accordance with the recommendations contained in this report, is appropriately designed and incorporates sound engineering practice, it is considered that the project is technically feasible and that the construction would not be expected to adversely affect the overall stability of the site or negatively influence the geotechnical hazards identified in Tables 1 and 2.

5. Conditions relating to design and construction monitoring

To comply with Pittwater Council conditions which are part of the design, construction, and post-construction certificate requirements of the GRMP, it will be necessary for DP to complete:

Form 2B this will comprise review of all structural drawings to confirm they address geotechnical issues of this report, and

Form 3 which requires the progressive inspection of all new footing excavations and bulk excavations into the slope to confirm compliance to design, with respect to allowable bearing pressure and stability.

6. Design life and requirement for maintenance and inspection

DP interprets the reference to design life requirements, as specified within the GRMP, to refer to structural elements designed to retain the subject slope and maintain the risk of instability within acceptable limits.

Specific structures that may affect the maintenance of site stability in relation to the proposed development on this site are considered to comprise:

- Any proposed retaining walls or shotcrete protection of slopes in relation to the proposed inclinator.

In order to attain a structural life of 100 years as required by the Council Policy, it may be necessary for the structural engineer to incorporate appropriate construction detailing and for the property owner to adopt and implement a maintenance and inspection programme.

A typical programme for developments on sloping sites is given in Table 3.

Table 3: Recommended Maintenance and Inspection Programme

Structure	Maintenance / Inspection Task	Frequency
Proposed retaining walls or shotcrete protection	Owner to check walls / shotcrete for deviation from "as-constructed" condition.	Every two to three years or following each significant rainfall event.

Where changes to site conditions are identified during the maintenance and inspection programme, reference should be made to a relevant professional (e.g. structural engineer or geotechnical engineer).

7. Limitations

Douglas Partners (DP) has prepared this report for this project at 212 Hudson Parade, Clareville in accordance with instructions received from the property owner, Mr Vic Micallef. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Mr Vic Micallef and his agents for this project only and for the purposes as described in the report.

It should not be used by or be relied upon for other projects or purposes on the same or another site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires a risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

We trust that these comments are sufficient for your present requirements. If further assistance is required, please do not hesitate to contact the undersigned.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully

Douglas Partners Pty Ltd



David Murray

Snr Associate / Engineering Geologist

Reviewed by



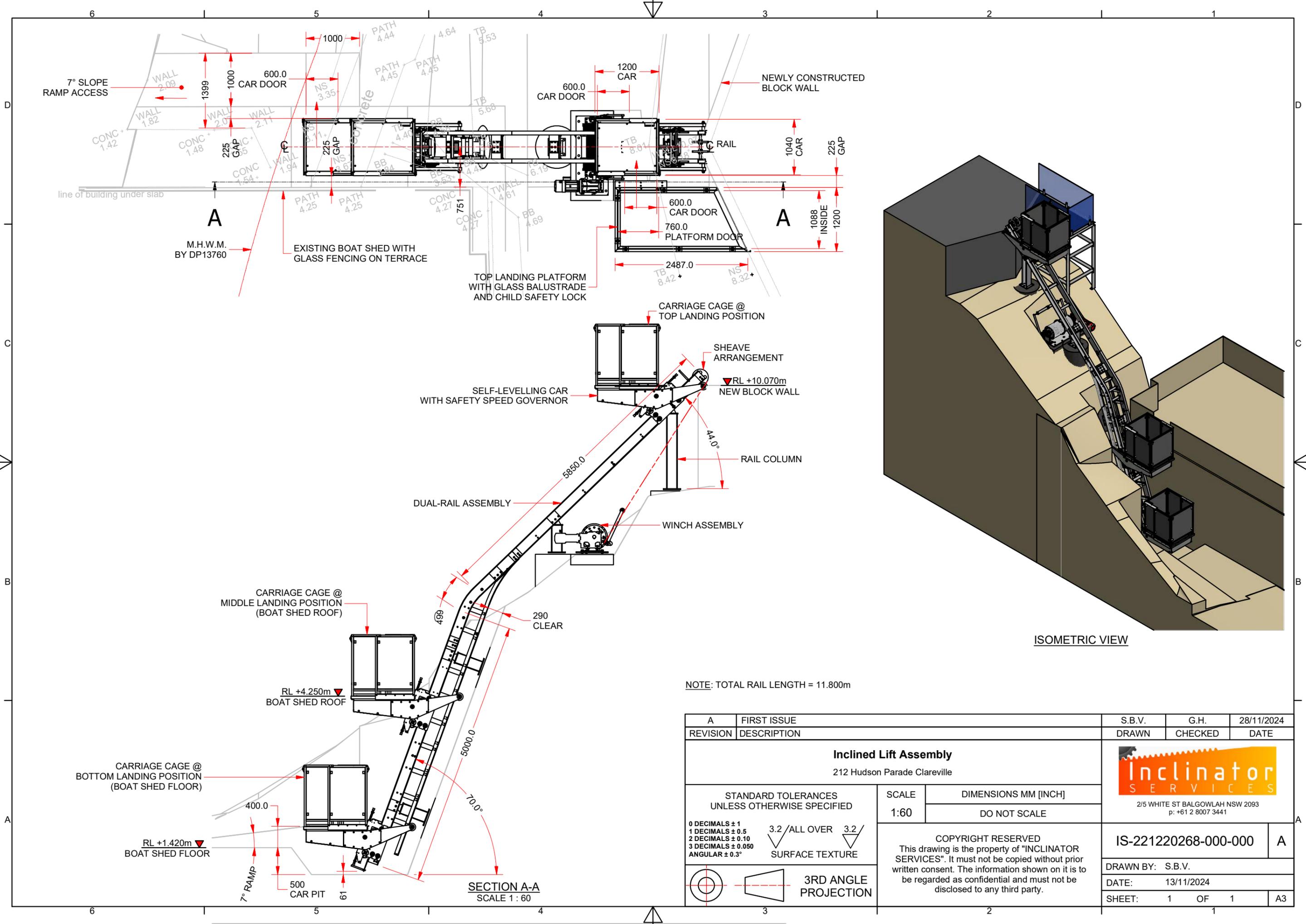
John Braybrooke

Principal / Engineering Geologist

Attachments: Design Drawings by Inclinators Services

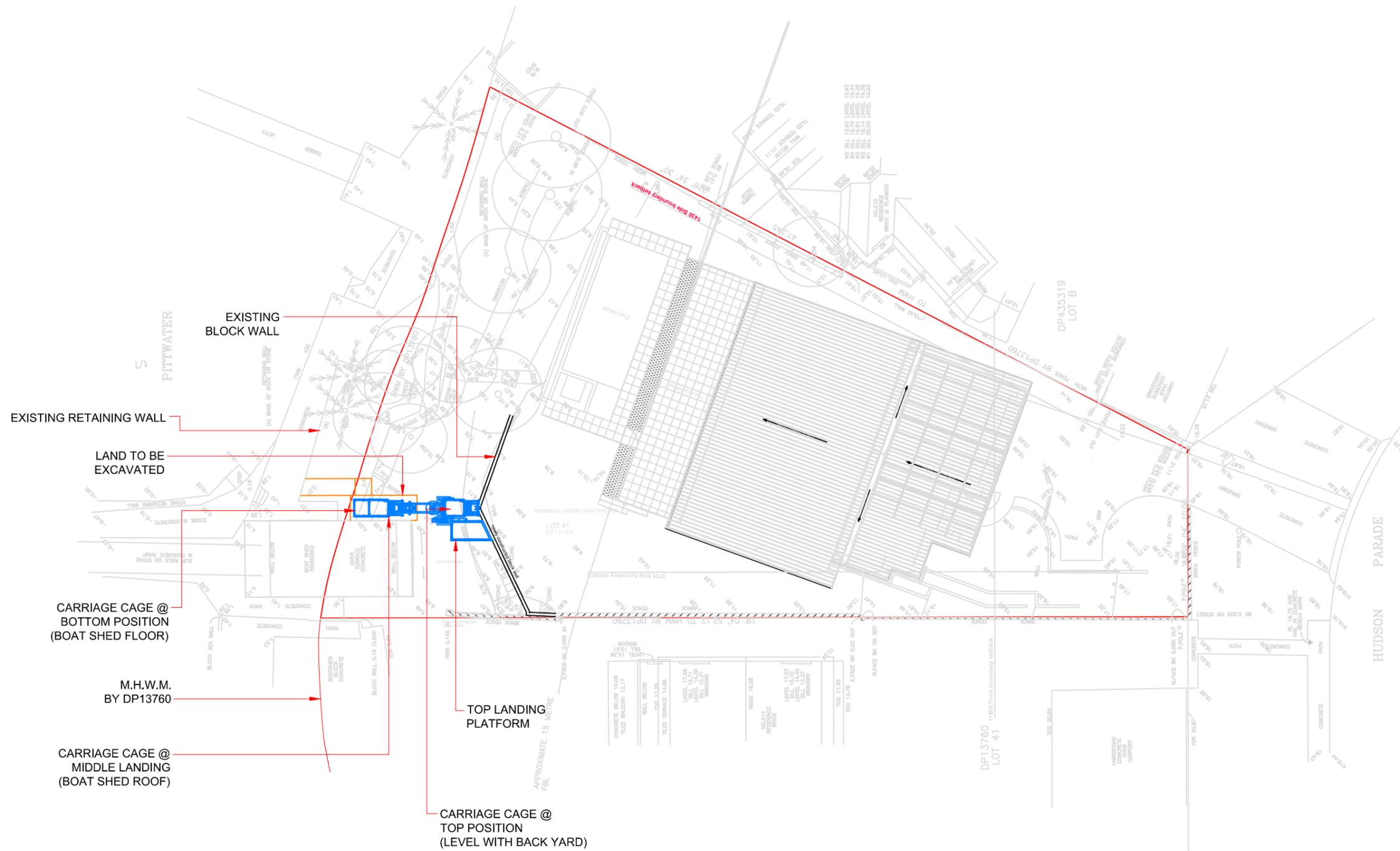
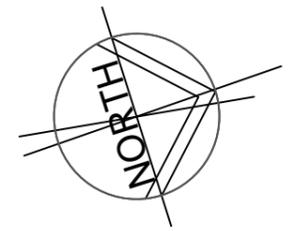
Photographs 1 and 2

Geotechnical Forms 1 and 1A



NOTE: TOTAL RAIL LENGTH = 11.800m

A	FIRST ISSUE	S.B.V.	G.H.	28/11/2024
REVISION	DESCRIPTION	DRAWN	CHECKED	DATE
Inclined Lift Assembly				
212 Hudson Parade Clareville		2/5 WHITE ST BALGOWLAH NSW 2093 p: +61 2 8007 3441		
STANDARD TOLERANCES UNLESS OTHERWISE SPECIFIED		SCALE	DIMENSIONS MM [INCH]	
0 DECIMALS ± 1		1:60	DO NOT SCALE	
1 DECIMALS ± 0.5				
2 DECIMALS ± 0.10		COPYRIGHT RESERVED This drawing is the property of "INCLINATOR SERVICES". It must not be copied without prior written consent. The information shown on it is to be regarded as confidential and must not be disclosed to any third party.		
3 DECIMALS ± 0.050				
ANGULAR ± 0.3°				
3RD ANGLE PROJECTION		IS-221220268-000-000 A		
		DRAWN BY: S.B.V.		
		DATE: 13/11/2024		
		SHEET: 1 OF 1 A3		



SITE SURVEY PLAN

- NOTES:**
1. NO VEGETATION AFFECTED.
 2. EXCAVATION AS SHOWN ON PLAN AND ELEVATION VIEWS.
 3. PROVISION OF SILT FENCE IF REQUIRED BY COUNCIL.
 4. IF STORM WATER IS TO BE AFFECTED, WILL BE DIRECTED INTO EXISTING SYSTEM.
 5. ALL WORKS TO BE IN ACCORDANCE WITH THE BUILDING CODE OF AUSTRALIA, LOCAL COUNCIL BUILDING APPROVAL, RELEVANT GOVERNING STATUTORY AUTHORITIES AND MINIMUM STANDARDS OF CONSTRUCTION.
 6. EXISTING STRUCTURES TO BE CERTIFIED BY ENGINEER TO WITHSTAND ADDITIONAL LOADS, IF REQUIRED.
 7. ENTIRE STRUCTURE AND STABILITY OF ADDITION TO BE CERTIFIED BY ENGINEER.
 8. THE INCLINED LIFT CONTRACTOR IS TO INCLUDE AND ARRANGE SEPARATE ENGINEERS DETAILS AND/OR INSPECTIONS AS REQUIRED.

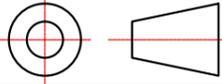
A	FIRST ISSUE	S.B.V.	G.H.	15/11/2024
REVISION	DESCRIPTION	DRAWN	CHECKED	DATE
Inclined Lift Assembly-Site Survey Plan 212 Hudson Parade Clareville		 2/5 WHITE ST BALGOWLAH NSW 2093 p: +61 2 8007 3441		
STANDARD TOLERANCES UNLESS OTHERWISE SPECIFIED 0 DECIMALS ± 1 1 DECIMALS ± 0.5 2 DECIMALS ± 0.10 3 DECIMALS ± 0.050 ANGULAR ± 0.3°		SCALE	DIMENSIONS MM [INCH]	
3.2 / ALL OVER 3.2 / SURFACE TEXTURE		1:280	DO NOT SCALE	
 3RD ANGLE PROJECTION		COPYRIGHT RESERVED This drawing is the property of "INCLINATOR SERVICES". It must not be copied without prior written consent. The information shown on it is to be regarded as confidential and must not be disclosed to any third party.		
		IS-23240175-000-001		A
		DRAWN BY: S.B.V.		
		DATE: 15/11/2024		
		SHEET: 1 OF 1		A3



Photo 1: Approximate alignment of proposed inclinometer (viewed from boatshed roof)

Note extremely weathered silstone bedrock outcrop



Photo 2: Approximate alignment of proposed inclinometer (viewed from western side of boatshed)



Geotechnical Assessment

Proposed Inclinometer

212 Hudson Pde, Clareville

CLIENT: Vic Micallef

PROJECT: 222043

PLATE No: 1

REV: A

DATE: Jan-25

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

Development Application for <u>Mr Vic Micallef</u>	Name of Applicant
Address of site <u>212 Hudson Parade, Clareville</u>	

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Peter Oitmaa on behalf of Douglas Partners Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 21 January 2025 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: <u>222043.00.R.003.Rev0 Proposal Inclinator</u>
Report Date: <u>16 Jan 2025</u>
Author: <u>David Murray</u>
Author's Company/Organisation: <u>Douglas Partners P/L</u>

Documentation which relate to or are relied upon in report preparation:

<u>IS-221220268-000-000 (A)</u>
<u>IS-223240175-000-001 (A)</u>
<u>by Inclinator Services</u>

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 Peter Oitmaa

Chartered Professional Status CPEng NER

Membership No. 2135224

Company Douglas Partners 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 <u>Mr Vic Micallef</u> Name of Applicant
Address of site <u>212 Hudson Parade, Clareville</u>

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: <u>222043.00.R.003.RWO Proposal Inclinater</u>
Report Date: <u>16 Jan 2025</u>
Author: <u>David Murray Douglas Partners P/L</u>
Author's Company/Organisation: <u>Douglas Partners P/L</u>

Please mark appropriate box

- ☞ Comprehensive site mapping conducted 2023 + 4/12/24
(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 Outcrop + previous assessments
 - ☞ Yes Date conducted
- ☞ Geotechnical model developed and reported as an inferred subsurface type-section - previous report
- ✓ ☞ 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 Peter Oitmaa
 Chartered Professional Status CPEng NER
 Membership No. 2135224
 Company Douglas Partners Pty Ltd

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007
APPENDIX C: LANDSLIDE RISK ASSESSMENT
QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY

QUALITATIVE MEASURES OF LIKELIHOOD

Approximate Annual Probability		Implied Indicative Landslide Recurrence Interval	Description	Descriptor	Level	
Indicative Value	Notional Boundary					
10 ⁻¹	5x10 ⁻²	10 years	20 years	The event is expected to occur over the design life.	ALMOST CERTAIN	A
10 ⁻²		100 years		The event will probably occur under adverse conditions over the design life.	LIKELY	B
10 ⁻³	5x10 ⁻³	1000 years	200 years	The event could occur under adverse conditions over the design life.	POSSIBLE	C
10 ⁻⁴	5x10 ⁻⁴	10,000 years	2000 years	The event might occur under very adverse circumstances over the design life.	UNLIKELY	D
10 ⁻⁵	5x10 ⁻⁵	100,000 years	20,000 years	The event is conceivable but only under exceptional circumstances over the design life.	RARE	E
10 ⁻⁶	5x10 ⁻⁶	1,000,000 years	200,000 years	The event is inconceivable or fanciful over the design life.	BARELY CREDIBLE	F

Note: (1) The table should be used from left to right; use Approximate Annual Probability or Description to assign Descriptor, not *vice versa*.

QUALITATIVE MEASURES OF CONSEQUENCES TO PROPERTY

Approximate Cost of Damage		Description	Descriptor	Level
Indicative Value	Notional Boundary			
200%	100%	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.	CATASTROPHIC	1
60%		Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.	MAJOR	2
20%	40%	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.	MEDIUM	3
5%	10%	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.	MINOR	4
0.5%	1%	Little damage. (Note for high probability event (Almost Certain), this category may be subdivided at a notional boundary of 0.1%. See Risk Matrix.)	INSIGNIFICANT	5

- Notes:** (2) The Approximate Cost of Damage is expressed as a percentage of market value, being the cost of the improved value of the unaffected property which includes the land plus the unaffected structures.
- (3) The Approximate Cost is to be an estimate of the direct cost of the damage, such as the cost of reinstatement of the damaged portion of the property (land plus structures), stabilisation works required to render the site to tolerable risk level for the landslide which has occurred and professional design fees, and consequential costs such as legal fees, temporary accommodation. It does not include additional stabilisation works to address other landslides which may affect the property.
- (4) The table should be used from left to right; use Approximate Cost of Damage or Description to assign Descriptor, not *vice versa*

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX C: – QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY (CONTINUED)

QUALITATIVE RISK ANALYSIS MATRIX – LEVEL OF RISK TO PROPERTY

LIKELIHOOD		CONSEQUENCES TO PROPERTY (With Indicative Approximate Cost of Damage)				
	Indicative Value of Approximate Annual Probability	1: CATASTROPHIC 200%	2: MAJOR 60%	3: MEDIUM 20%	4: MINOR 5%	5: INSIGNIFICANT 0.5%
A – ALMOST CERTAIN	10 ⁻¹	VH	VH	VH	H	M or L (5)
B - LIKELY	10 ⁻²	VH	VH	H	M	L
C - POSSIBLE	10 ⁻³	VH	H	M	M	VL
D - UNLIKELY	10 ⁻⁴	H	M	L	L	VL
E - RARE	10 ⁻⁵	M	L	L	VL	VL
F - BARELY CREDIBLE	10 ⁻⁶	L	VL	VL	VL	VL

Notes: (5) For Cell A5, may be subdivided such that a consequence of less than 0.1% is Low Risk.

(6) When considering a risk assessment it must be clearly stated whether it is for existing conditions or with risk control measures which may not be implemented at the current time.

RISK LEVEL IMPLICATIONS

Risk Level		Example Implications (7)
VH	VERY HIGH RISK	Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work likely to cost more than value of the property.
H	HIGH RISK	Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property.
M	MODERATE RISK	May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as practicable.
L	LOW RISK	Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required.
VL	VERY LOW RISK	Acceptable. Manage by normal slope maintenance procedures.

Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide.