Our ref: 7227-R1 Rev 2
3 October 2023

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North Ryde NSW 2113
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Kosciuszko Thredbo Pty Ltd / EVT
1 Friday Drive
Thredbo NSW 2625

Department of Planning and Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No DA 23/9955

Granted on the 27 October 2023

Signed Z Derbyshire

Sheet No 4 of 9

Attention: Chloe Chalk

Dear Chloe,

Harusch Walking Track, Thredbo NSW
Geotechnical Assessment

1. Introduction

This report presents the results of a geotechnical assessment for a proposed new walking track on the old Harusch ski run. Part of the existing track (western end) traverses a bog area that is to be avoided, if possible, by building a staircase or ramp down the embankment. The assessment was commissioned by Chloe Chalk of Kosciuszko Thredbo Pty Ltd / EVT, purchase order KTM0040699. The work was carried out in accordance with our proposal (ref: 7227-P1; dated: 21 April 2023).

Documents supplied to us for this investigation comprised:

- Aerial photo showing outline of proposed walking track.
- Miscellaneous site photos.
- Structural Plans for Harusch Stairs; prepared by: Camstruct Consulting Pty Ltd; ref: 23012-S01 to S04; rev 2; 10/8/2023.

No cutting or filling is proposed for the walking track. The proposed staircase involves an elevated structure above the embankment with post support and footings founded at suitable depth and on a suitable founding stratum.

This report must be read in conjunction with the attached “Important Information about your Geotechnical Report”.

2. Assessment Procedure

The assessment comprised the following scope of work:

- A review of existing regional maps and reports relevant to the site held within our files.
- Visual observations of surface features by a Senior Principal Geotechnical Engineer on 26 April 2023.
- Engineering assessment and reporting.

3. Regional Topography

The regional topography comprises moderately to steeply sloping terrain flanking the north-easterly flowing Thredbo River, with ground slopes over the land flanking the river generally ranging from 10º to 30º and some locally steeper sections, and more gentle slopes over the river shoulders. Numerous drainage depressions and watercourses flow towards the river, with some of the persistent watercourses to the north of the river carved several metres into the underlying granite bedrock. Side slopes to creeks and watercourses are typically steeper at 20° to 35º, and typically include numerous granite boulders and cobbles.

The site lies within an area designated as "G" as defined in the maps accompanying DIPNR's "Geotechnical Policy – Kosciuszko Alpine Resorts", November 2003, and therefore a geotechnical report is required to accompany the development application as per the requirements of the Geotechnical Policy.

4. Site Observations

The site is located within Thredbo, in the vicinity of the Gondola top station, as illustrated in Plate 1.

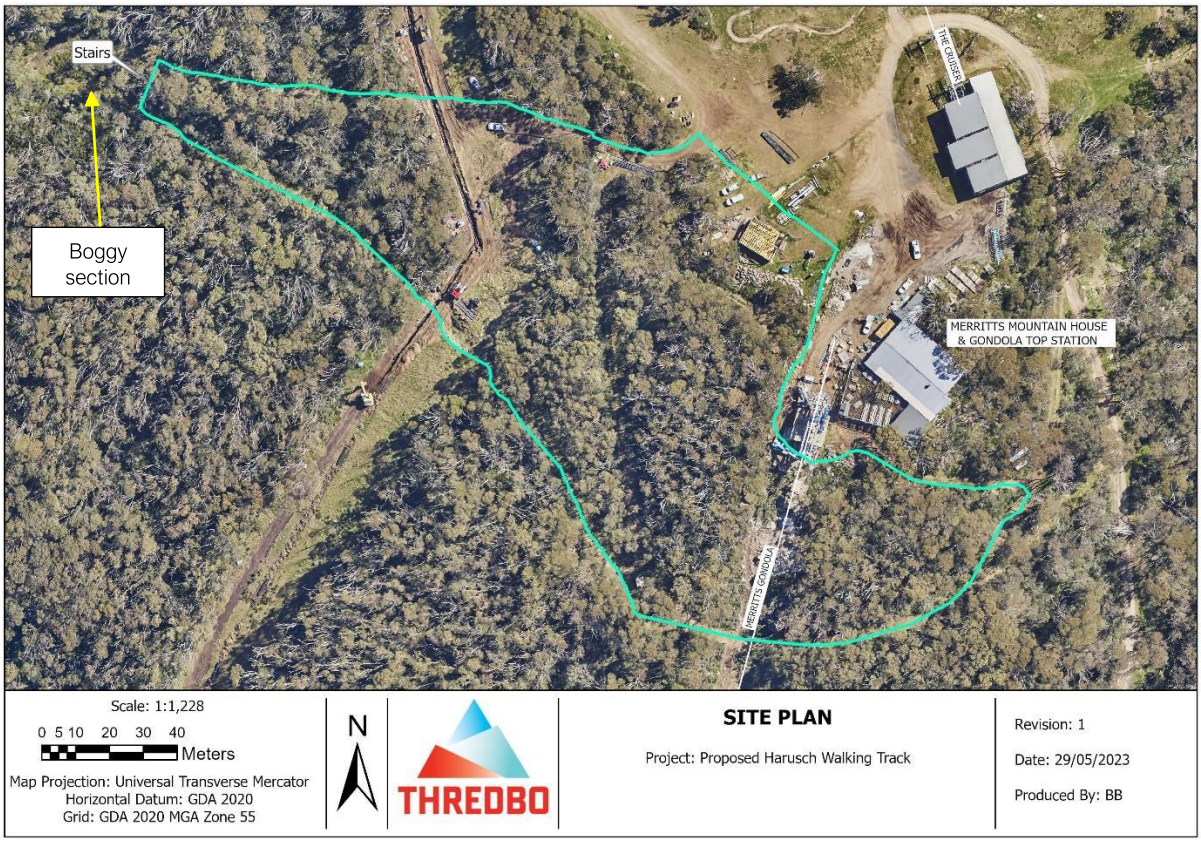

Plate 1 – aerial photo showing outline of walking track (in yellow).

Overall ground slopes range from about 5° to 10° in the vicinity of the Gondola top station, increasing to about 10° to 15° downslope.

The alignment of the track generally follows the Harusch ski run which is grass-covered with occasional small shrubs. The terrain in-between the track is heavily vegetated.

Development of the ski slopes has typically involved some minor surficial reshaping and disturbance, typically relatively shallow (less than about 1m depth). No granite exposures were observed. Variable subsurface conditions including fill, clay slopewash soils, completely decomposed granite (sands), with granite cobbles and boulders interspersed throughout the profile, and occasionally granite bedrock is anticipated.

No obvious signs of slope instability were observed during the site inspection.

Concentrated surface water was observed in the western part of the track which forms a relatively boggy section at the approximate location indicated in Plate 1.

5. Discussions & Recommendations

It is proposed to construct the walking track along the existing ski run which will generally not involve any earthworks. To avoid the boggy section noted above, it is proposed to traverse the slope in between the two sections of track using either a ramp or stairs. Either of these options would be suitable. For either option, the structure should be supported by posts and footings at appropriate intervals. Footings must be founded within suitable stratum (ideally extremely weathered or better granite at not less than 0.5m below ground level, or medium dense/stiff or better natural soils not less than 1 m below ground level). A maximum allowable bearing pressure of 150 kPa should be adopted for foundations.

The proposed works will have 'minimal or no geotechnical impact' on the site, based on the relatively shallow depths of excavation required, the lack of obvious signs of hillside instability observed or expected, and anticipated subsurface conditions expected in the area. We therefore consider that a geotechnical report prepared in accordance with the Geotechnical Policy for Kosciuszko Alpine Resorts (2003) is not required. A completed Form 4 – Minimal Impact Certification is attached to this report.

The following recommendations are provided for the development:

- Based on our site observations and previous test pitting in the area, we expect that due to previous site disturbance and observed slopes, the site is Class 'P', in accordance with AS2870-2011 'Residential slabs and footings'.
- Excavation is anticipated to be predominantly within soils of variable nature including completely weathered granite and cobbles and boulders. Excavation could be achieved by suitably sized excavator.
- No filling is anticipated for the development with the exception possibly of backfilling of the open excavation across the track indicated in Photo 5. Further advice must be sought if other significant filling is proposed.

6. Limitations

In addition to the limitations inherent in site investigations (refer to the attached Information Sheets), it must be pointed out that the recommendations in this report are based on assessed subsurface conditions from limited observations.

This report may have included geotechnical recommendations for design and construction of temporary works (e.g., temporary batter slopes or temporary shoring of excavations). Such temporary works are expected to perform adequately for a relatively short period only, which could range from a few days (for temporary batter slopes) up to six months (for temporary shoring). This period depends on a range of factors including but not limited to: site geology; groundwater conditions; weather conditions; design criteria; and level of care taken during construction. If there are factors which prevent temporary works from being completed and/or which require temporary works to function for periods longer than originally designed, further advice must be sought from the Geotechnical Engineer.

This report and details for the proposed development should be submitted to relevant regulatory authorities that have an interest in the property (e.g., Department of Planning) or are responsible for services that may be within or adjacent to the site for their review.

Asset accepts no liability where our recommendations are not followed or are only partially followed. The document "Important Information about your Geotechnical Report" in Appendix A provides additional information about the uses and limitations of this report.

❖❖❖

For and on behalf of
Asset Geotechnical Engineering Pty Ltd

Mark Bartel

Mark Bartel
BE, MEngSc, GMQ, CPEng, RPEQ/NER(Civil), DEP/PRE (NSW)
Managing Director | Senior Principal Geotechnical Engineer

Encl: Site Photos
Important Information about your Geotechnical Report
Form 4

Document Control

Distribution Register

Copy	Media	Recipient	Location
1	Secure PDF	Chloe Chalk	Kosciuszko Thredbo Pty Ltd / EVT
2	Secure PDF	Mark Bartel	Asset Geotechnical Engineering

Document Status

Rev	Revision Details	Author	Reviewer		Approved for Issue		
			Name	Initials	Name	Initials	Date
0	Initial issue	M. Bartel			M. Bartel	*MAB*	21 May 2023
1	Minor revisions	M. Bartel			M. Bartel	*MAB*	13 July 2023
2	Stair plans provided	M. Bartel			M. Bartel	*MAB*	3 October 2023

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QAS International
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018 AS/NZS 4801:2001

SITE PHOTOS

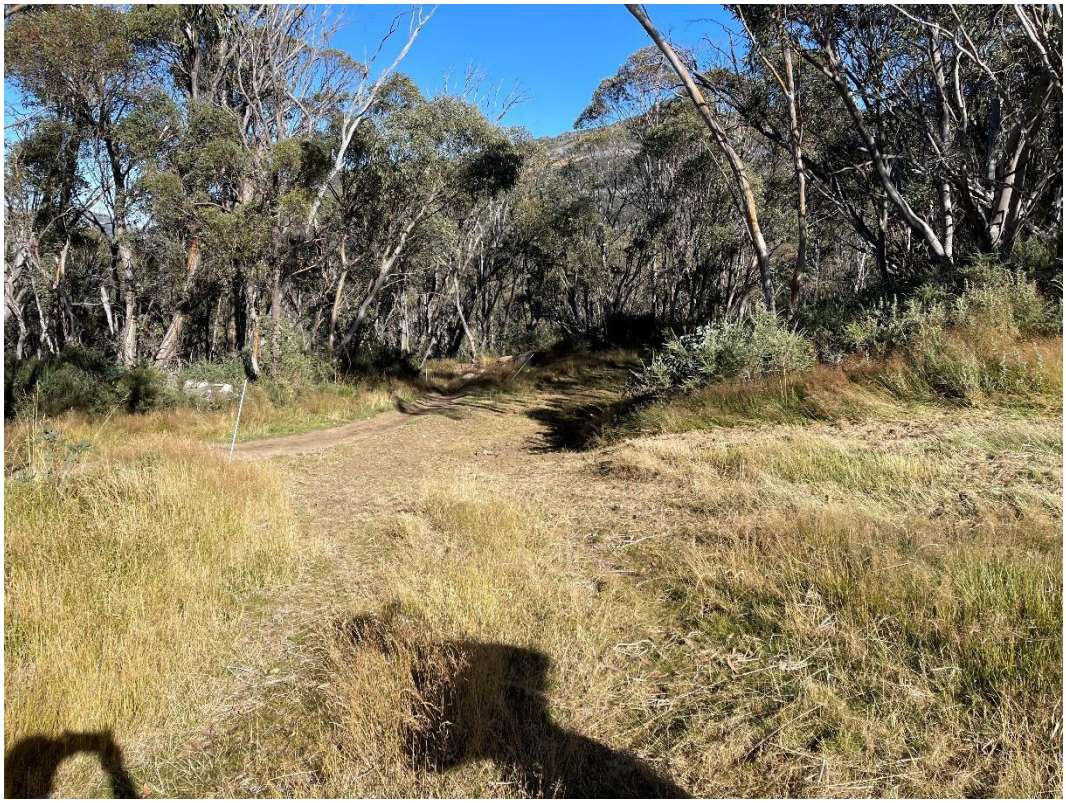

Photo 1 – start of track

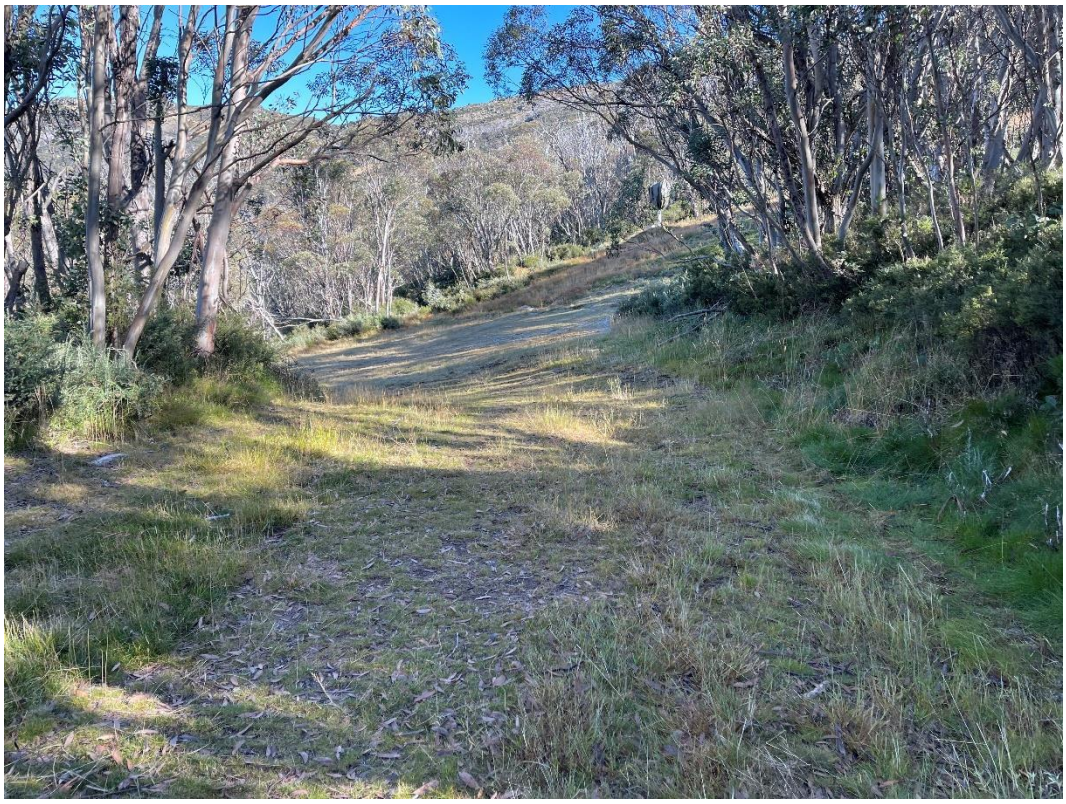

Photo 2 – typical track formation

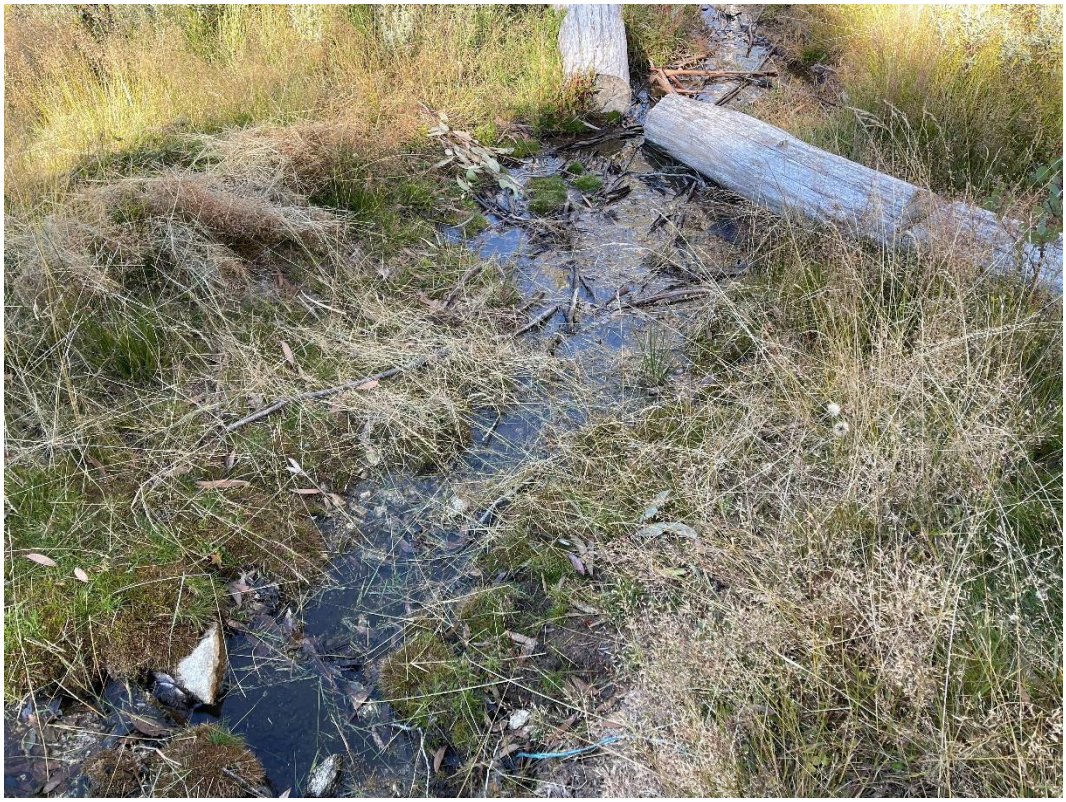

Photo 3 – concentrated water flow in boggy section of track

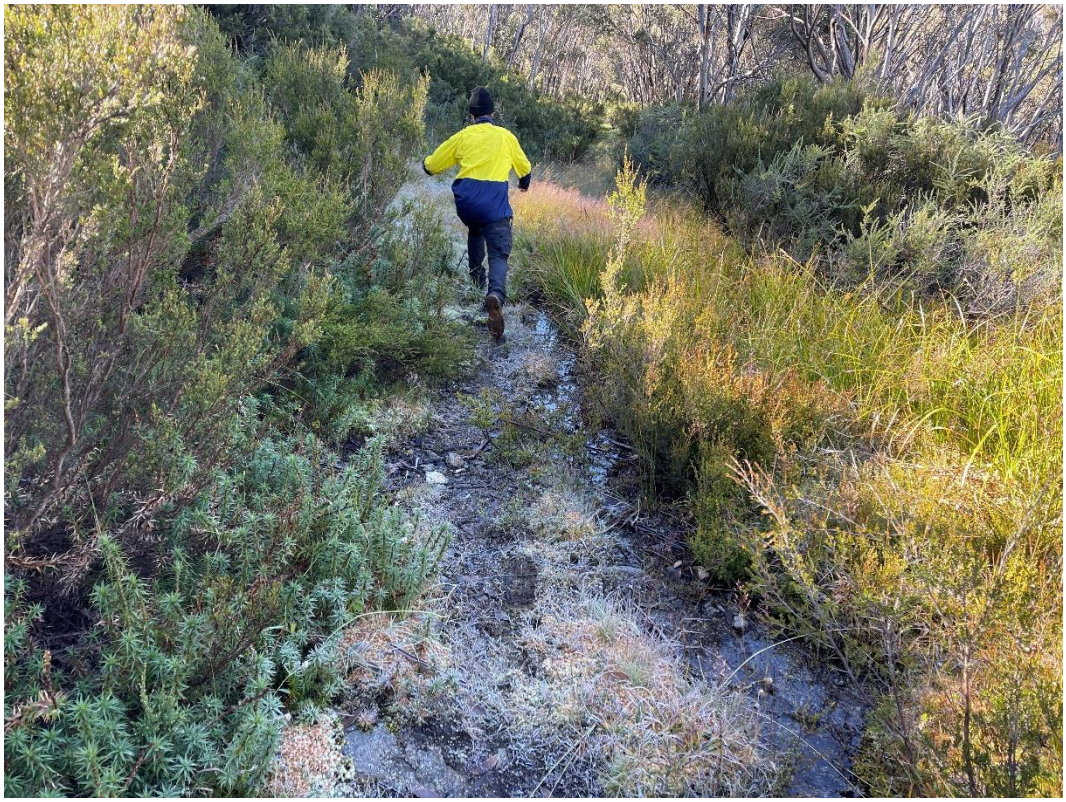

Photo 4 – boggy section of track

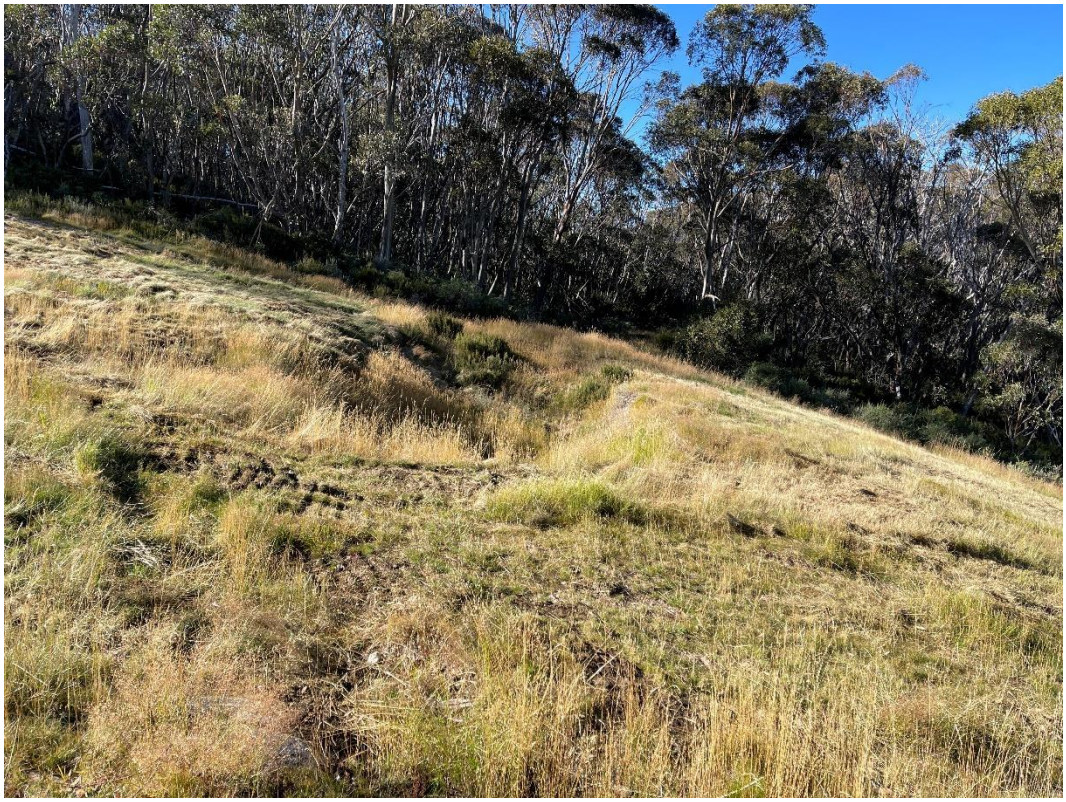

Photo 5 – open excavation across track

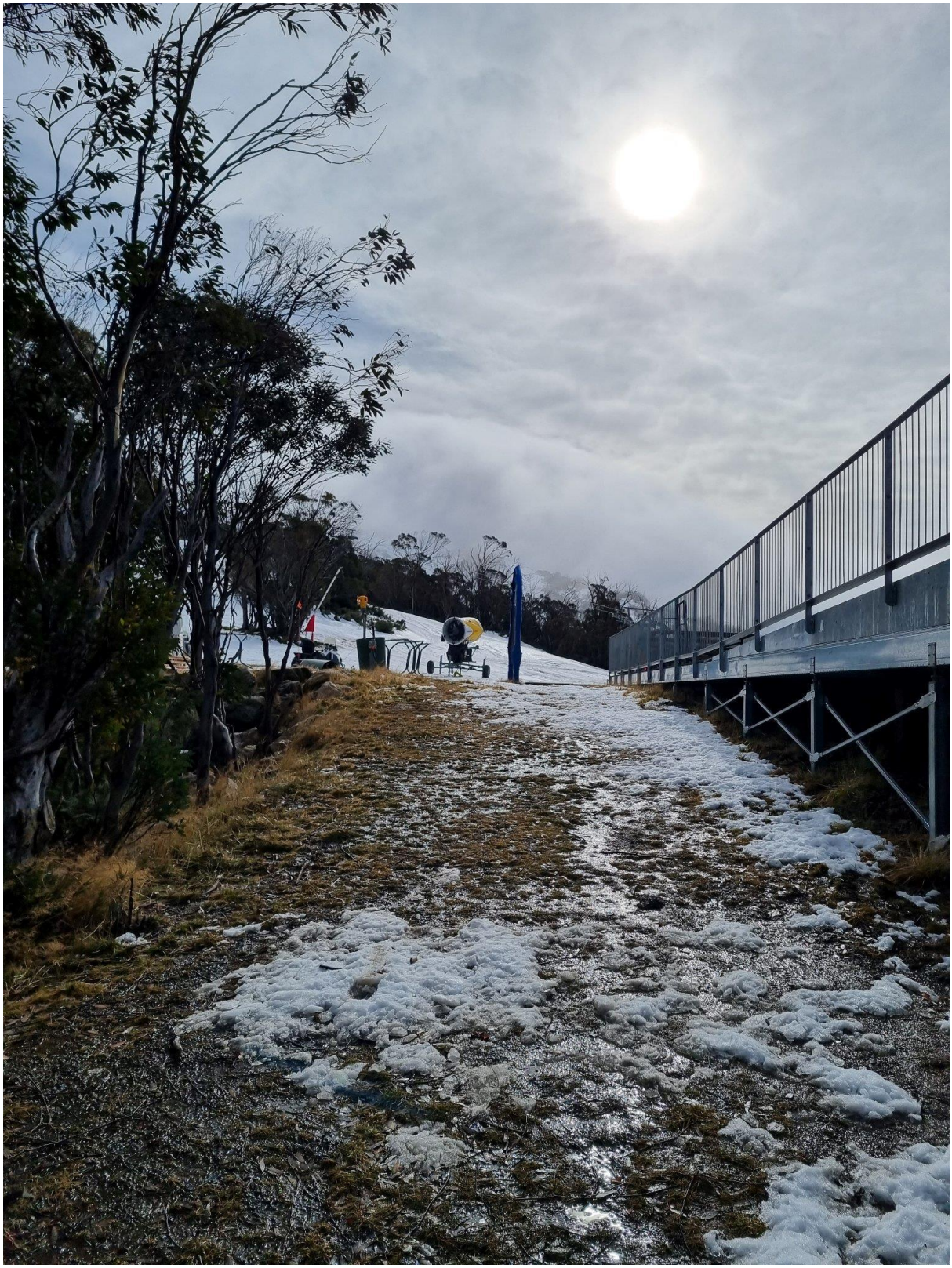

Photo 6 – diversion up cleared access track below gondola top station (source: Kosciuszko Thredbo Pty Ltd)

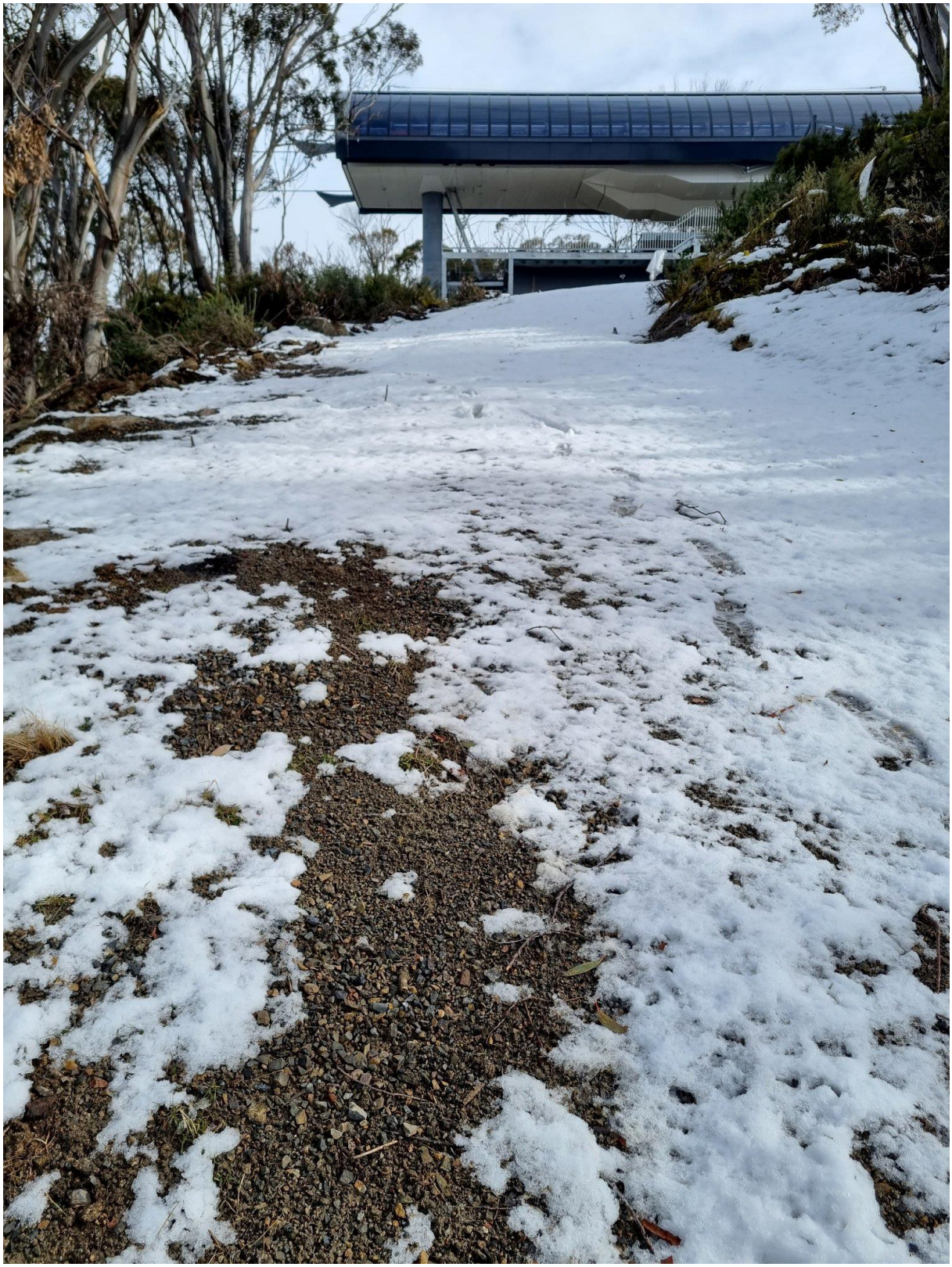

Photo 7 – diversion up cleared access track below gondola top station (source: Kosciuszko Thredbo Pty Ltd)

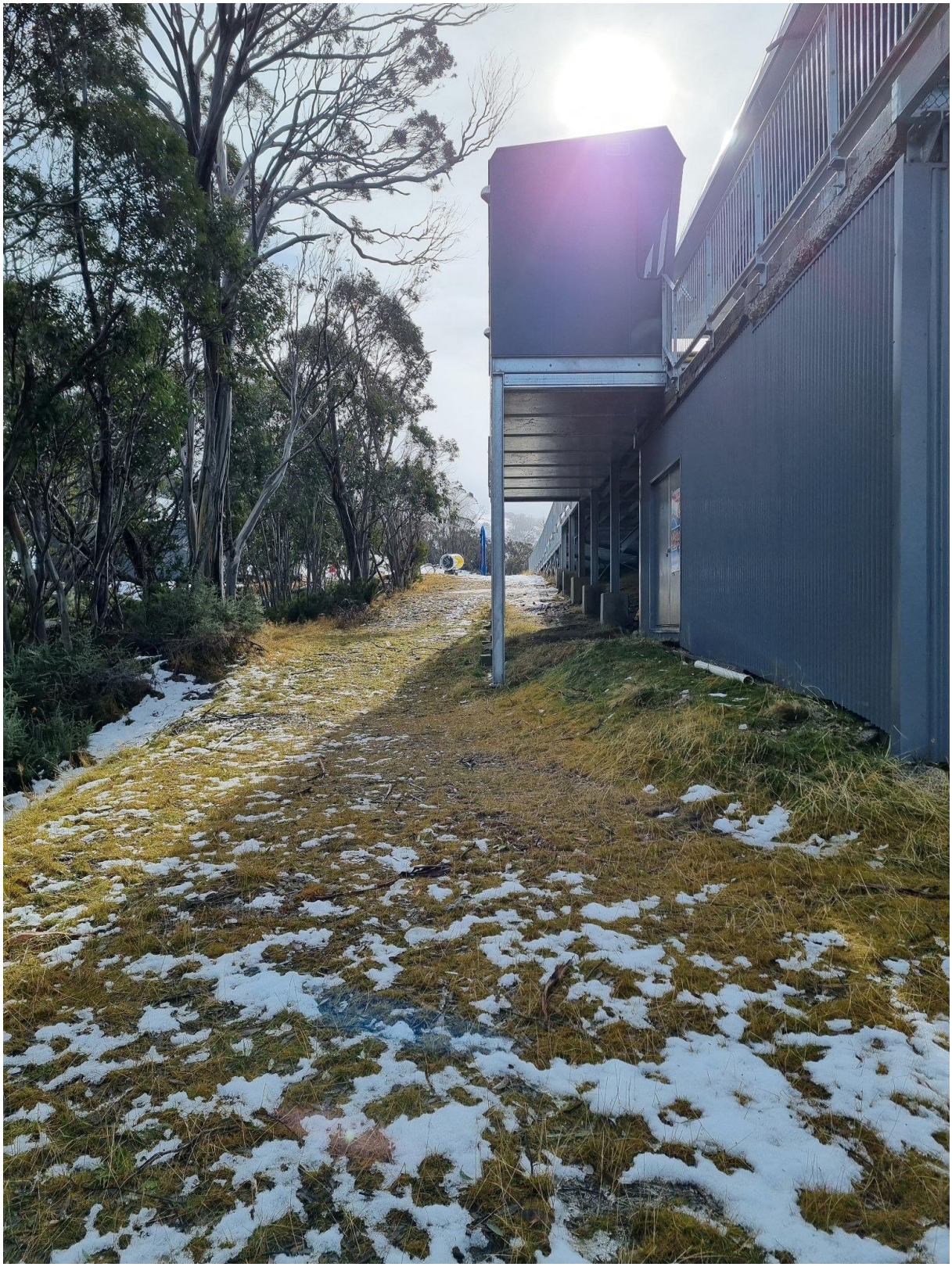

Photo 8 – diversion up cleared access track below gondola top station (source: Kosciuszko Thredbo Pty Ltd)

Important Information about your Geotechnical Report

Scope of Services

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client and Asset Geotechnical Engineering Pty Ltd ("Asset"), for the specific site investigated. The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

The report should not be used if there have been changes to the project, without first consulting with Asset to assess if the report's recommendations are still valid. Asset does not accept responsibility for problems that occur due to project changes if they are not consulted.

Reliance on Data

Asset has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps, and plans. Asset has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, Asset will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented, or otherwise not fully disclosed to Asset.

Geotechnical Engineering

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g., a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

Limitations of Site Investigation

The investigation program undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation program and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behavior regarding the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

Therefore, the recommendations in the report can only be regarded as preliminary. Asset should be retained during the project implementation to assess if the report's recommendations are valid and whether changes should be considered as the project proceeds.

Subsurface Conditions are Time Dependent

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. Asset should be kept appraised of any such events and should be consulted to determine if any additional tests are necessary.

Verification of Site Conditions

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that Asset be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience, and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

Reproduction of Reports

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included to minimize the likelihood of misinterpretation from logs.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Asset assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Asset or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

Data Must Not Be Separated from The Report

The report presents the site assessment and must not be copied in part or altered in any way.

Logs, figures, drawings, test results etc. included in our reports are developed by professionals based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These data should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Report Recommendations not Followed

Where the recommendations of the report are not followed or are only partially followed, there may be significant implications for the project (e.g., commercial loss, property loss or damage, personal injury, or loss of life). Consult Asset if you are not intending to follow all the report recommendations, to assess what the implications could be. Asset does not accept responsibility where the report recommendations have not been followed or have only been partially followed.

Other Limitations

Asset will not be liable to update or revise the report to consider any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.

Form 4 – Minimal Impact Certification

DA Number: _____

This form may be used where minor construction works which present minimal or no geotechnical impact on the site or related land are proposed to be erected within the "G" line area of the geotechnical maps.

A geotechnical engineer or engineering geologist must inspect the site and/or review the proposed development documentation to determine if the proposed development requires a geotechnical report to be prepared to accompany the development application. Where the geotechnical engineer determines that such a report is not required then they must complete this form and attach design recommendations where required. A copy of Form 4 with design recommendation, if required, must be submitted with the development application.

Please contact the Alpine Resorts Team in Jindabyne for further information - phone 02 6456 1733.

To complete this form, please place a cross in the appropriate boxes ☐ and complete all sections.

1. Declaration made by geotechnical engineer or engineering geologist in relation to a nil or minimal geotechnical impact assessment and site classification

I,

Mr ☒ Ms ☐ Mrs ☐ Dr ☐ Other ☐

First Name	Family Name
Mark	Bartel

OF

Company/organisation

AssetGeoEnviro

certify that I am a geotechnical engineer /engineering geologist as defined by the "Policy" and I have inspected the site and reviewed the proposed development known as

Harusch Walking Track, Thredbo NSW

As a result of my site inspection and review of the following documentation

(List of documentation reviewed)

Aerial photo showing marked-up route alignment, and various supplied site photos

Structural Plans for Harusch Stairs, Camstruct Consulting P/L; 23012-S01 to S04; rev 2; 10/8/2023

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Sheet No 5 of 9

I have determined that;

☐ ~~the current load-bearing capacity of the existing building will not be exceeded or adversely impacted by the proposed development, and~~ not applicable, no existing buildings

☒ the proposed works are of such a minor nature that the requirement for geotechnical advice in the form of a geotechnical report, prepared in accordance with the "Policy", is considered unnecessary for the adequate and safe design of the structural elements to be incorporated into the new works, and

☒ in accordance with AS 2870.1 Residential Slabs and Footings, the site is to be classified as a type

(insert classification type)

Class P - Problem Site (due to landslide risk mapping)

☒ I have attached design recommendations to be incorporated in the structural design in accordance with this site classification.

I am aware that this declaration shall be used by the Department as an essential component in granting development consent for a structure to be erected within the "G" line area (as identified on the geotechnical maps) of Kosciuszko Alpine Resorts without requiring the submission of a geotechnical report in support of the development application.

2. Signatures

Signature

Chartered professional status

CPEng 35641 NER (Civil)

Name

Mark Bartel

Date

3 October 2023

3. Contact details

Alpine Resorts Team
Shop 5A, 19 Snowy River Avenue
P O Box 36, JINDABYNE NSW 2627
Telephone: 02 6456 1733
Facsimile: 02 6456 1736
Email: alpineresorts@planning.nsw.gov.au