




EVT / Kosciuszko Thredbo Pty Ltd

Friday Flat & Middle Slopes Fan Gun Project Thredbo NSW

Geotechnical Assessment

Our ref: 6725-G1 Rev 1
23 March 2022

	Department of Planning and Environment
<i>Issued under the Environmental Planning and Assessment Act 1979</i>	
Approved Application No	DA 22/458
Granted on the	31 March 2022
Signed	S Butler
Sheet No	4 of 10

Your trusted engineering professionals

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

Friday Flat & Mid Slopes Fan Gun Project

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

(List of documentation reviewed) – and attached to the report

Friday Flat Fan Gun Project
Mid Slopes Fan Gun Project
Concrete Pit Plans by Techno Alpin

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
- ☒ 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'

- ☐ ~~I have attached design recommendations to be incorporated in the structural design in accordance with this site classification.~~ Not applicable, no structural design

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

Mark Bartel

Chartered professional status

CPEng 35641 NER (Civil)

Name

Mark Bartel

Date

23 March 2022

3. Contact details

Alpine Resorts Team

Shop 5A, 19 Snowy River Avenue

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Document Authorization

Prepared for EVT / Kosciuszko Thredbo Pty Ltd

Our ref: 6725-G1 REV 1

23 March 2022

For and on behalf of

AssetGeoEnviro



Mark Bartel

BE, MEngSc, GMQ, CPEng, RPEQ/NER(Civil), APEC IntPE(Aus)
Managing Director | Senior Principal Geotechnical Engineer

Document Control

Distribution Register

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2	Secure PDF	Mark Bartel	AssetGeoEnviro

Document Status

Rev	Revision Details	Author	Reviewer		Approved for Issue		
			Name	Initials	Name	Initials	Date
0	Initial issue	M. Bartel			M. Bartel	MAB	10 December 2022
1	Updated project description	M. Bartel			M. Bartel	MAB	23 March 2022



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Friday Flat Fan Gun Project
Middle Slopes Fan Guns
Concrete Pit Drawing by Techno Alpin

Appendices

- A Information Sheets
- B Site Photos

1. Introduction

This report presents the results of a geotechnical assessment for a proposed installation of snowmaking infrastructure and associated works at Friday Flat, Thredbo NSW (the Site). The assessment was commissioned by Mr Peter Fleming of EVT / Kosciuszko Thredbo Pty Ltd, purchase order KTM038806.

Documents supplied to us for this investigation comprised:

- Friday Flat Fan Gun Project (prepared by: Kosciuszko Thredbo Pty Ltd; undated; unreferenced) – attached.
- Mid Slopes Fan Gun Project (prepared by: Kosciuszko Thredbo Pty Ltd; undated; unreferenced) – attached.
- Drawing of Concrete Pit housing services beneath snow making gun (Techno Alpin) (attached).

We understand that the project involves:

Friday Flat:

- Removal of five (5) existing lance guns and pits;
- Installation of five (5) concrete pits and five (5) TT10 fan guns;
- Installation of three (3) retractable concrete pits for mobile fan guns;
- Installation of one (1) manual hydrant for mobile fan gun;
- Trench for electrical services; and
- Trench for new short lateral snowmaking pipe.

Mid Slopes:

- Installation of four (4) manual hydrants;
- Trench for electrical services; and
- Trench for new short lateral snowmaking pipe.

The electrical and snowmaking lateral trenches will be approximately 0.6m wide x 0.6-0.8m deep, and the concrete pits supporting the snowmaking guns will be 1.6m deep.

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 4 November 2021.
- 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 10° to 30° 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 35°, 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, north of the Alpine Way and north of the Thredbo River. The Friday Flat section is within gently sloping terrain with overall slopes of up to about 5 to 8°. The Mid Slopes section is located just beyond the ridge at the summit of the Sundowner Snowmaking extension, with slopes about 10°.

The alignment of the electrical trenching and the snowmaking pits are shown on the attached plans and will generally be on existing grass-covered ski slopes with occasional small shrubs.

Development of the ski slopes has involved some minor surficial reshaping and disturbance, typically relatively shallow (less than about 1m depth). No granite exposures were observed. Recent test pitting carried out within Friday Flat and for Sundowner Snowmaking Extension indicated 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 that might be encountered for some of the excavations for the concrete box supports for the snowmaking guns.

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

5. Discussions & Recommendations

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 previous test pitting observations by the undersigned 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 provided on the second page of this report.

The following recommendations are provided for the development:

- Based on our site observations and previous test pitting, 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.

- Excavation sides may be cut vertically for the trenches, up to maximum 1m depth. Excavation for the concrete boxes may also be cut vertically up to maximum 1.6m depth due to the limited lateral extent.
- Filling may comprise the excavated soils provided they are not too wet and do not contain too much organic matters that prevents achieving reasonable compaction levels. The fill should be placed in layers not more than 0.2m loose thickness and compacted using wheel roller on an excavator or other suitable compaction equipment (e.g. whacker-packer). Compaction should continue until no further subsidence or compression of the compacted surface is observed.

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.

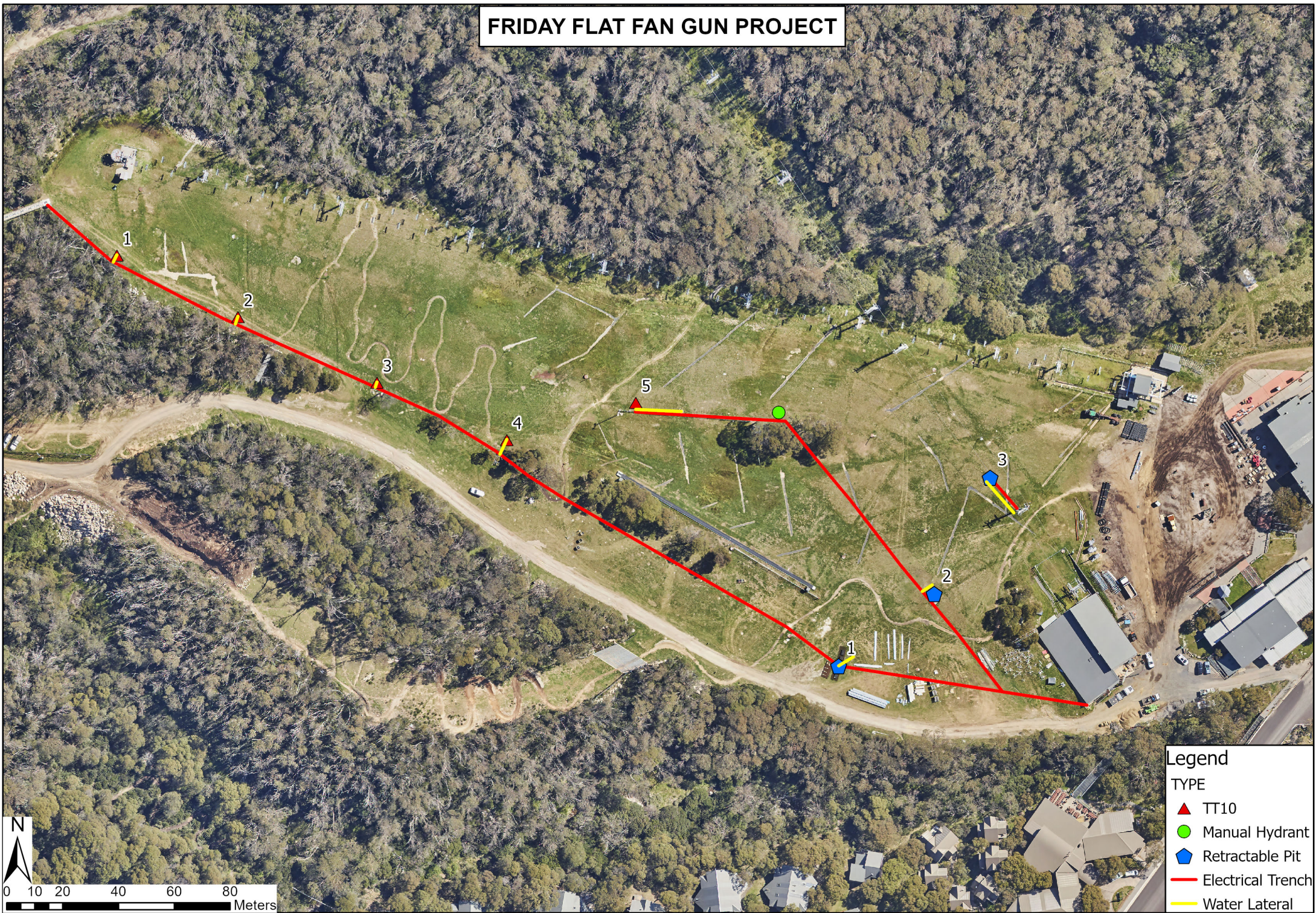
This report and details for the proposed development should be submitted to relevant regulatory authorities that have an interest in the property (e.g. Department of Planning) or are responsible for services that may be within or adjacent to the site for their review.

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.

Plans

Friday Flat Fan Gun Project
Middle Slopes Fan Gun Project
Concrete Pit Drawing by Techno Alpin

FRIDAY FLAT FAN GUN PROJECT



Legend

TYPE

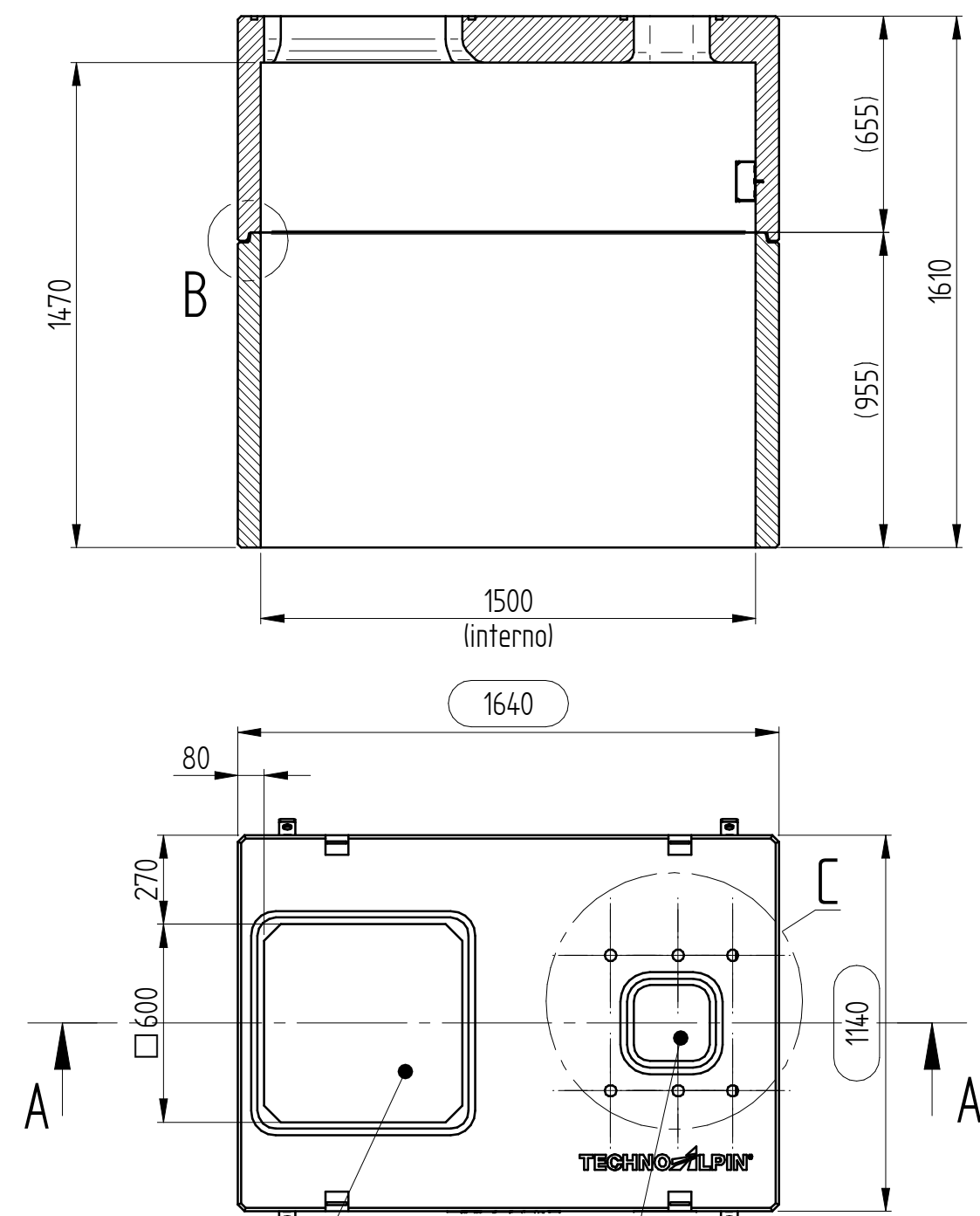
- ▲ TT10
- Manual Hydrant
- ⬠ Retractable Pit
- Electrical Trench
- Water Lateral

MIDDLE SLOPES FAN GUN PROJECT



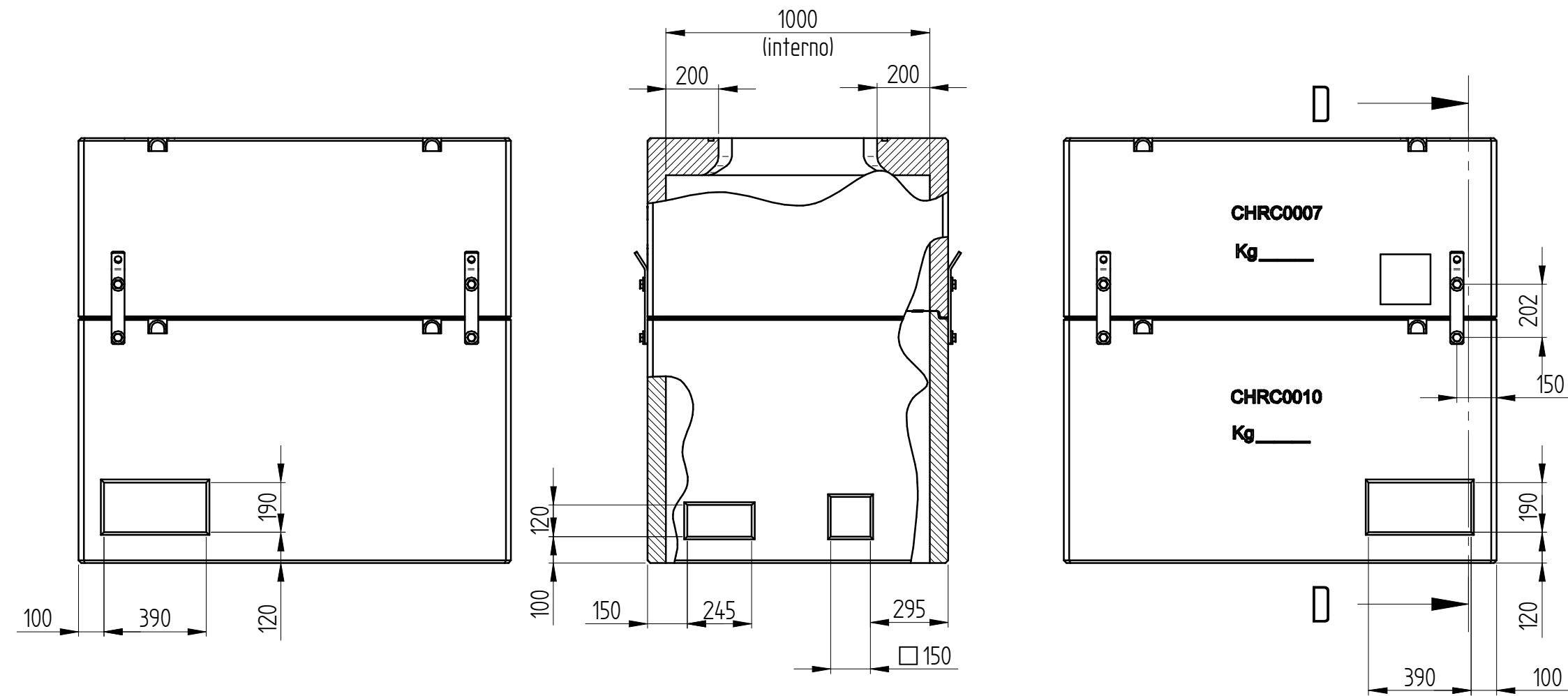
- Legend**
- Manual Hydrant
 - Electrical Trench
 - Water Lateral

Sez. A-A

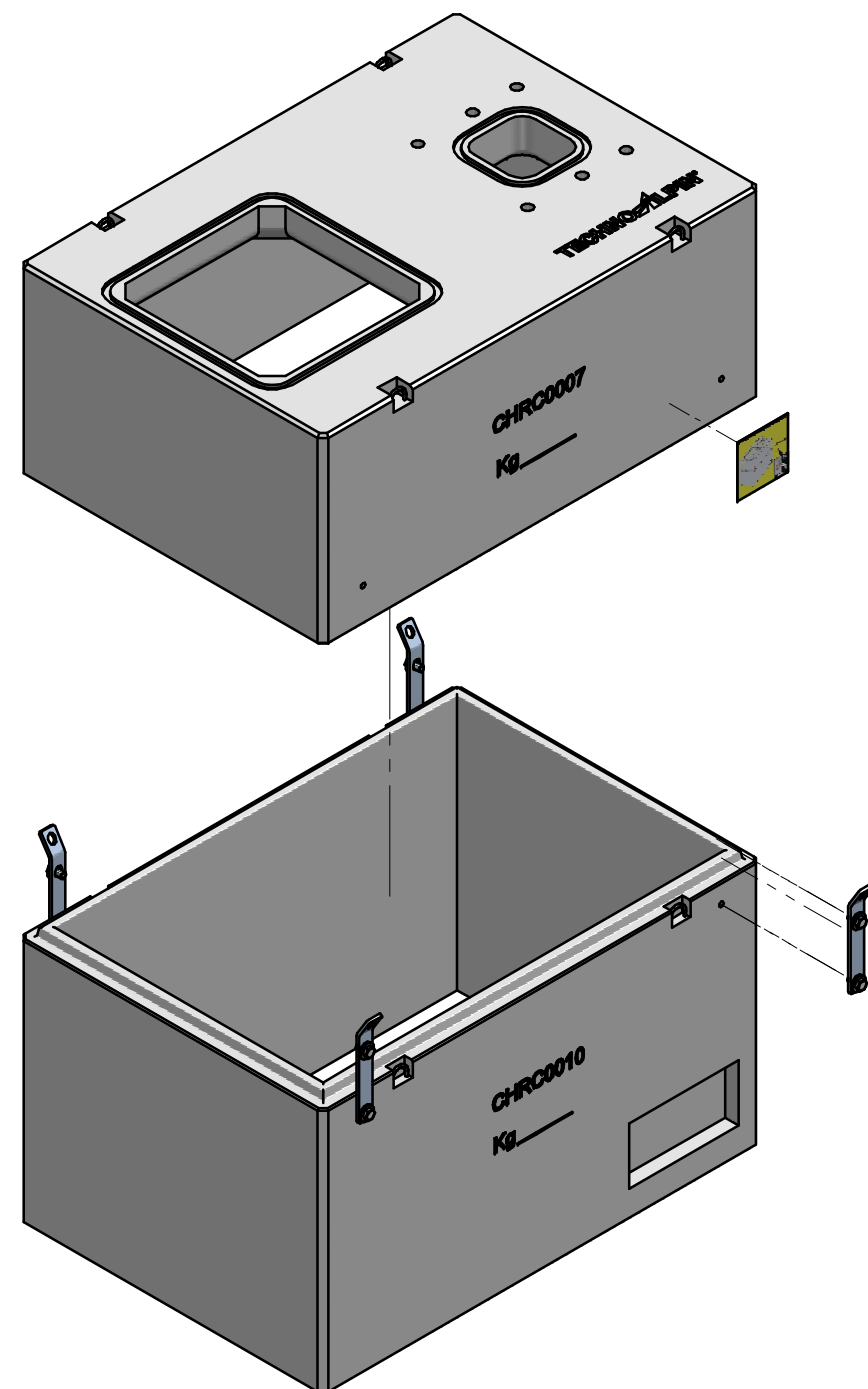
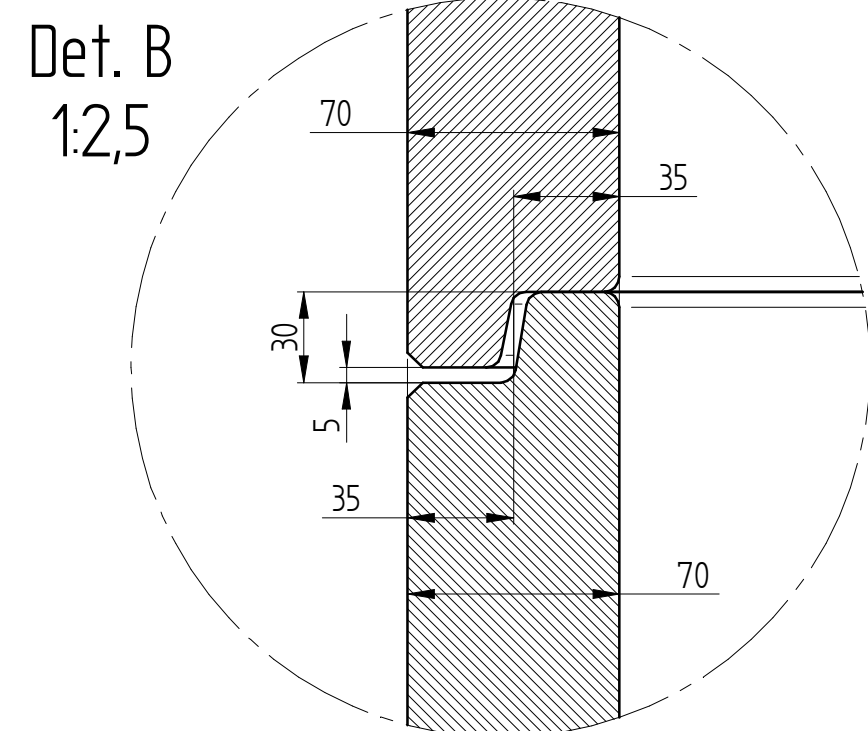
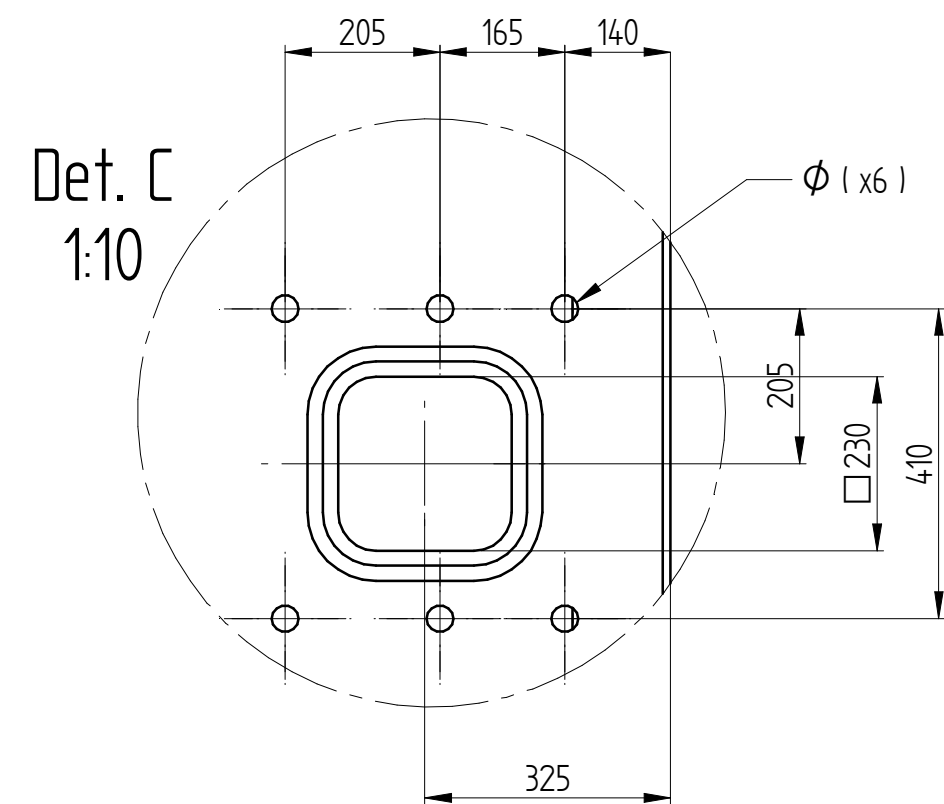


Einstiegs Luke
Chiusino
Entrance
Capot de regard

Lift 4.5m / Lanze / Turm 1.6m
Lift 4.5m / Lancia / Torre 1.6m
Lift 4.5m / Lance / Tower 1.6m
Lift 4.5m / Lance / Tour 1.6m



Sez. D-D



smooth surface treatment

7	SRD05040	00	Plug PVC 5mm with screw TGS 5 4,0x30	5
6	BL505016	00	Washer M5x15 ZN UNI 6593	5
5	SKEE1348	00	Wiring channel T1-N 120x60 grey RAL7030	10
4	PQSK0002	01	Sticker Pit indication for mounting	1
3	CHRC0012	00	Kit flange for pit complete	1
2	CHRC0007	01	Pit lid 2 entrances (reinforced) 600x600 H	1
1	CHRC0010	02	Pit lower part reinforced H	1
Pos.	Item	Rev.	Item description	Qty

[illegible]

Appendix A

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 with regard to 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 or not 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 apprised 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

This report is the subject of copyright and shall not be reproduced either totally or in part without the express permission of this Company. 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 in order 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 as a whole 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.

Partial Use of Report

Where the recommendations of the report are only partially followed, there may be significant implications for the project and could lead to problems. Consult Asset if you are not intending to follow all of the report recommendations, to assess what the implications could be. Asset does not accept responsibility for problems that develop where the report recommendations have only been partially followed if they have not been consulted.

Other Limitations

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

Appendix B

Site Photos



Photo 1

View of lower part of
Friday Flat
snowmaking.



Photo 2

Continuation of
previous photo in
panoramic sequence



Photo 3

Continuation of
previous photo in
panoramic sequence



Photo 4

Continuation of
previous photo in
panoramic
sequence.



Photo 5

Continuation of previous photo in panoramic sequence



Photo 6

Continuation of previous photo in panoramic sequence. Edge of concrete pit beneath snow making gun in foreground.



Photo 7
Example of
snowmaking gun on
top of concrete pit



Photo 8

View of ridgeline
looking towards
buildings – Mid
Slopes snowmaking.