Our ref: 7665-R1 Rev1
4 December 2024

assetgeoenviro
Suite 2.06 / 56 Delhi Road
North Ryde NSW 2113
02 9878 6005
assetgeoenviro.com.au

Kosciuszko Thredbo Pty Ltd
1 Friday Drive
Thredbo NSW 2625

Attention: Kyra O'Sullivan

Dear Kyra,

Proposed Sewer Main Rehabilitation, Thredbo Village NSW Geotechnical Assessment

1. Introduction

This report presents the results of a geotechnical assessment for Proposed Sewer Main Rehabilitation at Thredbo Village NSW (the Site). The assessment was commissioned by Kyra O'Sullivan of Kosciuszko Thredbo Pty Ltd.

Documents supplied to us for this assessment included the following documents.

- Site Plan for Thredbo Sewer Trunk Main Rehabilitation (prepared by Kosciuszko Thredbo Pty Ltd, revision B, dated 4 November 2024).
- Pit Levels for GIS2419 Sewer Main Rehabilitation (prepared by Kosciuszko Thredbo Pty Ltd, revision A, dated 1 November 2024).
- Trench Cross Section Plan – Sewer Line for Replacement, for GIS 2419 Sewer Main Rehabilitation (Prepared by Kosciuszko Thredbo Pty Ltd, reference GIS2419 Trench Cross Section, revision 1, dated 3 December 2024).

We understand the project involves replacing a 50m section (approximate length) of sewer pipe that has settled and caused misalignment. The approximate location of the section to be replaced in shown in the attached plans from Kosciuszko Thredbo Pty Ltd.

The existing sewer pipe is 300mm diameter concrete and will be replaced with a 300mm diameter PVC sewer pipe. The invert level of the pipe is at about 1.5m to 1.6m below ground level (bgl). Excavation to just below the invert level is needed to replace the section of sewer main.

The site is within the "G" area as per Department of Infrastructure, Planning and Natural Resources "Geotechnical Policy – Kosciuszko Alpine Resorts" (the Policy). However, the development is expected to be of minor impact as the project will involve relatively shallow temporary excavation of an existing trench and backfilling to reinstate. A full geotechnical report as per the Policy is therefore not needed.

2. Scope of Work

The objective of the Geotechnical Assessment is to provide information on the surface conditions and likely subsurface conditions, and to provide a Site Classification to AS2870-2011 'Residential Slabs and Footings' and a Form 4 certification with design recommendations.

The following scope of work was carried out to achieve the project objectives:

- A review of existing regional maps and reports relevant to the Site held within our files.
- Site observations by the undersigned, conducted on 3 October 2024.
- Review of supplied documents as listed above.
- Engineering assessment and reporting.

This report must be read in conjunction with the attached “Important Information about your Geotechnical Report” in Appendix A. Attention is drawn to the limitations inherent in site investigations and the importance of verifying the subsurface conditions inferred herein.

3. Regional Topography & Site Geology

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 1:250,000 Tallangatta Geological Map indicates the site is underlain by Silurian aged intrusive granite.

4. Site Observation

The sewer main runs within the lower part of a northerly facing side slope of a valley that flanks the Thredbo River. The sewer main alignment and the part to be replaced is shown in the attached plans supplied by Kosciuszko Thredbo Pty Ltd.

The ground surface over the part to be replaced slopes down to the north at an overall slope of about 5° where the sewer main is currently found, corresponding to a track that runs along the entire alignment. The slope becomes steeper to the north of the track, up to about 20° to 20°, and appears to be the edge of the original earthworks formed during installation of the sewer main and the access track. The ground surface flattens to about 10° to 5° beyond the toe of the fill batter.

Vegetation includes grass over the track, and medium thick to thick scrub and trees beyond the track.

Granite rock outcrop was seen on the southern side of the track in some locations, far away from the section to be replaced.

There are no major structures in the vicinity of the pipes.

There were no obvious signs of instability noted during the walkover assessment.

5. Discussions and Recommendations

The proposed work involves excavation of up to about 1.6m depth along a length of about 50m, in-between two manholes. The existing concrete pipe is to be removed, new bedding laid down, a new PVC pipe laid, and the trench backfilled. Other filling is not expected.

The proposed works will have 'minimal or no geotechnical impact' on the site, based on the generally relatively shallow depths of excavation required, and the lack of obvious signs of hillside instability observed or expected. 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, we expect that due to likely previous site disturbance, 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 fill and possibly completely weathered granite and cobbles and boulders. Excavation could be achieved by suitably sized excavator.
- Temporary excavation up to about 1.6m depth may be cut vertical and temporary support provided by proprietary or engineer-designed shoring boxes, as indicated in the attached trench cross section by Kosciuszko Thredbo Pty Ltd. The trench width to accommodate a DN300mm PVC pipe should be minimum 750mm and maximum 1000mm, to allow compaction of the backfill around the sides of the pipe.
- No permanent excavations are proposed.
- Filling should be placed in horizontal layers over prepared subgrade and compact as per Table 1.

Table 1 – Compaction Specifications

Parameter	Cohesive Fill	Non-Cohesive Fill
Fill layer thickness (loose measurement): • Within 1.5m of the rear of retaining walls • Elsewhere	 0.2m 0.3m	 0.2m 0.3m
Density: • Beneath Pavements or Landscaping • Beneath Structures • Upper 150mm of subgrade	 ≥ 95% Std ≥ 98% Std ≥ 100% Std	 ≥ 70% ID ≥ 80% ID ≥ 80% ID
Moisture content during compaction	± 2% of optimum	Moist but not wet

- Suitable fill beneath the pipe (bedding), and around the pipe (side support zone and overlay zone) should be a well-graded fine gravel or medium to coarse sand with some fines (not more than 10% passing a 75-micron sieve), such as a completely decomposed granite.
- Material from the excavation may be used as fill above the pipe bedding and surround.
- Subgrade for pipe laying should be prepared as follows:
    - Strip existing fill and topsoil. Remove unsuitable materials from the Site (e.g., material containing deleterious matter). Stockpile remainder for re-use as landscaping material or remove from site.
    - Excavate soils to design subgrade level, stockpiling for re-use as engineered fill or remove to spoil.

- Compact the upper 150mm depth to a dry density ratio (AS1289.5.4.1–2007) not less than 100% Standard.
- Areas which show visible heave under compaction equipment should be over-excavated a further 0.3m and replaced with approved fill compacted to a dry density ratio not less than 100%.

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 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.

❖❖❖

Please do not hesitate to contact the undersigned if you have any questions regarding this report or if you require further assistance.

For and on behalf of
AssetGeoEnviro

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
Site Plan – Thredbo Sewer Trunk Main Rehabilitation
Pit Levels – GIS2419 Sewer Main Rehabilitation
Trench Cross Section – Sewer Line for Replacement – GIS2419 Sewer Main Rehabilitation
Department of Planning & Environment Form 4

Document Control

Distribution Register

Copy	Media	Recipient	Location
1	Secure PDF	Kyra O'Sullivan	Kosciuszko Thredbo Pty Ltd
2	Secure PDF	Mark Bartel	Asset Geotechnical Engineering

Document Status

Rev	Revision Details	Date	Author	Reviewer	Approver
0	Initial issue	27 November 2024	AM		MAB
1	Client comment	4 December 2024	MAB		MAB

Suite 2.06 / 56 Delhi Road
North Ryde NSW 2113
02 9878 6005
assetgeoenviro.com.au

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

© Copyright Asset Geotechnical Engineering Pty Ltd. All rights reserved.

AssetGeoEnviro is a registered business name of Asset Geotechnical Engineering Pty Ltd (Asset). This Report has been prepared by Asset for its Client in accordance with a contract between Asset and its Client. The Report may only be used for the purpose for which it was commissioned and is subject to the terms of contract including terms limiting the liability of Asset. Unauthorised use of this document in any form whatsoever is prohibited. Any third party who seeks to rely on this Report without the express written consent of Asset does so entirely at their own risk, and, to the fullest extent permitted by law, Asset accepts no liability whatsoever in respect of any loss or damage suffered by any such third party.

Site Photos

Photo 1 – view of manhole at start of sewer section to be repaired.

Photo 2 – view of second manhole where sewer section is to be repaired.

Important Information about your Geotechnical Report

Scope of Services

The geotechnical report ("the report") was prepared in accordance with the contractual scope of services between the Client and AssetGeoEnviro ("Asset") for the specific site investigated. The scope of work may have been limited by factors like time, budget, access, or site disturbance.

Consult Asset before using the report if the project has changed. Asset won't be responsible for problems caused by project changes if not consulted.

Reliance on Data

Asset prepared the report using data provided by the Client and other individuals and organizations, including surveys, analyses, designs, maps, and plans. Asset has not verified the accuracy or completeness of the data except as stated in the report. Asset won't be liable for incorrect conclusions based on incorrect data, information, or conditions if they're concealed, withheld, misrepresented, or not fully disclosed.

Geotechnical Engineering

Geotechnical engineering heavily relies on judgment and opinion, making it less precise than other engineering disciplines. Reports are tailored to specific clients, projects, and needs, and may not be suitable for other clients or purposes. The report should only be used for its intended purpose unless additional geotechnical advice is obtained. If further geotechnical advice isn't obtained, the report can't be used if the proposed development's nature or details change.

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

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 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 organization 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 organization 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.

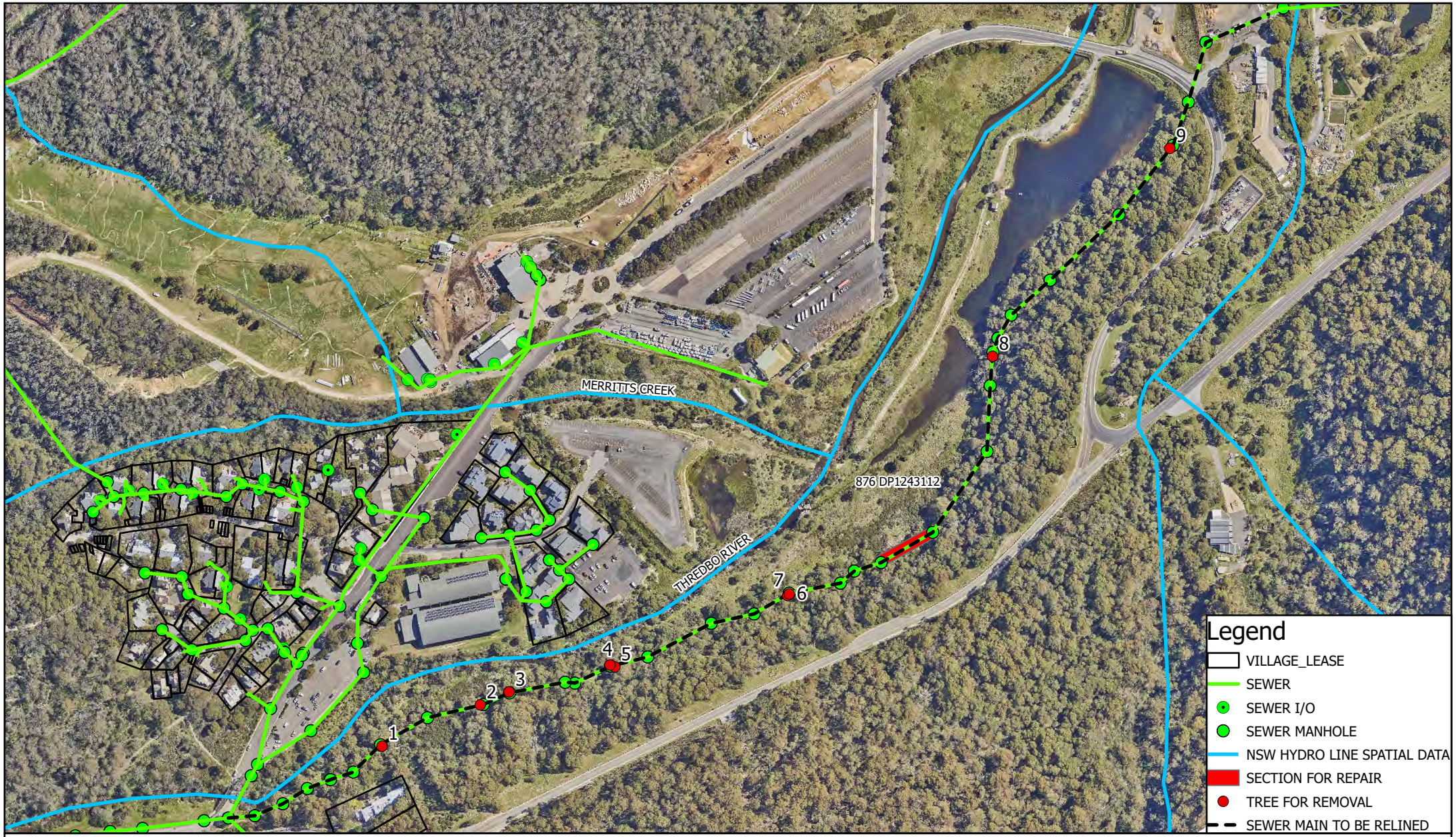
Logs, figures, drawings, test results etc. included in our reports are developed by professionals based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These data should not under any circumstances be redrawn for inclusion in other documents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

Report Recommendations not Followed

Where the report's recommendations are not followed, there may be significant implications for the project (e.g., commercial, property, personal, or life loss). Consult Asset if you don't intend to follow all the report recommendations. Asset won't accept responsibility if the report recommendations aren't 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.



Scale: 1:4,198

0 30 60 120 180 240 Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

N

THREDBO

SITE PLAN

Project: Thredbo Sewer Trunk Main Rehabilitation

Revision: B

Date: 4/11/2024

Produced By: KOS

Scale: 1:418

2.5 5 2.5 0 2.5 5 7.5 10

Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

THREDBO

PIT LEVELS

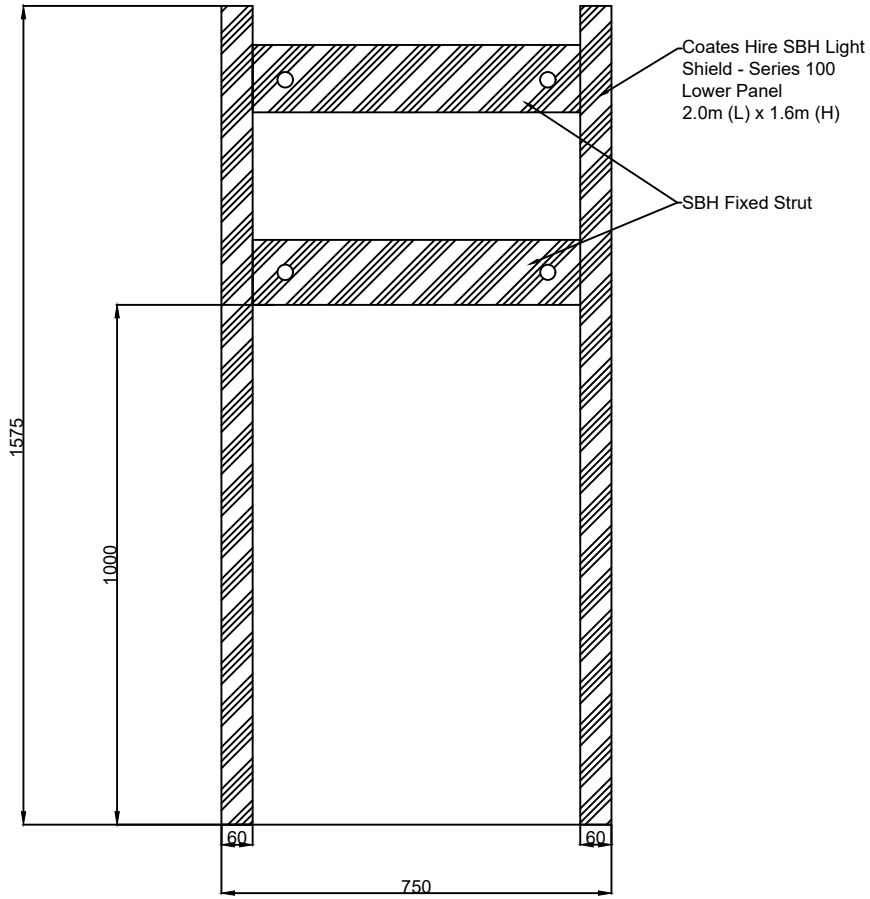
Project: GIS2419 Sewer Main Rehabilitation

Revision: A

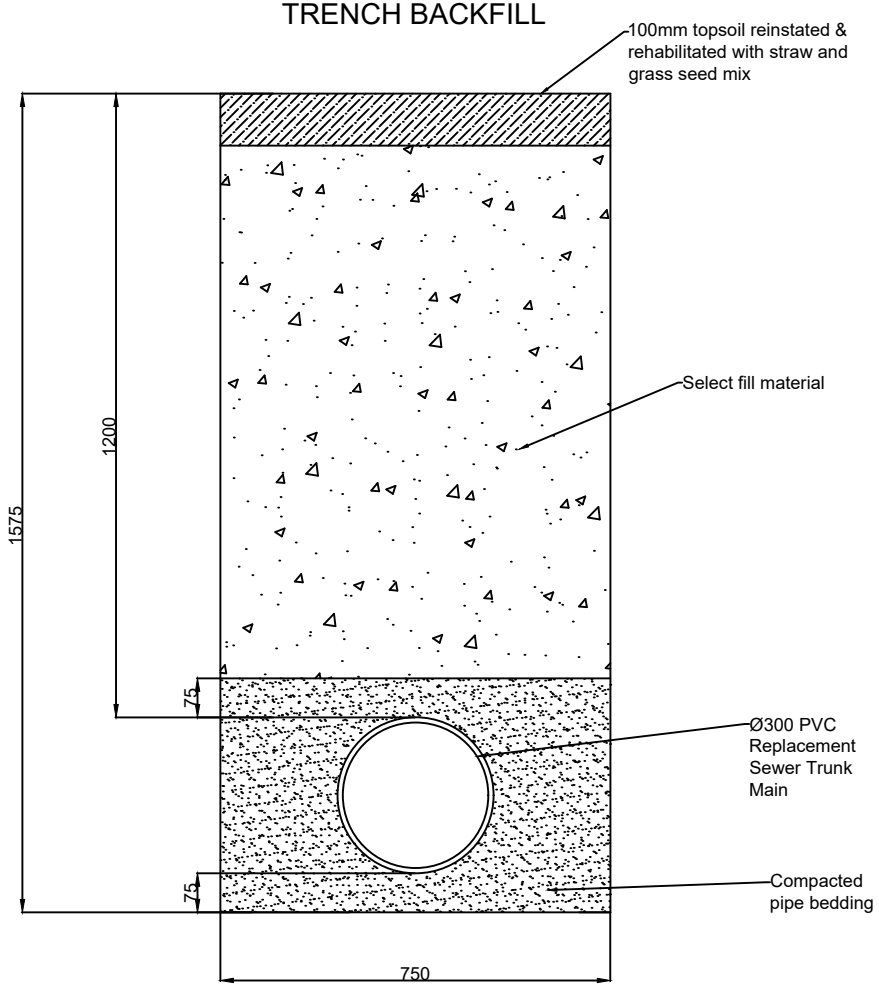
Date: 1/11/2024

Produced By: KOS

TRENCH SHORING



TRENCH BACKFILL



NOTES

1. Services backfill as per and AS 3500 - Plumbing and Drainage.
2. Overall trench depth will vary across length of pipeline from 1575 to 1650 mm.
3. Trench shoring will be installed as per manufacturer Operating & Safety Instructions and AS 4744.1 - 2000 - Steel shoring & trench lining equipment

DRAWING
Trench Cross Section - Sewer line for Replacement

PROJECT
GIS2419 - Thredbo Sewer Trunk Main Rehabilitation

THREDBO

REV	DATE	DESCRIPTION
0	06/11/24	Original for DA
1	03/12/24	Contractor markups

DESIGNED BY K. O'Sullivan	CHECKED BY E. Diver
SCALE 1:14.5	FILE NAME GIS2419 Trench Cross Section.dwg
SHEET 1/1	

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 [x] Ms ☐ Mrs ☐ Dr ☐ Other ☐

First Name	Family Name
Mark	Bartel

OF

Company/organisation

Asset Geotechnical Engineering Pty Ltd (trading as 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

Proposed Sewer Main Rehabilitation, Thredbo Village NSW

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

(List of documentation reviewed)

Site Plan for Thredbo Sewer Trunk Main Rehabilitation (prepared by Kosciuszko Thredbo Pty Ltd, revision B, dated 4 November 2024).
Pit Levels for GIS2419 Sewer Main Rehabilitation (prepared by Kosciuszko Thredbo Pty Ltd, revision A, dated 1 November 2024).
Trench Cross Section Plan – Sewer Line for Replacement, for GIS 2419 Sewer Main Rehabilitation (Prepared by Kosciuszko Thredbo Pty Ltd, reference GIS2419 Trench Cross Section, revision 1, dated 3 December 2024).

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.

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

4 December 2024

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