

Marlborough District Council

**Requirements for the Provision of
Geo-technical Reports**

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Introduction

The Geo-technical reporting requirements were introduced on 1st April 1999 and this is the first revision of that document. Investigation of and the reporting of geo-technical features is an exacting exercise requiring a blend of science and experience commensurate with the characteristics of a particular site.

While certain guidelines can be set out in the nature of minimum requirements the very nature of the task requires the achievement of such minima but an evaluation of the prevailing state, likely progression of that state, the best estimation of development impacts and matters of avoidance or mitigation.

Since 1999, as has been previously the case, knowledge has advanced and expectations increased making geo-technical evaluation more challenging if not more onerous. Because of the mix of “science and art” a Provider has to keep in mind the best estimate of the limits of skill or resource able to be applied in a particular instance. All parties interested in the outcome and not the least Council expect that an appropriate level of judgement will apply to all facets of a particular geo-technical investigation.

Purpose

Council has a duty under both the Resource Management and the Building Acts to assess applications for consents pursuant to those Acts. The geology of a particular location can be a determining factor as to the ability of a proposal to meet the needs of a proponent and discharge the obligations imposed on Council. It is necessary therefore to set out Council’s expectations and the reliance it places on the information provided in geo-technical evaluations so that this is understood and appreciated by a Provider.

Accordingly, Objectives Policies and Methods are set out below to assist in shaping and directing an investigation as to its scale and nature, in the understanding of Council’s reliance on those investigations.

Objectives

Geo-technical reporting will have as its objective the recording of the geophysical character of a site including the consequences of adverse climatic events, to enable reasoned projections to be made as to possible outcomes in both undeveloped and developed states.

Policies

Council sets the following Policies for the purpose of achieving the Objectives

Policy 1 – Standards for Providers

Providers of geo-technical reports will be Chartered Professional Engineers currently (at the time of adopting this version of the Policy) registered pursuant to the Chartered Professional Engineers Registration Act 2002. They will be recognised as having special expertise in geo-technical engineering: or, they are recognised as having expertise in civil engineering and are currently accredited by Council as a Provider for the purposes of geo-technical reporting.

Providing that other tertiary trained persons specialising in geo-technical engineering may be acceptable if their request for accreditation is supported by a Practitioner who meets the above standard or is a Practitioner in the profession of geo-technical engineering having a standing recognised by that profession.

A Provider, to remain accredited, shall hold Professional Indemnity Insurance at all times. The amount of cover is to be commensurate with the scale of work undertaken. Confirmation from the covering insurer that cover is held is required to be provided in the first instance and should there be any reduction or cessation of cover details of any change are to be conveyed to Council at the earliest instance.

Policy 2 - Responsibilities for Investigations

Fieldwork is to be the direct responsibility of the person or organisation recognised by Council. That person or organisation will direct the extent and degree of investigation.

Policy 3 - Physical Investigations

Fieldwork will include as a minimum, subsurface evaluation of subsoil profiles by quantitative sampling the results of these to be detailed in the Report. Each proposal is expected to have at least three inspection bores in other than exceptional circumstances. In the event that subsoil investigations are not carried out documentation shall include reasons for not carrying out the examination. Council reserves the right to not accept a geo-technical report not supported by subsurface evaluations.

Policy 4 – Opinions

A Provider’s Opinion in respect of a proposal **shall** take the shape and form as the Model Opinion set out elsewhere in this document. It can be expected that more likely than not any departure will be rejected. If a Provider believes there is a special circumstance then the Manager of the Regulatory Department should be apprised of relevant details at the earliest opportunity. Delays can be expected as the implications of a particular instance are worked through.

Council reserves the right to have any Opinion or Site Report peer reviewed at no cost to an applicant in any particular instance. If it believes on the grounds of the observations of the Peer Reviewer there are matters of concern then all costs of any consequent discussion or review of any further documentation will fall to the Applicant.

Costs in this context will be the cost of staff time and disbursements including the retaining of Peer Reviewers.

Policy 5 –Reports

A “Good Practice” model **Report** is set out elsewhere in this document for Providers to follow as it is considered such a structure assists in interpretation by Council Staff or Council’s Advisers and will perhaps assist Providers in addressing all aspects of a proposal.

A Provider may elect to follow their own report format but in any event the matters described in the model **Report** must be clearly evident in a report to be acceptable. If the matters identified in the Model Report are either not traversed in substance or discounted for valid technical reasons then it will be probable that the Report will not be accepted or, alternatively, it may be required to be peer reviewed at the Applicant’s cost.

When risk matters are evaluated in a report then the terminology used will be assumed to be consistent with matrix detailed in the Appendix. If the Provider uses some other method of rating risk in qualitative terms then the risk matrix is to form part of the documentation.

Providers should make their Clients aware of the outcomes if their intention is to not address investigations in the manner envisaged by the Model Report.

Policy 6 – Use of Providers Opinions and Reports

The provision of the required statement of professional opinion and related reports is regarded as an acknowledgement that the Provider understands that the purpose and use of such documentation is for decision making to enable Council to discharge its statutory obligations in the particular instance.

A Provider cannot reserve any rights as to the access to such Opinions or Reports lodged as part of a regulatory process administered by Council.

A Provider may impose a “life” on an Opinion or Site Report and in such instance the Provider should make their Client aware of such limitations.

In every case a Site Report and Opinion will be presumed to be that of the presenting Provider. In the event the work of another Provider is referred to or incorporated in some manner it will be taken that the presenting Provider has made all necessary investigations and calculations as to support the subsumed report. There will be no assignment to or reliance upon an Opinion of a third party without the express written concurrence of the third party.

Policy 7 – Quality Control

As a general practice and without notice peer reviews of documentation provided will be made. This is to ensure that Providers are observing appropriate standards of practice. The Peer Reviewer will observe any professional or ethical requirements required of a particular body to which the Reviewer belongs. Details of the Peer Reviewer observations will be given to the particular Provider.

Methods

To achieve the Objectives and Policies set out above it is expected that at least the following methods will be employed given that any particular instance may reasonably require additional methods or procedures to provide a best practice representation of the geophysical state prevailing in a particular instance.

Method 1

Conduct site investigations using procedures and practices appropriate to the scale and nature of the intended activity.

Method 2

Documentation shall follow the report format and the model form of Opinion set out below unless otherwise approved. (The Policy provides for departure from the Model Report format but this is qualified and a Provider must evaluate any particular consequences).

Risk Characterisation

A very difficult aspect of geo-technical work is assessment of and the communication of risk. Council has implemented and is working towards an organisational risk management regime. While there will be an increasing conformity of the concept of risk within Council, in time, unless a declared framework is made available there is a potential for misunderstanding through the lack of a common linguistic standard.

A table setting out a risk matrix for geo-technical matters is detailed in Appendix I. It is expected that a Provider will use this matrix when expressing an opinion as to possible risk. Should a Provider have difficulty with this matrix that difficulty should be canvassed and the distinction(s) elaborated.

Relationship with the RMA

A geo-technical report is a stand-alone document with its focus to be entirely on geo-technical matters. It is to stand apart from an Assessment of Environmental Effects (AEE) supporting a Resource Consent application albeit the latter document may import or otherwise refer to the geo-technical documentation. An AEE document is prepared for a different purpose and requires to be constructed in terms of the Resource Management Act’s objectives and purposes.

Model Documents

Opinion

All geo-technical **Reports** required by consent conditions or supporting applications for consents shall be accompanied by an “**Opinion**” in the model format.

Purpose of complying with the Format

The purpose of using the model format is to ensure the **Provider** understands there will be explicit reliance on **Opinion’s** and **Reports** to enable Council to discharge its statutory functions. Further, the **Provider** is confirming that the necessary skills have been exercised with due regard for the technical complexity of the matter under consideration.

Each **Opinion** *shall be specifically drafted* upon due consideration of the conclusions of the **Report**.

Reports

The purpose of a Report is to record factual geologic, geomorphologic and cultural features present, at the site specifically, and to the extent beyond the site as may be relevant. The **Opinion** will draw conclusions about features noted and their relevance in the instance, specify measures and set conditions appropriate to the proposal.

An example of what a geo-technical report **is not** is the following –

Geotechnical Assessment

We did not note from the cut banks at the vicinity of the site and inspection of roading and buildings on the subject site any evidence of soil instability.

Format of Reports

The following format is preferred as it provides a structured approach to presenting information, which if used consistently improves the communication of information between **Providers** and Council’s staff. The following is indicative of what a **Report** expected to address.

A – Synopsis

1 Scope of the investigation

This Section details the basis for the investigative engagement and any imposed constraints that may have a material bearing on the conclusions. The Investigator would detail any matters that might have been excluded from consideration given the terms of engagement.

2 Summary and Conclusions

The Investigator synthesises the details of the site investigations then draws conclusions as to possible or necessary constraints. This section may optionally be at the foot of the report if preferred.

3 Recommendations

Details desirable or necessary actions or controls that would arise from the Conclusions in terms of a specific proposal or details limitations as to any extrapolation of the findings that might be permitted. Suggestions as to possible consent conditions and monitoring programs would be framed here. This section may optionally be at the foot of the report if preferred

B – Report

1 Introduction

An optional Section the content being determined on a case basis by the Provider.

2 Site Description

This will specifically address the geological and geomorphologic characteristics of the site in particular and to such further extent that judgement indicates is relevant to the site. It will describe surface water patterns, surface expressions of subsoil disturbance and lithological boundaries for instance. This information will be presented on scale drawings in accordance with conventional mapping practice.

3 Geotechnical Investigations

All sites investigated will have at least three subsurface inspections to a depth consistent with the intended development needs and the details logged and included in the Report. Profiling the soil formation with a Scala penetrometer, only, is considered to be appropriate in only the very simplest of cases.

It will be generally expected that describing and the characterisation of the soil profile will include an evaluation of shear values, for appropriate soils, following the practice guide of the New Zealand Geotechnical Society. It should be clear when reporting results whether they are field or factored values. Inspection sites will be spatially located with geo-reference measurements recorded and shown on a scale plan. Lithological descriptions and classifications shall follow that of the New Zealand Geotechnical Society recommendations¹.

Where water or wastewater is to be discharged on site particular regard is to be had for the possible change in material strengths and likely changes to structural performance and any long-term effects.

4 Geotechnical Assessment

This section will evaluate and weigh the matters identified or determined as arising from the site investigation and properties and characteristics of constituent materials. There will be evaluation of short and long-term processes as the site exists at the time of investigation and any particular sensitivity of constituent materials.

5 Development Impact

In terms of the scope of the investigation and the Provider's understanding of what is proposed then the effects of development are canvassed and their consequences for the development, in terms of the site features and characteristics, is detailed. For instance effects of waterways either as they are or proposed to be modified, introduction or concentration of waste or storm-water both on and off site, seismic and gravitational effects, stability of cuts and requirements for fill. Such other pertinent to the particular proposal that sound geo-technical practice would indicate a need to be addressed.

6 Control or Implementation Measures

The Provider canvasses the consequences of development and details the need for control or management of inherent features to ensure the satisfactory long-term performance of the development as well as such introduced elements necessary to avoid or mitigate effects both on and off site.

7 Management Plans

These will arise out of the consideration of the Control and Implementation measures in the geo-technical context and would include setting performance standards, which would form the basis of performance conditions.

8 References

C - Maps & Plans

1 Location Plans and Details

A scale plan or plans geo-referencing the area investigated including cadastre is to be provided. These plans will be prepared using the same standard of drafting used in the preparation of construction or consents documents. Applications presenting with poorly drafted freehand diagrams can be expected to be rejected.

At all times it must be possible to determine the location of the essential elements either in respect of the investigations or proposed development features without scaling.

2 Detailed Plans

All features either inherent and relevant to the investigation (eg Inspection /Test holes) or recommended shall be geo-referenced and to scale so that subsequent processes (eg Building Consents, Resource Consents) can determine their location without scaling. It includes geological cross-sections depicting lithology and slopes in sufficient detail so as to convey a description of the site slopes. Any features considered to be of relevance for the site but not on the site shall be identified and geo-referenced

Appendix I – Risk Terminology

Geo-technical Risk Matrix

		Consequence		Likelihood		
		No risk to life, minor financial loss (<\$5k). Potential for small-scale instability only.	No risk to life, minor financial loss (<\$50k). Potential for small-scale instability only.	Very low risk to life, moderate damage and financial loss (<\$150k). Potential for moderate scale instability.	Low risk for loss of life, significant damage and financial loss (<\$500k). Potential for large-scale instability.	High risk for loss of life, extensive and significant damage and financial loss (>\$500k). Potential for large-scale instability.
Almost Certain	Extensive evidence of active creep and active instability. Steep Slope	M	H	H	E	E
Likely	Evidence of active creep and/or historic instability. Steep to moderate Slopes	M	M	H	H	E
Moderate	Evidence of historic soil creep and/ historic instability. Steep to moderate slopes	L	M	M	H	H
Unlikely	No evidence of soil creep or historic instability, but evidence of instability on similar slopes. Moderate slopes	L	L	L	M	H

Appendix II – Model Opinion

Opinion as to Land Stability.

Description of Work :

.....
I (insert full name)
.....

Hereby confirm that:

I am experienced in the field of **soils engineering** and more particularly **land and foundation stability** and am formally recognised by the Marlborough District Council. I am familiar with and understand the purpose of the Marlborough District Council's geo-technical reporting standards. This professional opinion is furnished to the Marlborough District Council. **(State purpose of report).**

NB: Where this opinion is also based on reliance on previous plans and reports by others then these should be referred to.

A site investigation report formatted as required is attached.

AND

Site investigations have been carried out under my direction and are described in our site investigation report(s) dated [**provide dates**] The following professional opinion is based on the assumption that the data obtained from these investigations is representative of the whole area under consideration. In my professional opinion having examined the site it is reasonable for Council to assume that the data referred to above is representative of the whole area under consideration.

In my professional opinion and having regard to the specifics of the site which I have investigated to the extent that acceptable engineering practices require, the plans and specifications are in accordance with acceptable engineering principles and practices and that a construction in accordance with such plans and specifications will meet proper engineering standards.

NB: Special requirements to be set out here for the design and/or supervision of the works including matters that Council should be aware of for the administration of its Statutory obligations and its Bylaws. Where this opinion relies on previous plans and reports by others then these are to be referred to.

OR

In my professional opinion and having regard to the specifics of the site which I have investigated to the extent that acceptable engineering practices require giving due regard to acceptable engineering principles and practices for land slope and foundation stability (**describe proposal**), then, providing that the recommendations in our accompanying report (**give description of report and plans**) [**insert the nature of controls to be complied with**] [**Complete Opinion**].

Appendix III - Interpretation

Absolute safety	Occurs where the probability of a Hazard occurring is zero. (See Safety)
Certificate	A specific document irrespective of form that attests to the Certifier's best endeavours to fairly state a situation and upon which Council may rely
Certification	See Certificate
Certified	See Certificate
Certifier	A person or Organisation accredited for the purpose of supplying Certification to Council
Chartered Professional Engineer	A Tertiary trained person who is registered in terms of the Chartered Professional Engineers Act 2002
Report	A report following the prescribed format setting out investigations and the results thereof pertinent to the production of a Certificate.
Hazard	Potential cause of human, social, environmental or economic harm. (Compare Risk)
Officer's Report	A report prepared by a Council Staff member identifying relevant issues and conclusions drawn there from, in the context of the empowering legislation and Councils Policies.
Opinion.	An approved form of certification used in matters relating to land stability
Peer Reviewer	A person having professional experience in matters pertinent to the context and having an acknowledged standing in the exercise of that profession by the members of that profession.
Producer	Provider of a Producer Statement for the purposes of the Building Act 1991
Producer Statement	Refer to the Building Act 1991, "Interpretation"
Provider	A person or organisation approved by Council for the purpose of issuing Certificates, Opinions or Producer Statements.
Registered Engineer	A Tertiary trained person who is registered in terms of the Engineers Registration Act 1924 (Repealed)
Risk	Probability of a specified loss or harm times its adverse consequences. (Compare Hazard)
Safety	Relative protection from adverse consequences. (See Absolute Safety)
Soils Engineering	A systematic evaluation of the geophysical factors prevailing at a site and the interpretation of those factors.
Standing Orders	New Zealand Standard 9202:1989 Model Standing Orders

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Endnotes

ⁱ The New Zealand Geo-technical Society *Guidelines for the description of soils and rocks in engineering use* is indicated as the preferred method of soils classification. There will be instances where especial consideration of soil properties will be made for the purposes of wastewater disposal. AS/NZ 1547:2000 *On-site domestic wastewater management* similarly provides a classification system. The first reference has the merit of providing a common terminology for engineers from the more general civil discipline versus the specialised geo-technical practitioner. The AS/NZ Standard on the other hand has been developed to focus on soil properties of particular relevance to behaviour responding to the introduction of wastewater. It is noted that the recently released NZS 1170.5 Supp: 2004 “Structural Design Actions” indicates the use of the above publication for classifying soils in respect of its purposes.

The ordinary course considered appropriate is that if so required both systems would be employed to ensure the maximising of the information content. If a practitioner feels that in the light of the particular skill and experience applying then as a matter of judgement one method of classification may be sufficient. It will be important to state within the Site Report what methodology is adopted given the base assumption from a Council Officer perspective that in the instance the expectation will be that the NZGS guideline will apply generally and AS/NZ Standard will be used for the purpose of that Standard.