Government of Western Australia
Department of Transport
and Major Infrastructure

Empowering a thriving community

Generic Geotechnical and Geophysical Investigation Scope

Generic Geotechnical and Geophysical Investigation Scope

Prepared for Department of Transport and Major Infrastructure (DTMI)

Prepared by W Gardiner & T Hunt of M P Rogers & Associates Pty Ltd

Date 15/05/2025

Version control

Version No.	Date	Prepared by	Revision or issue descriptions	Issues to
Draft	10/04/2025	M P Rogers & Associates	Combined Draft for DoT review.	DoT
0	15/05/2025	M P Rogers & Associates	Updated with Client comments and issued for Client use.	DoT
1	9/06/2025	DoT	Additional updates from internal review	DTMI

Amendment record

This guidelines document is reviewed to ensure its continuing relevance to the systems and process that it describes. A record of contextual revisions is listed in the following table.

Page No.	Context	Revision	Date

Contents

Note

[A geotechnical or geophysical investigation would likely be conducted as a one-off to capture the sub-surface features of a site. This can be used to assist with future management and monitoring requirements, as well as design of coastal structures or works.

Requirements of the LGA will determine if a geotechnical or geophysical investigation is required. Generally, a geotechnical investigation is used for design of structures including coastal protection structures. A geophysical investigation may be used for mapping subsurface features, like the location of subsurface rock used for planning and management purposes. Geophysical surveying can also be supplemented by geotechnical surveying for ground truthing purposes.

The LGA will need to understand their requirements and adjust this scope as required.]

Formatting Key

[Throughout this template three text colours have been used to distinguish between the following items.]

1. Required content.
2. [Guidance notes for the user to be deleted prior to use.]
3. Example text to be edited by the user prior to use.

Conditions of Use

The Maritime Directorate of DTMI provides this coastal monitoring template for use by coastal managers subject to the following Conditions of Use:

1. This template is provided in good faith and believed to be suitable to enable a coastal manager to apply and amend where directed to fit the purpose described. The Department does not provide any warranty as to the accuracy of any information therein nor as to its reliability. No person or corporation should act solely on the provided information without considering, and, if necessary, seeking verification of the provided information from an industry expert on the topic.
2. Neither DTMI nor any member officer or employee undertakes responsibility in any way whatsoever to any person or corporation in respect of the information provided and any new information attained after using this template, including any errors, omissions, and/or damages therein however caused, whether through negligence or otherwise.
3. DTMI and all its member officers and employees expressly disclaim all and any liability to any person or corporation into whose hands the provided information and any new information attained after using this template may come, whether as purchased or otherwise, in respect of anything and of the consequences of anything done or omitted to be done by any such person or corporation in reliance in whole or part upon the whole or any part of the information provided.
4. If this template supplied is used in any publication, the Department shall be acknowledged as a contributing party in respect to procurement of the service published or reported.

Aim / Objectives

[A geotechnical investigation aims to determine the subsurface soil and rock properties for the design and construction of proposed structures.

A geophysical investigation aims to map and image subsurface features for site characterisation and anomaly detection used for planning and management purposes. Geophysical surveying can also be supplemented by geotechnical surveying for ground truthing purposes.

The selection of the investigation type is required by the LGA, both types of investigation can be utilised at the same time depending on requirements.]

The aim of this geotechnical and/or geophysical investigation is to determine the subsurface soil and rock properties for the design and construction of proposed structures and/or to map and image subsurface features for site characterisation to determine its influence on coastal processes. The objectives and purpose of this geotechnical and/or geophysical investigation are as follows.

Geotechnical

- Identify subsurface soil and rock conditions, layer properties and thickness.
- Determine and provide recommendations on any required ground improvement or foundation design.
- Assess suitability of the site for proposed construction.
- Ground truth geophysical survey data.

Geophysical

- Identify subsurface stratigraphy and structural features.
- Determine the presence of any subsurface anomalies.
- Map the location and level of subsurface rock through the study area.
- Ground truth topographic survey and ground levels during the investigation.

Extent

[Provide a map outlining the area(s) to be investigated.]

The LGA manages approximately XX km of coast, stretching from XX to XX. Within this section of the coast, the LGA requires geotechnical and/or geophysical investigations for the whole coastline / the following areas.

- Area one. [Include the LGAs specific locations]
- Area two.
- Area three.

The location of these areas can be found in the following figure.

Figure 1 Areas for Geotechnical /(and) Geophysical Investigation(s). [Example location from Horrocks.]

Background

[Provide brief background for each area if required, including information such as:

- The purpose of the investigation.
- Known geological conditions.
- Details of any previous site investigations.
- Known geotechnical or geophysical concerns.
- Any other relevant information the LGA can provide.

The background of an example area is included below.]

The sites to be investigated are currently managed by the LGA [and other relevant owners, occupiers, or managers where relevant] with relevant details outlined below.

Generic Example

In XXX there have been rock shelves identified in certain locations along the sandy beach fronting XXX. The geological conditions along this coast require further analysis to understand the location, extent and properties of any underlying rock. This will allow for future coastal monitoring and management of the area to be appropriately informed and provide data to assist with possible design of future coastal structures.

[Include other areas if required]

Tasks

[The tasks outlined in this section detail the required components of the investigations.]

The following tasks are required to be completed by the Consultant as part of the investigations.

1. Task 1 – Preliminary Investigation.
2. Task 2 – Field Investigation.
3. Task 3 – Laboratory Testing (if applicable).
4. Task 4 – Data Processing and Interpretation.
5. Task 5 – Assessment and Reporting.

Task 1 – Preliminary Investigation

[The Consultant should review existing information and confirm access requirements. This should include reviewing geological and geotechnical information and identifying surface conditions.]

The Consultant is required to review background information including existing geological, geotechnical, and geophysical information. The Consultant will also be required to confirm any access requirements and gain approvals to conduct the testing.

Task 2 – Field Investigation

[The Consultant should perform field investigations including drilling, sampling, in-situ testing and geophysical investigations as required.]

The Consultant is required to perform field investigations to generate required outputs. The consultant will be required to confirm investigation levels to Australian Height Datum (AHD) while conducting the field investigations. The field investigation could include one or more of the following components.

Geotechnical Investigations

- Drilling and sampling including boreholes at strategic locations plus soil and rock samples for laboratory analysis.
- In-situ testing including performing Standard Penetration Tests (SPT), Conduct Cone Penetration Tests (CPT), shear tests and permeability tests as required.
- Monitoring wells.

Geophysical Investigations

- Seismic surveys.
- Electrical resistivity.
- Ground Penetrating Radar (GPR).
- Magnetic and gravity Surveys.

Task 3 – Laboratory Testing (if applicable)

[If required the Consultant can conduct laboratory testing on collected samples to determine various properties such as grain size distribution, moisture content, and shear strength.]

The laboratory testing could include the following tests.

- Grain size distribution.
- Atterberg limits.
- Moisture content.

- Density.
- Shear strength parameters.
- Consolidation tests.

Task 4 – Data Processing and Interpretation

[The Consultant should process and interpret data obtained from the field and laboratory investigations to develop a comprehensive understanding of subsurface conditions.]

The Consultant is required to analyse all collected data to provide clear representation of the results. This is likely to include the following aspects.

- Process raw geophysical data using specialised software (if applicable).
- Interpret field and laboratory data to identify subsurface features and develop soil/rock profiles.
- Determine geotechnical parameters for design or identify subsurface anomalies.
- Map the location and levels of subsurface properties relative to AHD.

Task 5 – Assessment and Reporting

[The Consultant should prepare a detailed report including all findings, interpretations and recommendations based on the investigation.]

The Consultant is required to prepare a detailed report including:

- Site description and objectives.
- Investigation methods.
- Data acquisition and processing procedures.
- Interpretation of results.
- Subsurface maps and profiles. Examples of useful mapping and cross-section visualisations are provided in the following figures.
- Geotechnical and/or geophysical analysis and recommendations.
- Conclusions and design parameters or identification of anomalies.
- Added appendices providing equipment information, QA/QC and/or calibration certificates.

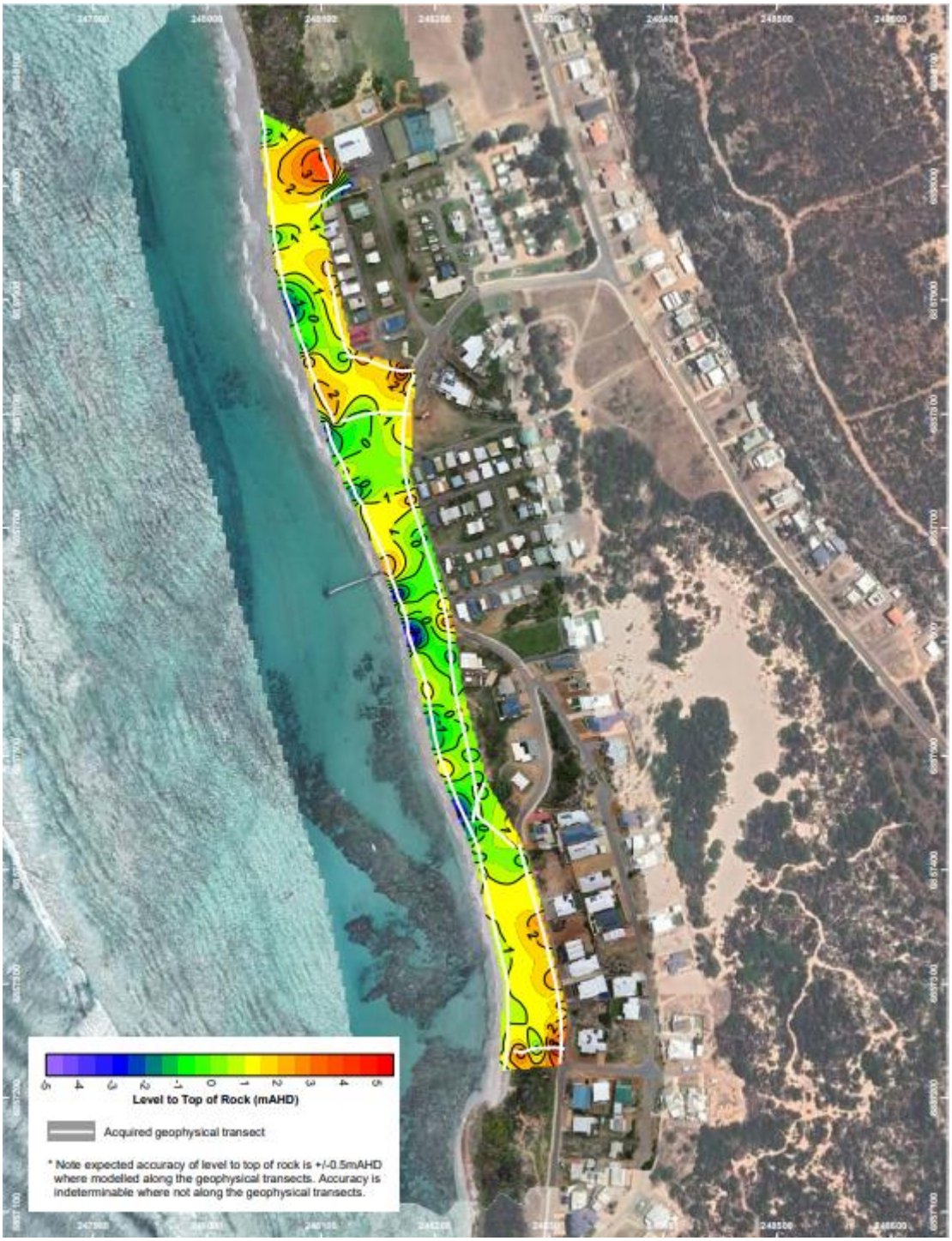

Figure 2 Example of mapping of bedrock from interpretation of subsurface properties. [Example from Horrocks.]

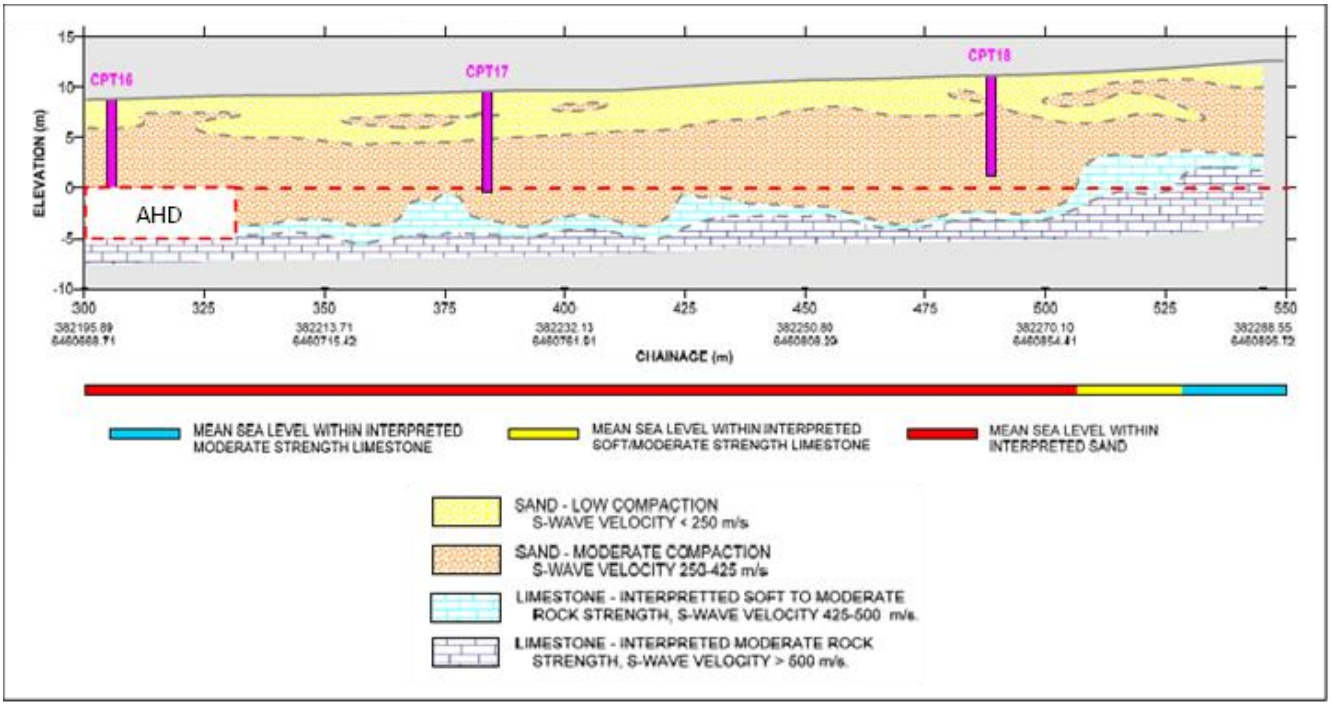

Figure 3 Example of cross-section from interpretation of subsurface properties. [Example from Two Rocks using geophysical MASW surveying supplemented by geotechnical CPT surveying for improved ground truthing.]

Methodology

[Provide a brief overview or request a detailed geotechnical and/or geophysical investigation methodology. The LGA should be cautious if prescribing a methodology as it may lead to additional costs and complications. The following example may be used as a guide.]

The Consultant is to develop and provide a methodology for the investigation, to be reviewed by the LGA. The methodology can include the following items, noting these may be used as a guideline only.

1. Review available background information and develop a plan for investigation.
2. Confirm with the LGA on appropriate field investigation processes.
3. Confirm and comply with all WHS and access requirements.
4. Conduct site inspections and field investigations.
5. Conduct laboratory testing. [If applicable].
6. Data processing and interpretation.
7. Reporting and provision of results.

Deliverables

[In this section, specify the required deliverables. This may include a detailed report, raw data and any specific formats required by the LGA client.]

The Consultant is required to provide the following deliverables.

1. Detailed report including:
   - Site description.
   - Investigation methods.

- Soil/rock profiles and/or geophysical maps.
- Laboratory and field test results.
- Geotechnical analysis and recommendations.
- Conclusions, design parameters and identification of anomalies.
- Appendices with raw data and laboratory test certificates (if applicable).

2. Any mapping is to be referenced in AHD and GDA2020 and supplied in both PDF and native electronic format.
3. (Include any requirements specific to the LGA).

Timeframe

[Use this section to request an estimate of the project's timeline or include a deadline if required. The timing of the investigation can also be specified here.]

The Consultant is to complete the investigation during (specify time e.g. October) and provide an estimated date for supply of deliverables.

[OR]

(The Consultant is to complete the investigation during (specify time e.g. October) and supply deliverables within XX weeks from completion of the investigation.)

Documents and Files to be Provided

[This is where the LGA can provide details of any documents and files that will assist the Consultant conducting the investigation. Examples of these documents are included below.]

The following files (and documents) will be provided to the Consultant on the award of the works.

- Previous surveys or investigations.
- Geotechnical and/or geophysical reports and data.
- Details of any specific labelling requirements. [If applicable.]
- Any relevant documents the LGA has access to.

Appendices

[Include any required documents, these could include any files containing the required extent of the investigations or previous studies.]