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## Engineering Endorsement

Competency Frameworks

*Surveyors Act 2003 s 39*

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## Introduction

This document describes the Competency Framework for the issue of an engineering endorsement as prescribed under section 39 of the Surveyors Act 2003

The competency framework describes the competency Units, Elements and Descriptors that are required to be met for the issue of the endorsement. The competency framework describes the performance that the candidate is required to display. Competency is developed through the appropriate combination of qualifications, skills, knowledge and experience

## Definitions

**Unit of Competency (Unit):** A major segment of the overall competency of a profession, typically representing a major function, role or field of activity.

**Element of Competency (Element):** A subdivision of a unit of competency into an observable function or activity.

**Performance Criteria (Descriptors):** An indicative list of the aspects of professional performance that would be regarded as evidence of competent professional performance in the work place in an element of competency.

**With Guidance:** The performance of the descriptor is achieved by the applicant under the direction of a competent supervisor. The applicant need not be able to perform the activity without requesting help in planning and execution.

**Under Supervision:** The performance of the descriptor is achieved by the applicant without direct supervision of each step; however the result of the activity cannot be used unless it has been checked by a competent supervisor.

## Interpretation of the Framework

The competencies for Surveyors seeking an Engineering endorsement will be demonstrated by experienced professional surveyors practising in the sector of the market dealing with infrastructure investigation design and construction (the “engineering” sector). The competencies are to be interpreted in this context.

Applicants will need to have demonstrated high levels of technical competence, leadership qualities and effective management over a number of years since achieving surveyor registration. As employees holding responsible positions in the public, private or tertiary sectors, or acting as private consultants, they will be competent practising professionals, demonstrating expertise in the field of engineering surveying. They will regularly carry out complex or critical survey work and resolve unusual problems. They will work autonomously and accept responsibility for all professional work

They will have demonstrated sound technical competence and management skills during their years of professional experience. They will work autonomously and accept responsibility for all professional work undertaken within their areas of expertise. However, they must recognise complex or unusual situations where professional guidance is required.

## Competency Requirements for Engineering Endorsement

An Applicant will need to display their competency at the Surveyor level, as well as their competency in this discipline of surveying work before being granted as engineering endorsement.

An Applicant seeking the issue of an engineering endorsement will need to demonstrate competency in the following Units:

- Unit 3: Management of Data and Information
- Unit 4: Presentation of Information
- Unit 6: Communications
- Unit 9: Controlling the Location of Developments

# Competency Table for Engineering Endorsement

**Unit 1: APPLICATION - Not Re-assessed. RENEWAL - as specified in SBQ-CF-0103.**

**Unit 2: APPLICATION - Not Re-assessed. RENEWAL - as specified in SBQ-CF-0103.**

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### **Unit 3: Management of Data and Information**

A Surveyor with an Engineering endorsement will be competent in all aspects of information and data management that are relevant to the engineering field of surveying and will be accountable for all work personally carried out or carried out under their direction.

Element	Descriptors
3.1 Process data to accepted standards and for specific requirements	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Determine procedures for verifying base data.</li> <li>ii. Apply the most appropriate technology required to process data.</li> <li>iii. Develop procedures for storing data in appropriate databases.</li> <li>iv. Establish systems for verify the integrity of data.</li> </ol>
3.2 Convert data from one system or format to another	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Optimise the operation of databases holding spatial and textual data.</li> <li>ii. Establish procedures to identify and collate data in one system for transfer and integration into other systems.</li> <li>iii. Determine appropriate technology and procedures to convert and transfer data between systems and formats.</li> </ol>
3.3 Administer electronic and physical data bases	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Determine procedures for recording, retrieving and updating information.</li> <li>ii. Develop and establish security systems to ensure data integrity.</li> <li>iii. Develop and implement appropriate maintenance systems.</li> </ol>
3.4 Analyse, evaluate and interpret data	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Develop procedures for determining the accuracy and reliability of data.</li> <li>ii. Assess client needs and develops systems for data interpretation and evaluation.</li> <li>iii. Identify opportunities for data enhancement.</li> <li>iv. Determine procedures for collating data and relating it to specific areas of interest.</li> </ol>

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### **Unit 4: Presentation of Information**

A Surveyor with an Engineering endorsement will be competent in presenting all information that is relevant to the field of surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.

<b>Element</b>	<b>Descriptors</b>
4.1 Assemble data into specific data or information sets	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Recognise market trends</li> <li>ii. Clarify and determine customer needs</li> <li>iii. Identify the potential benefits of creating specific information from various data bases</li> <li>iv. Use technology to assemble data into useful information</li> </ol>
4.2 Compile and produce maps, plan, charts and photographs	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Use the technology available for graphical and photographic presentation</li> <li>ii. Determine the uses and limitations of data bases</li> <li>iii. Apply appropriate cartographic principles</li> <li>iv. Use a computer aided drafting package</li> <li>v. Identify and use the best methodology to meet client needs</li> </ol>
4.3 Provide digital spatial information	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Correctly evaluate the accuracy, reliability and potential uses of data</li> <li>ii. Transfer spatial data files between various formats</li> <li>iii. Integrate spatial data with other information</li> <li>iv. Format data to meet client needs</li> </ol>
4.4 Produce models	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Create digital models of physical surfaces</li> <li>ii. Create model files and attach attribute information</li> <li>iii. Transfer model files between various formats</li> </ol>
4.5 Formally present information to clients, government agencies and public forums	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Identify and use appropriate communication and display techniques to present information in a usable manner</li> <li>ii. Address special interest groups</li> <li>iii. Conduct seminars and public meetings</li> <li>iv. Lead and/or contribute to discussion groups</li> </ol>
4.6 Prepare reports	Applicants will need to demonstrate that they are able to : <ol style="list-style-type: none"> <li>i. Prepare detailed technical reports</li> <li>ii. Prepare information brochures and reports</li> <li>iii. Prepare business reports on surveying matters</li> </ol>

4.7 Certify data	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> <li>i. Determine the accuracy and reliability of data to be certified</li> <li>ii. Explain the responsibilities of data certification</li> </ul> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>iii. Apply effective validation procedures</li> <li>iv. Apply effective techniques to manage risk associated with certification.</li> </ul>
4.8 Provide advisory services	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Discuss information with potential users</li> <li>ii. Decipher information and relate it to specific issues</li> <li>iii. Collate information and format it into relevant advice</li> <li>iv. Provide advice on opportunities to add value to existing information</li> <li>v. Provide sound advice to clients on surveying and land management matters</li> </ul>

**Unit 5: APPLICATION - Not Re-assessed. RENEWAL - as specified in SBQ-CF-0103.**

**Unit 6: Communication**

A Surveyor with an Engineering endorsement will be competent in applying communications skills in a professional manner. They will be responsible for accurately reporting significant difficulties to senior colleagues

Element	Descriptors
6.1 Communicate effectively	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Communicate effectively, orally and in writing</li> <li>ii. Compile, interpret and present information with guidance</li> <li>iii. Interpret briefs and instructions with guidance</li> <li>iv. Issue clear, accurate instructions to subordinates</li> <li>v. Exchange data and information through electronic communications under supervision</li> </ul>
6.2 Present, promote, report on and advocate ideas on surveying and allied areas of practice	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Prepare present technical reports under supervision</li> <li>ii. Prepare position and discussion papers on surveying and allied topics or publication under supervision</li> <li>iii. Present papers at seminars and public meetings</li> </ul>

<p>6.3 Prepare and comprehend surveying documents</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Prepare and interpret surveying reports with guidance</li> <li>ii. Prepare specifications and standards with guidance</li> <li>iii. Prepare submissions and quotations with guidance</li> <li>iv. Prepare documents defining work procedures and processes with guidance</li> <li>v. Prepare documents of measurement technology and data acquisition with guidance</li> </ul>
<p>6.4 Comprehend, report on and discuss relevant legal matters</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Operate in accordance with government Acts, Regulations or instructions</li> <li>ii. Contribute to discussions on legal matters pertaining to land and land information with clients, colleagues and other professionals</li> <li>iii. Prepare advice for clients on legal requirements relating to land development under supervision</li> <li>iv. Prepare advice for clients on land rights, land tenure disputes, and rights of entry and occupation under supervision</li> <li>v. Prepare advice for clients on legislation pertaining to planning, development and environment issues under supervision</li> <li>vi. Advise clients on responsibilities and liabilities pertaining to spatial information under supervision</li> </ul>
<p>6.5 Collaborate with colleagues and other interested parties</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Discuss development projects with other stakeholders on under supervision</li> <li>ii. Represent the concerns of clients and/or special interest groups to government, authorities and other stakeholders under supervision</li> <li>iii. Negotiate solutions to common problems with other parties under supervision</li> <li>iv. Preparing advice and information on surveying, geomatics, and land developments under supervision</li> </ul>
<p>6.6 Use professional expertise to contribute to the processes that shape society</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> <li>i. Can explain the need for orderly management and administration of land resources</li> </ul> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>ii. Identify opportunities to utilise surveying for the benefit of society</li> </ul>

**Unit 7: APPLICATION - Not Re-assessed. RENEWAL - as specified in SBQ-CF-0103.**

**Unit 8: Not Applicable**

### **Unit 9: Controlling the Location of Developments**

A Surveyor with an Engineering endorsement will be competent in the surveying required to control the location and quality of engineering developments including the measurement of earthworks; the installation of machines, structures or equipment at industrial sites; or the extraction of materials. They will be accountable for the outcomes of work personally carried out or carried out under their supervision and control.

<b>Element</b>	<b>Descriptors</b>
9.1 Control and locate engineering works, development projects, and the building or installation of structures and machines.	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> <li>i. Can explain the role of other professionals, technicians and trades persons.</li> </ul> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>ii. Read, interpret and understand detailed design and construction plans.</li> <li>iii. Establish appropriate reference systems.</li> <li>iv. Select and use the appropriate technology for site operations.</li> <li>v. Set out works.</li> <li>vi. Communicate results to client, construction staff and other consultants</li> <li>vii. Use adequate redundant measurements to validate data.</li> <li>viii. Understand and implement appropriate risk assessment techniques</li> <li>ix. Apply Workplace Health and Safety procedures as required for each task or site.</li> </ul>
9.2 Control and measure the extraction of minerals and other materials.	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> <li>i. Can explain a variety of techniques for the extraction of minerals and other materials.</li> <li>ii. Can explain the measuring and monitoring outcomes needed for the safe, cost effective extraction of materials.</li> <li>iii. Can explain the roles of other professionals, technicians, and trades persons.</li> </ul> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>iv. Establish appropriate reference systems.</li> <li>v. Select and use the appropriate technology for site operations.</li> <li>vi. Establish effective reporting systems.</li> </ul>
9.3 Establish quality control systems.	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> <li>i. Determine client needs and required accuracies.</li> <li>ii. Apply appropriate technology.</li> <li>iii. Detail methods and procedures.</li> <li>iv. Implement measuring and monitoring programs.</li> <li>v. Implement effective reporting procedures.</li> </ul>

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<p>9.4 Monitor the position, shape and size of structures, land forms and sea beds.</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"><li>i. Understands the roles of other professionals, technicians, and trades persons.</li><li>ii. Explain the basic principles, theory and accuracy of various aerial and terrestrial photogrammetric, and remote sensing methods</li></ul> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"><li>iii. Read and understand design and detail plans, and applies the required accuracies.</li><li>iv. Establish appropriate reference systems.</li><li>v. Apply appropriate technology.</li><li>vi. Implement effective reporting systems.</li><li>vii. Establish procedures to validate results.</li><li>viii. Judge the applicability of photogrammetric and remote sensing methods to mapping and engineering projects</li></ul>
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***Unit 10: Not Applicable***

***Unit 11: Not Applicable***