



# **GEOSPATIAL ENGINEERING COMPETENCIES**

## **Specialist Land Surveying Competencies**

**March 2023 revision**

Notes:

Each of the activities under the competencies must be signed-off to the standard that the applicant has achieved – more details and explanation of the levels (A, K, E and B) are contained in the quick guide to competencies.

Optimum standards of competencies:

These are the optimum levels of achievement that an applicant needs to achieve for the grades of Technical Member or Member.

The optimum standard is given against each activity statement

There is a little flex in the optimum standards, so if an applicant is not able to achieve the optimum standard in a few activities, this can be balanced out by exceeding the optimum standard elsewhere in the competencies.

Experienced applicants may be able to sign off all the competencies in one go, but we would expect trainees and apprentices to do this over the duration of their training period. Competencies may be updated annually, so if you are working on a particular revision you should be aware that you need to be familiar with the latest revision at the time of review and may be questioned on these.

Revisions 2023: This is an extensive update

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GELS01		Competency	Ability to undertake topographic surveys				
			Date of assessment				
		Optimum Standard		Activity Details			
ITEM	TECHNICAL MEMBER	MEMBER	A				
A	K	B					
B	E	B					
C	E	B					
D	E	B					
E	E	B					
F	E	B					

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GELS02		Competency	Use and understanding of surveying instruments				
			Date of assessment				
		Optimum Standard		Activity Details			
ITEM	TECHNICAL MEMBER	MEMBER	A				
A	E	B	Theodolite / Total Stations				
B	E	B	GNSS, Static & Kinematic				
C	E	B	Laser Scanner, Static & SLAM				
D	E	B	Levels: Optical, Digital, Precise				
E	E	B	Field instrument checking and adjustment				
F	K	E	Understanding of manufacturer and routine servicing, maintenance, and calibration				
G	E	B	Accessories; checking and adjustment				
H	A	K	Utility Mapping tools (GPR, Electromagnetic Locators)				
I	A	K	Photogrammetric survey methods				
J	A	K	Other methods of measuring distance or position (drone, mobile mapping, instrumentation and monitoring, etc)				

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GELS03		Competency	Application of geometric principles				
			Date of assessment				
Optimum Standard			Activity Details				
ITEM	TECHNICAL MEMBER	MEMBER					A
A	E	B	Calculating coordinate geometry using manual or computerised methods				
B	E	B	Use of co-ordinate reference systems, scales and projections				
C	E	B	Application of corrections for meteorological and environmental variations				
D	E	B	Linear, 2D and 3D survey control. Intersections, known backsight, resections, free station, rounds of angles, traversing, network and geometric configurations				
E	E	B	Adjustment of survey measurements. Redundant observations. Appropriate adjustment methods (Least Squares. Bowditch), residuals, standard errors, error ellipses				
F	E	B	Measurement of heights, use of height datum, datum transformations, geoid/spheroid separations				
G	E	B	Error propagation				

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GELS04		Competency	Geospatial data processing and production of deliverables				
			Date of assessment				
Optimum Standard			Activity Details				
ITEM	TECHNICAL MEMBER	MEMBER					A
A	E	B	Transfer of survey data between instrument and computer				
B	E	B	Transfer of survey/design data from computer to instrument for validation/setting out				
C	E	B	Electronic processing of coordinate geometry data including geometric networks				
D	E	B	Data processing of captured information and production of deliverables. Eg drafting plans, producing reports				
E	E	B	Use and manipulation of digital ground models (DEM/DTM)				
F	E	B	Point cloud registration and principles of data extraction				
G	E	B	Data validation and quality control procedures				
H	E	B	Data management, archiving, versioning, backup and security				
I	K	E	Data security and legal considerations				

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

Name of Supervisor	Name of Applicant
Supervisor's signature	Date