

**Draft 0.1**

This is a draft update to CPPSIS5057 Conduct precision surveys:

<https://training.gov.au/Training/Details/CPPSIS5057>.

Changed PCs to active voice.

Changed 'person' to 'candidate' in PE.

Code changed to CPPSUR5057.

Range of Conditions added to Knowledge Evidence.

I've added mapping info.

TAG will need to reassess this as unit is redeveloped.

## Unit of Competency

### CPPSUR5057 Conduct precision surveys

#### Modification history

Release	Comments
1	<del>Replaces superseded equivalent CPPSIS5057A Carry out a precision survey. This version first released with CPP Property Services Training Package Version 3.</del>
	Replaces superseded equivalent CPPSIS5057 Conduct precision surveys

#### Application

This unit specifies the skills and knowledge required to conduct a precision survey, including techniques for precise levelling, precise setting out and industrial measurements, and detecting structural deflection and deformation. The unit covers preparing for precision surveying by analysing project specifications and information, and identifying and controlling risks and contingencies. The unit also covers selecting and using specialised equipment, attachments and instruments necessary for precise levelling and setting out, and checking horizontal and vertical movement of structures. The unit requires the ability to apply high level surveying computations to surveying problems, including conducting statistical analysis of measurements and errors to achieve specified accuracies and tolerances.

The unit supports those who work under limited supervision in a surveying team.

No licensing, legislative, regulatory, or certification requirements apply to this unit of competency at the time of publication.

#### Prerequisite Unit

None

#### Unit Sector

Surveying and spatial information services

#### Elements and Performance Criteria

1. Prepare for precision survey.	<ul style="list-style-type: none"><li>1.1 Identify project specifications, precision survey objectives and accuracy requirements in consultation with appropriate persons.</li><li>1.2 Identify and control risks and manage contingencies according to organisational requirements.</li><li>1.3 Determine and select specialised equipment and attachments for precise levelling and setting out according to project specifications.</li><li>1.4 Carry out precise levelling run and calculate and record results according to organisational requirements.</li></ul>
2. Apply techniques for precise setting out.	<ul style="list-style-type: none"><li>2.1 Determine applications of specialised surveying techniques used for precise setting out according to project specifications.</li><li>2.2 Determine remote measuring systems to be used for industrial measurements according to project specifications.</li><li>2.3 Conduct set-out and observations according to project specifications, using instruments and attachments suitable for precise setting out.</li></ul>

3. Detect structural deflection and deformation.	<p>3.1 Determine survey methods used to check horizontal movement of engineering structures and instruments used to monitor verticality of tall structures.</p> <p>3.2 Determine survey methods used to check vertical movement due to settlement of engineering structures caused by tunnelling and mining.</p> <p>3.3 Carry out precision survey of an accuracy that will detect and monitor deformation or deflection of engineering structure according to project specifications.</p>
4. Finalise precision survey.	<p>4.1 Finalise and check precision survey according to project specifications and organisational requirements.</p> <p>4.2 Notify appropriate persons of survey results according to organisational requirements.</p> <p>4.3 Complete survey documentation and archive data according to organisational requirements.</p>

### Foundation Skills

Candidates require:

- planning and organising skills to:
  - plan and prioritise work to meet survey timeframes
- numeracy skills to:
  - analyse measurements between two or more points to achieve accuracy and precision in calculations
  - conduct error analysis relating to angle, distance and height difference, observations, values and positional results
- oral communication skills to:
  - ask questions to clarify survey requirements
  - report details of survey results
- reading skills to:
  - analyse graphical and technical information in construction and engineering plans
- writing skills to:
  - prepare technical reports
  - record technical information in organisational documentation
- technology skills to:
  - calibrate specialist instruments and attachments.
- problem-solving skills to:
  - apply risk control and contingency strategies to anticipated and identified problems.

### Unit Mapping Information

Supersedes and is equivalent to CPPSIS5057 Conduct precision surveys

### Links

Companion Volume Implementation Guide:

<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=6f3f9672-30e8-4835-b348-205dfcf13d9b>

## Assessment Requirements for CPPSUR5057 Conduct precision surveys

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### Performance Evidence

To demonstrate competency, a candidate must meet the performance criteria of this unit by:

- conducting two different precision surveys.

While conducting the above precision surveys, the candidate must:

- analyse standards, specifications and information in plans and drawings to determine surveying and precision requirements
- apply precision surveying techniques, measurements and error analysis to achieve specified accuracies and precision tolerances
- carry out precise levelling run, using two of the following pieces of specialised equipment and attachments:
  - global navigation satellite system (GNSS)
  - gyro-theodolite
  - optical and digital level
  - optical reading instruments
  - total station (reflectorless)
  - total station (theodolite function)
- carry out precise setting out using one of the following instruments and attachments:
  - auto collimation and laser eyepieces
  - total stations
  - zenith and nadir auto plumb instruments
- carry out precise setting out using one of the following remote measuring systems:
  - precise intersection techniques
  - robotic instruments
  - terrestrial photogrammetry
- use industry-accepted survey methods to detect and monitor deflection and deformation of structures
- communicate clearly with others to clarify and report project information
- comply with organisational and legal requirements for:
  - completing records and documentation
  - recording, storing and filing data
  - using, checking and storing surveying equipment
  - working safely and using personal protective equipment (PPE)
- plan and implement risk management and contingency strategies.

### Knowledge Evidence

To be competent in this unit, a candidate must demonstrate knowledge of:

- accuracy standards and field procedures for high-precision horizontal and vertical control surveys
- basic application of electromagnetic measuring principles and techniques
- common terms used in precision surveying calculations
- data reduction techniques
- basic concepts of algebra, geometry and trigonometry
- industry-accepted methods for error analysis
- legislative, statutory and industry requirements and standards relating to work tasks
- methods for computing three-dimensional (3-D) coordinates and coordinate changes by intersection
- organisational policies and procedures relating to:
  - health and safety relating to survey activities
  - reporting and documentation
  - using specialised surveying equipment, attachments and instruments
- standard plan design and presentation conventions
- surveying methods used to detect horizontal and vertical movement of structures
- appropriate persons:
  - client
  - colleague
  - engineer
  - manager
  - registered or qualified surveyor
- remote measuring systems:
  - precise intersection techniques
  - robotic instruments
  - terrestrial photogrammetry.

### Assessment Conditions

Assessors must meet the requirements for assessors contained in the Standards for Registered Training Organisations.

Assessment must be conducted in the workplace or a simulated workplace using realistic conditions, materials, activities, responsibilities, procedures, safety requirements and environmental considerations.

Candidates must have access to:

- equipment:
  - PPE
  - specialised surveying equipment, attachments and instruments selected from those listed in the performance evidence
  - remote measuring system selected from those listed in the performance evidence
- specifications:
  - survey specifications, including relevant plans and drawings
  - organisational policies, procedures and documentation relating to work health and safety
- relationships with team members and supervisor:
  - working in a team.

## Links

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<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=6f3f9672-30e8-4835-b348-205dfcf13d9b>