Australian Government

CPPSIS6035A Conduct complex engineering set out surveys

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

CPPSIS6035A Conduct complex engineering set out surveys

Modification History

Unit revised and not equivalent to CPPSIS6015A Conduct complex engineering set out surveys
Element structure, performance criteria, and critical aspects reviewed to reflect workplace requirements
Skills and knowledge requirements and the range statement updated

Unit Descriptor

This unit of competency specifies the outcomes required to conduct complex engineering set out surveys. It requires the ability to demonstrate highly specialised technical skills and to plan and execute project activity according to job specifications. Functions will entail complying with and developing or amending organisational guidelines.

Application of the Unit

This unit of competency supports the application of planning, organisational, communication, sound problem-solving and accuracy skills; error analysis; designing and interpreting technical documentation; and a high-level understanding of technology. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying.

Licensing/Regulatory Information

Licensing, legislative, regulatory and certification requirements may impact on this unit. Incorporate these requirements according to state, territory and federal legislation.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify project.	1.1	***Organisational priorities*** are determined to identify project activity.
		1.2	***Project objectives*** are set according to organisational priorities and ***client requirements***.
2	Organise project resources.	2.1	Characteristics of the ***operating environment*** and any special ***equipment*** or resource requirements are identified according to ***organisational guidelines***.
		2.2	Equipment is checked to be in good working order.
		2.3	***Manufacturer specifications*** with regard to the use of equipment are complied with.
		2.4	Project objectives comply with relevant ***legislation*** and ***company policy***.
		2.5	Personnel and work teams are selected for the project activity.
3	Plan the project.	3.1	Project objectives, ***principal work activities*** and ***constraints*** are defined and documented according to written spatial data specifications and ***client*** requirements.
		3.2	Plan includes information on identified risks, ***contingencies***, risk management processes and resources.
		3.3	Plan gives full details of technology and ***techniques*** to be used for the engineering set out.

		3.4	***Design*** is interpreted to identify the ***surveying data components*** required for set out.
		3.5	Agreed communication processes between project members, client and other ***stakeholders*** are implemented and maintained.
		3.6	***OHS*** and legislative requirements are incorporated into project ***risk management plan***.
		3.7	Pertinent ***legal and statutory standards*** are researched, considered and adhered to.
		3.8	Work is allocated to appropriate personnel, and ***supervisory processes***, checks, measures and problem-solving techniques are implemented to ensure work is completed within ***time available***.
4	Manage and monitor the project.	4.1	Identified project components are accurately set out.
		4.2	***Set out measurements*** are ***validated*** and recorded according to project ***specifications***.
		4.3	***Project management mechanisms*** are implemented to measure, record and report progress of activities in relation to the agreed schedule and plans.
		4.4	Progress is reviewed throughout the project, and any agreed changes are implemented to ensure consistency with project scope, objectives and constraints.
		4.5	Agreed communication processes between project members, client and other stakeholders are implemented and maintained.
		4.6	Contingencies and constraints are managed to ensure project meets specifications.
		4.7	OHS requirements are adhered to.
		4.8	***Quality assurance processes*** are implemented based on the project plan.

5	Finalise the project.	5.1	***Relevant personnel*** are informed of the results according to organisational guidelines.
		5.2	***Required documentation*** is completed according to organisational guidelines.
		5.3	Spatial data is archived according to project specifications.
6	Review project's strategic achievements.	6.1	Project achievements are reviewed against the organisation's ***strategic goals***.
		6.2	Recommendations are made on possible links between project achievements and future organisational goals.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Required skills

- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
- initiative and enterprise skills to:
  - manage information
  - translate requirements into design
- literacy skills to:
  - assess, develop and use workplace information
  - read and write key performance reports, including technical reports
  - research and evaluate to source surveying and spatial information services educational information
- numeracy skills to:
  - analyse errors
  - conduct image analysis
  - estimate costs
  - interpret and analyse statistics
  - perform mental calculations
  - record with accuracy and precision
  - undertake high level computations
- organisational skills to:
  - plan and coordinate technical and human resource inputs to research activities
  - plan and prioritise activities to meet contractual requirements
- project-management skills to:
  - plan engineering and set out surveys according to specifications
  - coordinate, conduct, monitor and report on action taken
- spatial skills to:
  - exercise precision and accuracy in relation to complex engineering set out survey techniques
  - archive and retrieve spatial data
  - manage and manipulate spatial data
  - manage files
  - solve problems relating to height, depth, breadth, dimension, direction and

position in actual operational activity and virtual representation

- technology skills to:
  - use computers to develop survey documentation
  - use instruments when conducting complex engineering set out surveys

Required knowledge

- abilities of work teams
- accuracy and precision requirements
- calibration of specialised surveying equipment
- data formats
- data management
- data reduction and manipulation techniques
- guidelines of projects
- high-level, relevant engineering-related tasks and associated computations
- legislative, statutory and industry requirements and standards
- limitations of the guidelines relating to equipment, measuring and analysis
- organisational policies and guidelines, such as OHS guidelines
- planning and control processes
- project review procedures
- safe work practices
- surveying reference systems
- surveying data capture and data set out methodologies
- surveying equipment for data capture and data set out

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example CPPSIS6028A Conduct design and set out survey.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of:

- accessing and interpreting design information to identify the components to be measured and monitored
- applying solutions to a range of problems
- documenting and reporting
- managing contingencies
- organising and prioritising activity
- performing measurements
- planning resources
- reducing and manipulating spatial data
- recording and reporting non-conformity aspects
- knowledge of survey reference systems and data capture and data set out methodology.

Specific resources for assessment

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.
Where applicable, physical resources should include equipment modified for people with disabilities.

Context of assessment

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

Method of assessment

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).
Demonstrated competency in a range of situations, that

may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.
Obtained by observing activities in the field and reviewing induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

Guidance information for assessment	Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of surveying and spatial information services requirements to assess competency. Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical). Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff. All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory. Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time. In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Organisational priorities may include:	• client focus • external influence and focus • financial priorities

- internal influence and focus
- operational plan
- strategic plan.

Project objectives may include:	• agreed client requirements • written survey specifications.
Client requirements refer to description of outputs and may be contained in:	• contracts • memos • tender briefs • verbal instructions • written instructions.
Operating environment:	• any surveying project work site.
Equipment may include:	• global navigation satellite system (GNSS) • level • tape • total station.
Organisational guidelines may include:	• appropriate timelines • code of ethics • company policy • final product formats • formal design parameters • legislation relevant to the work or service function • manuals • OHS policies and procedures • personnel practices and guidelines outlining teamwork, work roles and responsibilities • requirements for data processing.
Manufacturer specifications may include:	• equipment specifications • operator manuals.
Legislation may include:	• Australian standards • award and enterprise agreements • certification requirements • codes of practice • quality assurance requirements.
Company policy may include:	• company OHS standards • customer service standards • company goals, such as mission statement • governance guidelines • guidelines on the use of equipment • internal and external communication guidelines • operational manuals • operational plan • strategic plan.
Principal work activities	• activity and sequence of activity determined to be

may include:	essential in order to meet project objectives.

Constraints may include:	• coverage • datum • environmental factors • industry requirements • legal and statutory • financial • resource availability • time.

Client may include:	• customers with routine or special requests
	• external to organisation
	• internal to organisation
	• regular and new customers, including:
	  • business enterprises
	  • government enterprises
	  • members of the public
	  • suppliers.

Contingencies may include:	• equipment failure • injury to personnel • personnel turnover • observation errors • obstructions to project plan • weather.
Techniques may include:	• indoor • outdoor • special operating methods to suit legislative or industry requirements.
Design may include:	• digital information • hard copy plans • maps • written instructions.
Surveying data components may include:	• depth • dimension • direction • flow rates • position • slope.
Stakeholders may include:	• human resource personnel: internal or external • procurement agency: internal or external management.
OHS may include:	• Australian standards • development of site safety plan

- identification of potential hazards
- inspection of work sites
- training staff in OHS requirements
- use of personal protective clothing
- use of safety equipment and signage.

Risk management plan may include:	• adhering to budget • anticipating external influences • contingency planning • guidelines for the selection of contractors • effective communication and consultation • effective project management • internal and external audit processes • milestone review and evaluation • realistic timelines • targeted activity.
Legal and statutory standards may include:	• local government requirements • national standards • state statutes and regulations.
Supervisory processes may include:	• directing activity • implementing • meeting deadlines • monitoring • planning • overseeing practices • reviewing • targeting.
Time available may involve estimates for time duration of project, including:	• client instructions • consideration of contingencies • consideration of past project experiences • experience of project personnel • location of project • methods to be employed • resources and equipment to be used.

Set out measures may include:	• any equipment used for survey project:
	  • current meter
	  • echo sounder
	  • GNSS
	  • level
	  • remote sensing
	  • tape
	  • theodolite
	  • tide gauge
	  • total station.

Validated means reflecting the true state of a test result, including tests for	• confounding bias • information/data bias • observational bias

systematic distortions such as:	• recall bias • selection bias.
Specifications may include:	• detailed technical descriptions of survey data and its requirements • preparation of cross-sections and plans with all information included.
Project management mechanisms may include:	• communication with stakeholders • dispute resolution guidelines • monitoring and adjusting key milestones.
Quality assurance processes may be internal and external and may include:	• monitoring target achievement • product or service measurement against set criteria • standard verification.
Relevant personnel may include:	• colleagues • registered surveyors • company personnel • staff or employee representatives • supervisors or line managers • suppliers • users.
Required documentation may include:	• electronic or paper-based correspondence with client • field records • final report • progress reports • records of conversation • survey plots • organisational work activity sheets.
Strategic goals may include:	• key work areas and expertise • economic positioning • future directions • growth model • international alignment.

Unit Sector(s)

Surveying and spatial information services

Custom Content Section

Not applicable.