



Australian Government

Assessment Requirements for CPPSIS5065

Design basic engineering structures

Release: 1

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Modification History

Release 1.

New unit of competency.

This version first released with CPP Property Services Training Package Version 3.

Performance Evidence

A person demonstrating competency in this unit must satisfy the requirements of the elements, performance criteria, foundation skills and range of conditions of this unit. The person must also prepare a design and drawings for two projects using a basic engineering structure from one of the following categories:

- railway
- rural road
- urban road
- sewer line
- stormwater drainage line
- other basic engineering structure.

While designing the above basic engineering structures and creating related drawings, the person must:

- communicate clearly with others to clarify and report project information
- comply with organisational and legislative requirements for:
 - identifying hazards and working safely, using personal protective equipment (PPE)
 - recording, storing and filing data
 - reporting and completing documentation
 - setting up and using surveying equipment
- comply with manufacturer specifications when calibrating and using equipment
- create designs for basic engineering structures which include:
 - construction layout
 - cul de sac design
 - kerb returns
 - long section plots
 - natural surface cross-section
 - natural surface terrain model
 - plot design
 - vertical alignment design

- create drawings that comply with design requirements, including:
 - data extracted from existing engineering drawings
 - drawing entities that are linked to database attributes
 - producing drawings, views and plots at required scale
- create, extract and output information from engineering plans
- organise resources and equipment appropriate to perform required work tasks
- perform advanced data reduction techniques to reduce and manipulate surveying data
- perform calculations appropriate to the type of engineering structure within industry-accepted tolerances for accuracy
- plan work tasks by checking plans, drawings, maps and specifications
- prepare the drawing environment by setting up the hardware and software system, drawing defaults and customising menus
- measure components and design specifications within industry-accepted tolerances for accuracy and using two of the following pieces of equipment:
 - hand-held laser measuring device
 - global navigation satellite system (GNSS)
 - level
 - total station
- save drawing files in a range of formats relating to the design software, including one of the following:
 - data exchange format (DXF)
 - format used in triangulation process to define position of points and triangles (PTS)
 - Excel spreadsheet format (XLS)
- use a broad range of software features and functions to produce engineering drawings.

Knowledge Evidence

A person demonstrating competency in this unit must demonstrate knowledge of:

- calculations relating to the design of basic roads, including:
 - cross-sections
 - cut and fill volumes
 - grades and levels of grades
 - grade intersections
 - vertical curves, including levels and length
- drawing software display principles, including:
 - colour
 - composition
 - font type
 - legends
 - media
 - scale

- size
- text and line style
- industry drawing standards, data formats, and precision and accuracy requirements for preparing engineering drawings using software
- key design considerations for the basic engineering structures specified in the performance evidence
- methods for calculating volume relating to:
 - contours and spot heights
 - cross-sections: mean area and end area using trapezoidal, prismoidal and Simpson's rules
- methods for calculating surveying data and verifying its accuracy
- methods for setting up, levelling and calibrating equipment
- reference and coordinate systems for surveying data, including Australian Height Datum and Map Grid of Australia
- standard construction and engineering plan design and presentation conventions.

Assessment Conditions

The following must be present and available to learners during assessment activities:

- equipment:
 - as specified in the performance evidence, including PPE
- specifications:
 - job specifications, drawings, maps and related engineering plans
 - organisational policies, procedures and documentation relating to work health and safety
- physical conditions:
 - access to equipped work station
- relationships with team members and supervisor:
 - working in a team.

Timeframe:

- as specified by project requirements.

Assessor requirements

As a minimum, assessors must satisfy the assessor requirements in the Standards for Registered Training Organisations (RTOs) current at the time of assessment.

Links

Companion Volume implementation guides are found in VETNet -

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