



**Australian Government**

# **CPCPIG2021A Design domestic urban irrigation systems**

**Release: 1**

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## **Modification History**

Prerequisite unit added to unit

Changes to descriptor, performance criteria, required skills and knowledge, range statement and critical aspects

Not equivalent to CPCPIG2011A

## **Unit Descriptor**

This unit of competency specifies the outcomes required to prepare basic designs and irrigation drawings for domestic irrigation systems.

## **Application of the Unit**

Work is normally undertaken in a drafting office environment. Location for drawing and design application may be either domestic or commercial, and may be a new work site or an existing structure being renovated, extended, restored or maintained.

## **Licensing/Regulatory Information**

In some jurisdictions, this unit of competency may form part of accreditation, licensing, legislative, regulatory or certification requirements.

## **Pre-Requisites**

CPCPCM2043A          Carry out WHS requirements

## **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 performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

- |   |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Prepare for work.              | <p>1.1 Site survey is conducted of proposed irrigation area according to client requirements.</p> <p>1.2 <b><i>Work health and safety</i></b> (WHS) and <b><i>environmental requirements</i></b> associated with design of domestic irrigation systems are adhered to throughout the work.</p> <p>1.3 <b><i>Quality assurance requirements</i></b> are identified and adhered to according to workplace requirements.</p> <p>1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by the work and <b><i>statutory and regulatory authorities</i></b>' requirements.</p> <p>1.5 <b><i>Tools and equipment</i></b> for preparing basic irrigation designs and drawings are selected and checked for serviceability.</p> <p>1.6 Work area is prepared to support efficient design of domestic irrigation systems.</p> |
| 2 | Identify drawing requirements. | <p>2.1 Areas requiring irrigation and <b><i>system design components</i></b> are identified.</p> <p>2.2 <b><i>Information</i></b> is obtained on the soil type, ground slope, contours and prevailing wind.</p> <p>2.3 Underground services, buildings, paths and other permanent structures are located and noted.</p> <p>2.4 Water supply is located and its influence on design requirements is determined.</p> <p>2.5 Appropriate emitters are selected to suit function and</p>                                                                                                                                                                                                                                                                                                                                                                 |

design requirements.

- |   |                           |     |                                                                                                                                                    |
|---|---------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Design irrigation system. | 3.1 | Site plan is drawn to include structures, paths and property boundaries.                                                                           |
|   |                           | 3.2 | Garden areas are sketched to include locations of lawns, garden beds, trees, vegetable patches or ferneries.                                       |
|   |                           | 3.3 | Pipe runs and water emitters are sketched to design requirements.                                                                                  |
|   |                           | 3.4 | Sizes of pipes are calculated using standard data and information is recorded in required format.                                                  |
|   |                           | 3.5 | List of <b>materials</b> is compiled to include number and type of water emitters, control valves, quantities of pipes, fittings and components.   |
|   |                           | 3.6 | <b>Sustainability principles and concepts</b> are applied throughout the design process.                                                           |
|   |                           | 3.7 | Drawing and design are submitted for approval.                                                                                                     |
|   |                           |     |                                                                                                                                                    |
| 4 | Clean up.                 | 4.1 | Work area is cleared and materials disposed of, reused or recycled according to legislation, regulations, codes of practice and job specification. |
|   |                           | 4.2 | Tools and equipment are cleaned, checked, maintained and stored according to manufacturer recommendations and workplace procedures.                |
|   |                           | 4.3 | Documentation is completed according to workplace requirements.                                                                                    |

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - access information
  - determine requirements
  - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
  - follow instructions
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
- initiative and enterprise skills to identify and report to appropriate personnel any faults in tools, equipment or materials
- literacy skills to:
  - compile list of materials
  - complete workplace documentation
  - read and interpret:
    - documentation from a variety of sources
    - plans and specifications
  - record information
- technical skills to design and draw a domestic urban irrigation system, including:
  - identifying material requirements
  - selecting and locating components
  - site layout
  - site requirements and structures
- numeracy skills to apply measurements and calculations
- planning and organising skills to:
  - plan and sequence tasks with others
  - plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technology skills to:
  - access and understand site-specific instructions in a variety of media
  - use mobile communication technology

**Required knowledge**

- job safety analysis (JSA) and safe work method statements (SWMS)
- process and workplace requirements for basic irrigation design
- processes for accessing information and for calculating material requirements
- properties of water, including pressure and flow rates
- relevant statutory and authority requirements related to drawing and installing irrigation systems
- SI system of measurement
- specifications of the range of irrigation products available
- standards applicable to the installation
- technologies for irrigation measurement and drawings
- various types of irrigation systems, including types of materials and components used
- workplace and equipment safety requirements

## Evidence Guide

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

### Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment providing that simulated or project-based assessment techniques fully replicate plumbing and services workplace conditions, materials, activities, responsibilities and procedures.

### 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:

- locating, interpreting and applying relevant information, standards and specifications to the design of domestic irrigation systems
- applying safety requirements throughout the work sequence, including electricity safety requirements and the use of personal protective clothing and equipment
- given the site plan and specifications for the irrigation of a 200 square metre garden (of lawn, shrubs, trees and flowers), designing and preparing a drawing of the system, incorporating automatic timers and controls, varying sprinkler heads and zones, and indicating the materials required (by number and type), ensuring:
  - application of sustainability principles and concepts
  - correct identification of location, design and details of proposed system
  - correct selection and use of appropriate processes, tools and equipment
  - completing all work to specification
  - compliance with regulations, standards and organisational quality procedures and processes
  - communicating and working effectively and safely with others.

### Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and

environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the minimum task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry-related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

## **Method of assessment**

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace

- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

## 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, if used in the performance criteria, is detailed below. 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) may also be included.

***Work health and safety*** is to be according to commonwealth, state and territory legislation and regulations and may include:

- handling of materials, including hazardous materials and substances
- hazard control
- personal protective clothing and equipment prescribed under legislation, regulations and workplace policies and practices
- use of firefighting equipment
- use of first aid equipment
- use of tools and equipment
- workplace environment and safety.

***Environmental requirements*** cover water quality management and may include:

- clean-up protection
- stormwater protection
- waste management.

**Quality assurance requirements** may include:

- Environment Protection Authority (EPA)
- internal company quality assurance policy and risk management strategy
- International Standards Organisation
- site safety plan
- workplace operations and procedures.

**Statutory and regulatory authorities** include:

- commonwealth, state or territory, and local authorities administering applicable Acts, regulations and codes of practice.

**Tools and equipment** may include:

- calculator
- computer design software
- drawing and drafting equipment
- laser measuring devices
- measuring equipment.

**System design components** may include:

- backflow prevention devices
- controls
- pipework
- valves
- water emitters, which may include:
  - drip emitters
  - gear drive
  - impact
  - in-line turbo drippers
  - mist sprays
  - oscillating
  - pop up
  - pulsating
- selection of water emitters, based on:
  - automatic control systems
  - manufacturer specifications
  - physical site conditions
  - site requirements
  - subsoil systems
  - types of plants requiring irrigated water.

**Information** may include:

- charts and hand drawings
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions
- material safety data sheets (MSDS)
- memos
- maps
- organisation work specifications and requirements
- regulatory and legislative requirements, particularly those pertaining to:
  - building codes
  - WHS and environmental requirements
  - plumbing regulations
- relevant Australian standards
- safe work procedures relating to the design of domestic irrigation systems
- signage
- sketches and plans, including job plans
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.

**Materials** may include:

- drafting and drawing equipment
- plans.

**Sustainability principles and concepts:**

- cover the current and future social, economic and environmental use of resources
- may include:
  - efficient use of material
  - minimising water wastage
  - considering use of alternative water supply
  - selecting appropriate components and material to ensure minimal environmental impact.

## **Unit Sector(s)**

### **Functional area**

**Unit sector** Plumbing and services

## **Custom Content Section**

Not applicable.