Australian Government

CPCPDR4012B Design and size stormwater drainage systems

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

CPCPDR4012B Design and size stormwater drainage systems

Modification History

Minor editorial changes to performance criteria, required skills and knowledge, range statement and critical aspects
Equivalent to CPCPDR4012A

Unit Descriptor

This unit of competency specifies the outcomes required to design, size and document the layout of surface and sub-soil stormwater drainage systems up to legal points of discharge. It covers the preparation for the planning, identification and confirmation of system specifications and requirements, the planning of the system layout and work finalisation processes, including records and documentation.

Application of the Unit

Site location for application of the plan will be residential and 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

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 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 planning.	1.1	Nature and scope of the planning task are identified and confirmed.
		1.2	***Work health and safety*** (WHS) and ***environmental requirements*** associated with installation of ***stormwater drainage systems*** are adhered to throughout the work.
		1.3	Work is organised and sequenced in conjunction with others involved in or affected by the work.
		1.4	***Tools and equipment*** required for planning, sizing and documenting the layout of stormwater drainage systems, including personal protective equipment, are selected and checked for serviceability.
		1.5	Work area in which planning process is to be conducted is prepared.
2	Identify system requirements.	2.1	***Information*** and specifications for required work are obtained and confirmed, if necessary by site inspection.
		2.2	Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work.
		2.3	Design criteria are determined from relevant Australian standards and proposed method of installation.
		2.4	Stormwater catchment and flow requirements are identified.
		2.5	Stormwater pipe size is determined to conform to regulatory authorities' main or street kerb and relevant Australian standards.

		2.6	Stormwater retention pit size, silt and flotation arrestor pit size, rainwater tank size and stormwater overflow discharge locations are determined to suit job requirements.
		2.7	System type is selected to suit collection and disposal requirements.
		2.8	***Sustainability principles and concepts*** are observed when preparing for and undertaking work process.
3	Design system layout.	3.1	Layout of stormwater drainage system is planned according to plans, specifications, relevant Australian standards and workplace procedures.
		3.2	Stormwater disposal system is specified according to job requirements.
		3.3	***Materials*** required are specified and optimised from proposed design according to relevant Australian standards.
		3.4	Plans are recorded according to ***statutory and regulatory authorities'*** and workplace requirements.
4	Restore work area.	4.1	Work area is restored according to workplace procedures.
		4.2	Tools and equipment used in the process are refurbished and left according to workplace procedures.
		4.3	Information is accessed and documentation, including work backup, 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
  - identify requirements, including system 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:
  - complete workplace documentation
  - read and interpret:
    - documentation from a variety of sources
    - plans, specifications and drawings
    - regulations and relevant Australian standards
  - record written plans and complete other relevant workplace documentation, including work backups
- numeracy skills to apply measurements and calculations
- planning and organising skills to:
  - organise 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
- technical skills to interpret plans and specifications to plan, size and document the layout of a surface and sub-soil stormwater drainage system, incorporating downpipes, pits, tanks and overflow discharge
- technology skills to:
  - access and understand site-specific instructions in a variety of media
  - use mobile communication technology

Required knowledge

- Australian standards applicable to stormwater drainage systems
- catchment, rainfall intensity and run-off calculations
- characteristics and application of different pipe systems, including their fittings and fixture supports and fixing and joining techniques
- design concepts and performance measures for stormwater and sub-soil drainage systems
- determining levels
- job safety analysis (JSA) and safe work method statements (SWMS)
- principles of water flow and stormwater and sub-soil drainage
- process of planning, sizing and documenting the layout of stormwater and sub-soil drainage systems using relevant sources of information
- relevant statutory requirements related to planning, sizing and documenting stormwater and sub-soil drainage systems
- SI system of measurements
- stormwater installation techniques
- use of computers and relevant computer-aided design (CAD) software
- water tank installation
- workplace and equipment safety requirements

Evidence Guide

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, Australian standards and specifications to planning, sizing and documenting the layout of a stormwater drainage system
- applying safety requirements throughout the work sequence, including electrical safety requirements and the use of personal protective clothing and equipment
- given the development plans and specification, designing, sizing and documenting the layout details of a surface and sub-soil stormwater drainage system for a residential unit development comprising at least five two-storey (Class 1) units; and a commercial (Class 6) building, which includes drainage to the legal point of discharge to the external stormwater drainage network, ensuring:
  - application of sustainability principles and concepts
  - correct identification of plan details
  - correct selection and use of appropriate processes, tools and equipment
  - completion of all work to specification
  - compliance with regulations, relevant Australian 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
- hazard control
- hazardous materials and substances
- personal protective clothing and equipment prescribed under legislation, regulations and workplace policies and practices
- safe operating procedures, including recognising and preventing hazards associated with:
  - electricity
  - other machines
  - surrounding structure and facilities
  - trip hazards
  - underground services
  - use of tools and equipment
  - work site visitors and the public
  - working at heights
  - working in confined spaces

- working in proximity to others
- use of firefighting equipment
- use of first aid equipment
- workplace environment and safety.

Environmental requirements cover water quality management and may include:

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

Stormwater drainage systems will:

- be gravity, pumped and displacement operated
- terminate at point of connection with external stormwater drainage network, including:
  - disposal pit
  - easement
  - gutter
  - on-site storage tank
  - stormwater drain
  - sub-soil disposal system.

Tools and equipment may include:

- CAD software
- drawing instruments
- ladders
- laser measuring devices
- measuring equipment.

Information relating to stormwater disposal plans may include:

- authority mains or kerb
- charts and hand drawings
- instructions issued by authorised organisational or external personnel
- job drawings
- manufacturer specifications and instructions
- material safety data sheets (MSDS)
- maximum discharge rates allowed
- memos
- plans and sketches
- organisation work specifications and requirements
- possible locations of stormwater components
- regulatory and legislative requirements, particularly those pertaining to:

- National Construction Code
- WHS and environmental requirements
- plumbing regulations

- relevant Australian standards, including AS/NZS3500 National plumbing and drainage: Part 3 Stormwater drainage
- safe work procedures relating to planning, sizing and documenting the layout of stormwater drainage systems
- signage
- site relative levels
- stormwater flow rates
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.

Sustainability principles and concepts:

- cover the social, economic and environmental use of resources to meet current and future needs
- may include:
  - correctly handling hazardous materials
  - disposing of waste material to ensure minimal environmental impact
  - harvesting rainwater
  - incorporating efficient use of material into the design, including recycling material
  - preventing environmental contamination
  - using efficient design principles throughout to minimal environmental impact
  - using energy and water efficiently.

Materials may include:

- drafting and drawing materials
- relevant plans and specifications.

Statutory and regulatory authorities include:

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

Unit Sector(s)

Competency field Drainage

Unit sector Plumbing and services

Custom Content Section

Not applicable.