

Unit of Competency CPCPPS5025

Design grey water re-use systems

Application

This unit specifies the skills and knowledge required to design grey water re-use systems. The unit addresses the collection, treatment, diversion and storage options for the design of grey water re-use systems for wide span and high-rise mixed development building projects.

The role may involve interaction with architects, builders, suppliers, clients and relevant planning authorities and requires a sound understanding of applicable legislation, standards and codes.

The requirements of this unit are typically carried out by experienced people such as hydraulic design consultants or design engineers.

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

Prerequisite Unit

Nil.

Elements and Performance Criteria

1. Evaluate design parameters.	<ul style="list-style-type: none">1.1 Establish scope of work for design of grey water re-use systems for wide span and high-rise building projects.1.2 Establish performance requirements considering the safety of system users or building occupants.1.3 Determine design requirements from relevant Australian Standards, codes, plans, specifications and client brief.1.4 Identify potential household or community health and environmental risks and take measures to protect public health that impact the design parameters.1.5 Apply sustainability principles and concepts as part of the design process.1.6 Conduct additional research to outline design parameters.1.7 Interpret manufacturer requirements and trade and technical manuals for grey water re-use systems1.8 Conduct cost-benefit analysis for implementing the proposed design.
2. Plan and detail system components.	<ul style="list-style-type: none">2.1 Detail primary, secondary and advanced secondary treatment and tertiary systems.2.2 Plan layout of pipework systems including type and location of fittings, valves, controls and other system components.2.3 Design and detail changes to building drainage system and identify inspection requirements.2.4 Evaluate and detail grey water land application, disposal, diversion, storage and wet weather storage options to identify problems and plan solutions.2.5 Plan and detail stored and pressurised grey water systems for irrigation, sanitary flushing and other approved uses.2.6 Plan and detail storage tanks and approved disposal options.2.7 Calculate pipe size and pump duty and size and detail pumpwell, pump and pump control requirements.

	2.8 Evaluate approved materials and jointing methods for grey water re-use systems, design pipe supports and specify installation requirements.
3. Design and size systems.	3.1 Design grey water re-use systems for residential, commercial and industrial applications which include water treatment and backflow protection of drinking and non-drinking water supply systems. 3.2 Design grey water re-use systems to ensure that the systems can be properly and safely maintained. 3.3 Design and size grey water re-use systems using relevant computer software packages.
4. Prepare documentation.	4.1 Prepare client brief of the proposed design. 4.2 Prepare plans and specifications for grey water re-use systems. 4.3 Prepare testing and commissioning schedule. 4.4 Produce operation and maintenance manual including information on how to properly and safely maintain the system.

Foundation skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Supersedes and is equivalent to CPCPPS5025A Design grey water re-use systems.

Links

Companion Volume Implementation Guide:

<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad>

Assessment Requirements for CPCPPS5025 Design grey water re-use systems

Performance Evidence

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

- designing, sizing and documenting the layout details of a greywater re-use system for a high-rise mixed development building and a wide span project, including:
 - a specification for both
 - planning and detailing systems components, including:
 - storage tanks
 - system overflow
 - treatment systems
 - piping systems
 - plumbing systems
 - usage systems
 - designing and sizing a grey water re-use system.

Knowledge Evidence

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

- approved installation methods
- hazards associated with devices and systems used in the hydraulic sector
- nature of materials and effect of their performance in a variety of conditions
- organisational quality procedures and processes
- principles of technology in the design of grey water re-use systems for residential, commercial and industrial applications to include water treatment and backflow protection of drinking and non-drinking water supply systems
- terminology and definitions used in hydraulic design
- work drawings and specifications
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards
- scope of work:
 - interpretation of plans and specifications
 - sizing and documenting layout of grey water re-use systems for residential, commercial and industrial applications to include water treatment and backflow protection of drinking and non-drinking water supply systems
- design requirement:
 - architectural plans
 - building specifications
 - owner requirements

- o pipework identification
 - o sizing of pipework
 - o backflow protection of drinking and non-drinking water supply systems
 - o water treatment
 - o specialist water use applications
- health risks:
 - o abdominal pain
 - o acute enteritis
 - o bacillary dysentery
 - o chest pain
 - o cholera
 - o common colds
 - o coughing
 - o diarrhoea
 - o digestive and nutritional disturbances
 - o dysentery
 - o fever
 - o gastroenteritis
 - o giardiasis
 - o helminthes, including flukes and worms
 - o hepatitis
 - o hookworm disease
 - o infectious hepatitis
 - o meningitis
 - o muscle aches
 - o neurological symptoms, including nervousness and insomnia
 - o poliomyelitis
 - o respiratory infections, such as pneumonia
 - o restlessness
 - o salmonellosis (food poisoning)
 - o taeniasis
 - o toxoplasmosis
 - o typhoid fever
 - o vomiting
 - o weight loss
- environmental risks:
 - o algal blooms
 - o excess nutrient loads
 - o fish kills
 - o oxygen depletion
- measures to protect public health:
 - o auditing
 - o contact avoidance

- o contact minimisation
 - o disinfection and sterilisation
 - o education
 - o legislation
 - o licensing
 - o maintenance
 - o separation barriers
 - o set back distances
 - o timing discharges
 - o wet weather storage
- cost-benefit analysis comparing:
 - o the range of suitable materials and system choices available to enable cost-effective choices to be made without compromising integrity of project
 - o water savings and environmental benefits against initial and ongoing maintenance costs
- national water programs, statutory and regulatory requirements, relevant Australian Standards, and codes:
 - o AS/NZS 1546 On-site domestic wastewater treatment units
 - o AS/NZS 1547 On-site domestic wastewater management
 - o AS/NZS 3500 Plumbing and drainage set
 - o AS 2200 Design charts for water supply and sewerage
 - o National Construction Code (NCC)
 - o Commonwealth, state or territory government policies, including health departments
- manufacturer requirements:
 - o material specifications
 - o grey water treatment systems
 - o pump installation
 - o pipe sizing
 - o storage systems
 - o technical and trade manuals
- information gathered during desktop to support design purposes:
 - o architectural and building plans
 - o developer plans
 - o manufacturer data
 - o building applications
 - o brochures
 - o forms
 - o policies
 - o reports
- performance requirements including compliance limits for:
 - o bacteria levels
 - o chlorine levels

- o nutrients
 - o pH
 - o phosphates
- performance requirements established using relevant Australian Standards, codes and local authority plans:
 - o cover
 - o discharge
 - o flow conditions
 - o pipe grades
- layout of pipework systems:
 - o drainage systems
 - o elevated pipework systems
 - o gravity systems
 - o pumped and rising mains
 - o requirements for irrigation systems
 - o requirements for flushing water systems
- stack systems:
 - o fully vented
 - o fully vented modified
 - o single stack
 - o single stack modified
 - o waste stack
 - o two-pipe system
 - o reduced velocity aerator system
- layout of pipe work system design:
 - o designing pipework systems to not unduly affect building integrity and aesthetic appeal
 - o location of pipework (fire rating of enclosure)
 - o demonstrating principles of economy, serviceability, durability and fit for use
- fittings, valves and controls:
 - o backflow prevention devices
 - o irrigation control systems
 - o isolating valves
 - o level indicators
 - o pump controls
- land application options:
 - o surface irrigation
 - o subsurface irrigation
 - o spray irrigation
- storage tanks:
 - o connections
 - o containment
 - o location

- o material
 - o overflow provision
 - o pumps
 - o sizing
 - o support
 - o switches
 - o valves
 - o vermin control
- pipe size and pump duty calculations:
 - o calculating pipe sizing
 - o calculating pressure and flow requirements
 - o determining flow and fixture loadings
 - o interpreting design charts and tables
- pump well, pump and pump control requirements:
 - o automatic controls
 - o capacity
 - o corrosion-resistant materials
 - o detailing
 - o high and low-level water controls and alarms
 - o inlet and outlet design requirements
 - o installation and mounting requirements
 - o macerator requirements
 - o pump sizing
 - o pump well sizing
 - o selection of pump type
 - o valve requirements
 - o warning system
- materials:
 - o copper (Cu)
 - o polypropylene (PP)
 - o polybutylene (PB)
 - o polyethylene (PE)
 - o unplasticised polyvinyl chloride (uPVC)
 - o other approved material
- jointing methods:
 - o brazing
 - o compression joints
 - o electrofusion welding
 - o mechanical joints
 - o solvent cement
 - o threading
 - o other approved jointing methods
- pipe supports:

- o anchors
 - o bedding
 - o bracket spacing
 - o concrete support
 - o corrosion protection
 - o manufacturer-recommended specific fixings
 - o material requirements
 - o provision for expansion
 - o saddles
- installation requirements:
 - o pipe protection such as:
 - cover
 - corrosion
 - impact
 - fire rating
 - o level of workmanship
 - o manufacturer-recommended specific fixings
 - o pipe support
 - o provision for expansion
 - o serviceability and access
- methods for applying sustainability principles and concepts:
 - o selecting appropriate material to ensure minimal environmental impact
 - o efficient use of material
 - o efficient energy usage/capital outlay comparison
 - o local environment consideration
 - o water efficiency
 - o re-use of greywater
 - o consideration of the Green Building Council of Australia rating scheme
- types of plans:
 - o axonometrics
 - o cross-sections
 - o details
 - o elevations
 - o isometrics
 - o sections
 - o schematics produced using:
 - computer generation
 - drawing equipment
- specification:
 - o backflow prevention
 - o flow requirements
 - o jointing
 - o manufacturer requirements

- o materials
 - o residual pressures
 - o work health and safety (WHS)
 - o specialised components
 - o storage
 - o support
 - o testing
 - o valve selection
 - o water treatment
 - o workmanship
- testing for:
 - o air pressure
 - o backflow protection
 - o defect inspection
 - o drainage inspection
 - o hydrostatic
 - o performance:
 - flow
 - pressure
 - o water quality
 - o quality assurance (QA) audit
- commissioning schedule information:
 - o balancing disposal system
 - o flow and pressure adjustments
 - o leak check
 - o pump settings
 - o pressure test
 - o safety requirements
 - o system certification
 - o system flushing
 - o system defects
 - o system functions as per design
 - o system purge
 - o valve operation
 - o ventilation
 - o vermin control
- operation and maintenance manual information:
 - o as installed drawings
 - o certification documentation
 - o land application compliance checks
 - o maintenance schedules
 - o manufacturer brochures
 - o ongoing maintenance requirements

- o pump maintenance
- o regular inspections
- o results of commissioning test
- o safety management system
- o surface ponding checks
- o system detail, setting and operations
- o valve function
- o system operational parameter adjustments and checks:
 - chlorine levels
 - dissolved oxygen
 - nitrates
 - pH
 - phosphates
 - suspended solids
 - water quality.

Assessment Conditions

Assessors must satisfy the requirements for assessors listed in the Standards for Registered Training Organisations.

This unit must be assessed in the workplace or a close simulation using realistic workplace conditions, materials, activities, responsibilities, procedures, safety requirements and environmental considerations.

Links

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