



Australian Government

Department of Education, Employment and Workplace Relations

AHCWAT501A Design water treatment systems

Release: 1

AHCWAT501A Design water treatment systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers the process of identifying design requirements, determining specifications for storage and treatment systems, and determining capital and operating expense budgets for the system designed and defines the standard required to: identify design requirements; determine specifications for suitable pumping and power systems; design treatment systems; determine capital and operating expense budgets for the system designed.
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Application of the Unit

Application of the unit	This unit applies to water managers and involves a technical and self-directed role in developing and integrating resources and systems and covers the process of identifying design requirements, determining specifications for storage and treatment systems, and determining capital and operating expense budgets for the system designed.
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
1. Determine design requirements	1.1. Quality of water to be treated and level of treatment is determined. 1.2. Construction specifications define the work required to treat water for the enterprise in accordance with environmental and Occupational Health and Safety (OHS) requirements. 1.3. Environmentally sensitive areas are identified and protected according to local, State and National legislation. 1.4. Design calculations and decisions are documented to enterprise requirements.
2. Define pumping and power systems	2.1. Pumps are selected to treat water efficiently and effectively as required, to enable supply at the flow and the pressure required to operate the distribution system. 2.2. The pump motor combinations are efficient and the pumps are reliable, functional, serviceable and flexible for the intended application. 2.3. Energy requirements are determined and layout of electricity lines are determined and checked with local authority. 2.4. The relationship between capital and operational costs are optimised including a comparison of energy sources. 2.5. Structures, valves and accessories are selected and integrated into a functional system that can be monitored and maintained according to enterprise guidelines. 2.6. Performance indicators, design calculations and decisions are documented according to enterprise guidelines. 2.7. Construction specifications define the work required to make a suitable pumping and power system available to enterprise. 2.8. Power supply design specification is checked with power authorities
3. Design an water treatment system	3.1. Treatment systems are evaluated and designed with respect to a range of key variables. 3.2. Pipes, valves and fittings are sized according to design system specifications so that capital cost is balanced against operation costs over the anticipated system life.

ELEMENT	PERFORMANCE CRITERIA
	3.3. Flows, water levels and pressures are calculated and documented to be within the acceptable tolerances for optimum performance. 3.4. Flows, water levels and pressures are achievable by the pumps operating at optimum efficiency and according to enterprise standards. 3.5. Mechanisms for controlling and adjusting pressure are included.
4. Determine capital expense budget	4.1. Design calculations and decisions are documented and relevant information is communicated clearly through plans, specifications and manuals. 4.2. Design output is checked by a competent designer against enterprise objectives. 4.3. Materials requirements are determined and documented from plans and specifications. 4.4. Labour requirements are estimated based upon documented work schedule, with reasonable allowance for variances in work schedules. 4.5. Costing attributed to each component is based upon quoted information from suppliers, or sound analysis of individual elements.
5. Determine operating expense budget	5.1. Operating expense budget indicates all expenses applicable to the completed irrigation system.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- collect and analyse information
- identify adverse environmental impacts of water treatment activities and appropriate remedial action
- identify design requirements
- develop specifications
- develop and implement relevant enterprise OHS and environmental procedures
- use literacy skills to fulfil job roles as required by the organisation. The level of skill may range from reading and understanding documentation to completion of written reports

REQUIRED SKILLS AND KNOWLEDGE

- use oral communication skills/language competence to fulfil the job role as specified by the organisation including questioning, active listening, asking for clarification, negotiating solutions and responding to a range of views
- use numeracy skills to estimate, calculate and record complex workplace measures
- use interpersonal skills to work with others and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.

Required knowledge

- design processes
- developments in water treatment technology
- automatic control and monitoring systems
- waste management and environmental issues
- budgeting, contractual development and obligations
- environmental protection agency regulations
- environmental impacts of water treatment
- cost/benefit analysis
- enterprise policies and procedures.

Evidence Guide

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	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy holistically all of the requirements of the performance criteria and required skills and knowledge and include achievement of the following: • identify design requirements • determine specifications for suitable pumping and power systems • design treatment systems • determine capital and operating expense budgets for the system designed.
Context of and specific resources for assessment	Competency requires the application of work practices under work conditions. Selection and use of resources for some worksites may differ due to the regional or enterprise circumstances.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole.	
Reuse systems may include:	• disinfestation and filtering equipment
Drainage systems may include:	• surface drains • culverts • mole drains • sand slit • sub-surface traps • pit and trap systems • dune and swale systems • reed beds • water-recycling pumps and baffles.

Unit Sector(s)

Unit sector	Water
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Co-requisite units

Co-requisite units		

Competency field

Competency field	
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