

### Modification history

Release	Comments
Release 1	This version released with AHC Agriculture, Horticulture and Conservation and Land Management Training Package Version 5.0.

AHCWAT5XX	Design water treatment systems
<b>Application</b>	<p>This unit of competency describes the skills and knowledge required to identify design requirements, determine specifications, define pumping and power system requirements, determine capital expense and operating expense budgets, and design water treatment systems.</p> <p>The unit applies to individuals who apply specialised skills and knowledge to the design of water treatment systems, and take personal responsibility and exercise autonomy in undertaking complex work. They analyse and synthesise information and analyse, design and communicate solutions to sometimes complex problems.</p> <p>All work is carried out to comply with workplace procedures, health and safety in the workplace requirements, legislative and regulatory requirements, sustainability and biosecurity practices.</p> <p>No licensing, legislative or certification requirements apply to this unit at the time of publication.</p>
<b>Prerequisite Unit</b>	Nil
<b>Unit Sector</b>	Water (WAT)

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine design requirements	1.1 Determine the quality of water to be treated and level of treatment required 1.2 Develop construction specifications that define the work required to treat water 1.3 Identify and protect environmentally sensitive areas according to local, state and federal legislation and regulations 1.4 Document design calculations and decisions
2. Define pumping and power systems	2.1 Identify and select pumps that can treat water efficiently and at the flow and the pressure required to operate the distribution system 2.2 Select pump and pump motor combinations that are efficient, reliable, functional, serviceable and flexible for the intended application 2.3 Determine energy requirements and layout of electricity lines and check with local authorities 2.4 Optimise the relationship between capital and operational costs including a comparison of energy sources 2.5 Select structures, valves and accessories and integrate into a functional system that can be monitored and maintained 2.6 Document performance indicators, design calculations and decisions 2.7 Design construction specifications that define the work required to make a suitable pumping and power system

<b>Elements</b>	<b>Performance Criteria</b>
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
3. Design an water treatment system	3.1 Evaluate treatment systems and design with respect to a range of key variables 3.2 Size pipes, valves and fittings according to design system specifications so that capital cost is balanced against operation costs over the anticipated system life 3.3 Calculate and document flows, water levels and pressures so that they are within the acceptable tolerances for optimum performance 3.4 Confirm that flows, water levels and pressures are achievable by the pumps operating at optimum efficiency 3.5 Include mechanisms for controlling and adjusting pressure
4. Determine capital expense budget	4.1 Document design calculations and decisions and communicate relevant information through plans, specifications and manuals 4.2 Determine and document materials required from plans and specifications 4.3 Estimate labour requirements based upon documented work schedule with reasonable allowance for variances in work schedules 4.4 Base costing attributed to each component on quoted information from suppliers, or sound analysis of individual elements 4.5 Document capital expense budget 4.6 Confirm design and capital expense budget output with an appropriately experienced and qualified person
5. Determine operating expense budget	5.1 Calculate an operating expense budget that includes all expenses applicable to the completed system 5.2 Document operating expense budget

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<b>Foundation Skills</b>	
<i>This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.</i>	
<b>Skill</b>	<b>Description</b>
Reading	<ul style="list-style-type: none"> <li>Identify and interpret information regarding design requirements for water treatment system, including environmentally sensitive areas</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Develop and document construction specifications and design plans specifications and manuals</li> </ul>
Oral communication	<ul style="list-style-type: none"> <li>Initiate discussions with local authorities, using clear language to communicate energy requirements and check layout of electricity lines, and confirm power supply design specification with power authorities</li> <li>Use clear communications with appropriately experienced and qualified person to discuss design output and capital expense budget outputs</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>Use site investigations data to determine the most cost-effective water treatment system</li> <li>Calculate water flows, levels and pressures</li> <li>Calculate and document capital and operating expense budgets</li> </ul>

<b>Unit Mapping Information</b>			
<b>Code and title current version</b>	<b>Code and title previous version</b>	<b>Comments</b>	<b>Equivalence status</b>
AHCWAT5XX Design water treatment systems Release 1	AHCWAT501 Design water treatment systems Release 1	Minor changes to application Major changes to performance criteria Foundation skills added Assessment requirements updated	No equivalent unit

<b>Links</b>
Companion Volumes, including Implementation Guides, are available at VETNet: <a href="https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72">https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72</a>

<b>TITLE</b>	<b>Assessment requirements for AHCWAT5XX Design water treatment systems</b>
<b>Performance Evidence</b>	
<p>An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit. There must be evidence that the individual has designed a water treatment system on at least one occasion and has:</p> <ul style="list-style-type: none"> <li>• collected and analysed information for the design of a water treatment system</li> <li>• compared costings</li> <li>• developed water treatment system specifications</li> <li>• documented outcomes</li> <li>• identified system design requirements</li> <li>• identified adverse environmental impacts of water treatment activities and taken appropriate remedial action</li> <li>• developed budgets.</li> </ul>	
<b>Knowledge Evidence</b>	
<p>An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:</p> <ul style="list-style-type: none"> <li>• principles and practices of water treatment system design, including: <ul style="list-style-type: none"> <li>• automatic control and monitoring systems</li> <li>• budgeting, contractual development and obligations</li> <li>• cost/benefit analysis</li> <li>• design processes</li> <li>• developments in water treatment technology</li> <li>• environmental impacts of water treatment</li> <li>• environmental protection agency regulations</li> <li>• waste management and environmental issues</li> </ul> </li> <li>• workplace health and safety and environmental protection legislation and regulations, codes of practice and workplace policies and procedures relevant to water treatment system design.</li> </ul>	
<b>Assessment Conditions</b>	
<p>Assessment of skills must take place under the following conditions:</p> <ul style="list-style-type: none"> <li>• physical conditions: <ul style="list-style-type: none"> <li>• a workplace setting or an environment that accurately represents workplace conditions</li> </ul> </li> <li>• resources, equipment and materials: <ul style="list-style-type: none"> <li>• water treatment system site</li> <li>• site information and data relevant to water treatment system design</li> </ul> </li> <li>• specifications: <ul style="list-style-type: none"> <li>• local, state and federal workplace health and safety and environmental protection legislation, regulations, codes of practice and workplace requirements applicable to water treatment system design</li> </ul> </li> <li>• relationships: <ul style="list-style-type: none"> <li>• local authorities, appropriately experienced and qualified person</li> </ul> </li> <li>• timeframes: <ul style="list-style-type: none"> <li>• according to job requirements.</li> </ul> </li> </ul> <p>Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.</p>	
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