



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **SFIAQUA504C Plan environmentally sustainable aquacultural practices**

**Release: 1**

## SFIAQUA504C Plan environmentally sustainable aquacultural practices

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit of competency involves planning and implementing strategies and systems for sustainable environmental and socioeconomic aquacultural or ornamental practices in the workplace.</p> <p>Licensing, legislative, regulatory or certification requirements may apply to this unit. Therefore it will be necessary to check with the relevant state or territory regulators for current licensing, legislative or regulatory requirements before undertaking this unit.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>All enterprise or workplace procedures and activities are carried out according to <i>relevant government regulations, licensing and other compliance requirements</i>, including <i>occupational health and safety (OHS) guidelines, food safety and hygiene regulations and procedures</i>, and <i>ecologically sustainable development (ESD) principles</i>.</p> <p>Equipment operation, maintenance, repairs and calibrations are undertaken in a safe manner that conforms to manufacturer instructions. Appropriate <i>personal protective equipment (PPE)</i> is selected, checked, used and maintained.</p>
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### Licensing/Regulatory Information

Refer to Unit Descriptor

## Pre-Requisites

<b>Prerequisite units</b>		

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## 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.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. Prepare and implement environmental strategies</p>	<p>1.1. Environmental and aesthetic values are assessed for enterprise location, <i>cultured or held stock</i>, construction and operation.</p> <p>1.2. Financial and other resources are identified and allocated for environmental management within the enterprise.</p> <p>1.3. Environmental management strategies that ensure compliance with legislative requirements are incorporated into risk mitigation procedures.</p> <p>1.4. Strategies are assessed for their effectiveness in reducing environmental impacts from the enterprise, including ongoing reduction of waste, adverse impacts with <i>wildlife</i> and <i>other resource users/uses</i>, as well as energy and water efficiency.</p> <p>1.5. Newly available technologies are incorporated into environmental management strategies if found practicable and feasible.</p> <p>1.6. Professional assistance is obtained appropriate to the complexity of the task and financial risk involved and <i>appropriate bodies consulted</i>.</p> <p>1.7. Any community concerns are identified and addressed in the development of strategies.</p> <p>1.8. Environmental management plan is designed based on risk identification and mitigation procedures.</p> <p>1.9. Environmental management plan reflects the requirements of the business plan, production plan and other <i>planning parameters</i> and is achievable with the enterprise's resources and budget.</p> <p>1.10. Water quality and ongoing environmental monitoring plans are developed and documented, and areas of responsibility communicated to staff.</p> <p>1.11. Mechanisation or automation of process or activity, including the use of specialised contract services, is researched and introduced.</p>
<p>2. Design a waste management system</p>	<p>2.1. Wastes and outputs are identified for inclusion in the waste water management system.</p> <p>2.2. <i>Waste water management system</i> ensures collection, treatment, storage and re-use of stock and other facility wastes in the most <i>efficient</i> manner.</p> <p>2.3. Where appropriate, materials and consumables obtained by the enterprise are from recycled or</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>re-useable materials and obtained in amounts that result in packaging and waste reduction.</p> <p>2.4. Composting, shredding, re-using and recycling are used as and when appropriate.</p> <p>2.5. Waste disposal contractors are identified, terms negotiated and business awarded according to the environmental management plan.</p> <p>2.6. Performance of the contract is monitored and action taken where variance is identified.</p>
3. Conserve energy resources	<p>3.1. Machinery purchase, management and operation procedures reflect efficient use of machinery to reduce fuel usage and <i>emissions or discharges</i>.</p> <p>3.2. Energy used for heating, cooling, lighting and operation of remote appliances is efficient and from <i>alternative sources</i> where appropriate and available.</p> <p>3.3. <i>Design of buildings and structures</i> takes into consideration the use of passive energy for lighting, heating and shelter.</p>
4. Conserve water resources	<p>4.1. Water is managed to optimise its use.</p> <p>4.2. Contamination of water effluent with chemicals or wastes is minimised through sound utilisation strategies.</p> <p>4.3. Settlement ponds, effluent treatment works and waste reduction processes are used appropriately.</p>
5. Minimise adverse interactions with wildlife and other resource users	<p>5.1. Potential interactions with wildlife and other resource users are identified and regularly assessed for level of adverse impacts.</p> <p>5.2. Strategies are developed to mitigate adverse interactions.</p>
6. Undertake an environmental audit	<p>6.1. Environmental audit takes into consideration <i>relevant factors</i>.</p> <p>6.2. Reports are prepared according to enterprise, customer and legal requirements.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

## REQUIRED SKILLS AND KNOWLEDGE

### Required skills

- communicating with work teams and management
- relating to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- consulting with external bodies/agencies, community groups and industry specialists
- conserving energy resources
- managing water use
- minimising waste
- preparing and implementing strategies
- undertaking an environmental audit.

### Literacy skills used for:

- interpreting aquaculture engineering publications
- interpreting technical and regulatory documents
- writing an environmental audit report.

### Numeracy skills used for:

- allocating financial resources
- calculating energy and water efficiency
- assessing financial risk
- applying formulae for design criteria, such as water flows, pump effectiveness, temperature control and oxygen injection.

### Required knowledge

- antibiotic, pesticide and herbicide resistance
- effect of effluent on plants, animals and environment
- energy flows and food webs
- environmental control standards
- land catchment and coastal processes
- legislative requirements, including OHS, HAZCHEM, duty of care and dangerous goods
- noise, dust, odour and light control
- nutrient cycling
- principles of composting and waste management
- principles of integrated and sustainable agriculture and aquaculture systems
- mechanisation or automation of process or activity
- risk identification and reduction
- soil testing processes and procedures and results interpretation

<b>REQUIRED SKILLS AND KNOWLEDGE</b>
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| <ul style="list-style-type: none"><li>• use of specialised contract services.</li></ul> |
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## Evidence Guide

<b>EVIDENCE GUIDE</b>	
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.	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment evidence required to demonstrate competence in this unit</b>	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> <li>develop environmental management strategies and systems that use available resources and meet enterprise procedures and legislative requirements, and to communicate these to staff.</li> </ul> <p>Assessment must confirm knowledge of:</p> <ul style="list-style-type: none"> <li>aquaculture systems</li> <li>effects of chemicals and water quality on aquatic organisms</li> <li>regulations impacting on aquaculture.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment is to be based around an actual aquaculture enterprise or simulated through a detailed case study.</p> <p>Resources may include:</p> <ul style="list-style-type: none"> <li>models and farm hatchery components.</li> </ul>
<b>Method of assessment</b>	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> <li>work-based project</li> <li>work-based scenario or case study</li> <li>written or oral short-answer testing.</li> </ul>
<b>Guidance information for assessment</b>	This unit may be assessed holistically with other units within a qualification.

## Range Statement

<b>RANGE STATEMENT</b>
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. <b>Bold italicised</b>



**RANGE STATEMENT**

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.

***Relevant government regulations, licensing and other compliance requirements*** may include:

- business or workplace operations, policies and practices:
  - commercial law, including fair trading and trade practices
  - consumer law
  - corporate law, including registration, licensing and financial reporting
  - disability policies and practices
  - equal opportunity, anti-discrimination and sexual harassment
  - industrial relations and awards, individual employment contracts and share of catch agreements
  - jurisdictional variations
  - superannuation
  - taxation
  - trade practices
  - warnings and dismissals
  - worker's compensation
- ESD principles, environmental hazard identification, risk assessment and control
- fisheries or aquaculture regulations, permits, licences, quotas, catch restrictions and other compliance requirements, including:
  - Australian Exclusive Economic Zone
  - international treaties and agreements
- food safety, Hazard Analysis Critical Control Point (HACCP), hygiene and temperature control along chain of custody
- imports quarantine and inspection, and importing approved arrangements for Australian Quarantine Inspection Service (AQIS), Australian Customs Service (ACS) and Biosecurity Australia (BA)
- Indigenous native title, land claims and cultural activities, including fishing by traditional methods

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	<ul style="list-style-type: none"> <li>• maritime and occupational diving operations: <ul style="list-style-type: none"> <li>• foreign and Australian legislation applying to quarantine and customs</li> <li>• International Convention for the Safety of Life at Sea (SOLAS)</li> <li>• International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 1978)</li> <li>• Marine Emergency Response Search and Rescue (MERSAR)</li> <li>• National Standards for Commercial Vessels</li> <li>• pollution prevention - International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)</li> <li>• Uniform Shipping Laws (USL) Code</li> <li>• use of vessels, right of way and other marine orders, bunkering and refuelling</li> </ul> </li> <li>• land, buildings and vehicles: <ul style="list-style-type: none"> <li>• buildings and structures design and appearance, constructions and additions</li> <li>• poaching, trespass and theft</li> <li>• road laws for use of motor vehicles, bikes, trucks and other transport equipment</li> <li>• soil and water management</li> <li>• use of chemicals and biological agents</li> <li>• use of firearms and powerheads</li> <li>• use of utilities, including water, natural gas, electricity and sewage</li> <li>• water or land lease, tenure or ownership and use</li> </ul> </li> <li>• OHS hazard identification, risk assessment and control</li> <li>• product quality assurance: <ul style="list-style-type: none"> <li>• correct naming and labelling (e.g. country of origin, Australian Fish Names Standard and eco-labelling)</li> <li>• correct quantities, sizes and other customer requirements</li> <li>• third-party certification (e.g. Australian Grown and ISO 14001:2004 Environmental management systems).</li> </ul> </li> </ul>
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<b>RANGE STATEMENT</b>	
<i>OHS guidelines</i> may include:	<ul style="list-style-type: none"> <li>• appropriate workplace provision of first aid kits and fire extinguishers</li> <li>• clean, uncluttered, hygienic workplace</li> <li>• codes of practice, regulations and/or guidance notes which may apply in a jurisdiction or industry sector</li> <li>• enterprise-specific OHS procedures, policies or standards</li> <li>• hazard and risk assessment of workplace, maintenance activities and control measures</li> <li>• induction or training of staff, contractors and visitors in relevant OHS procedures and/or requirements to allow them to carry out their duties in a safe manner</li> <li>• OHS training register</li> <li>• safe lifting, carrying and handling techniques, including manual handling, and the handling and storage of hazardous substances</li> <li>• safe systems and procedures for outdoor work, including protection from solar radiation, fall protection, confined space entry and the protection of people in the workplace</li> <li>• systems and procedures for the safe maintenance of property, machinery and equipment, including hydraulics and exposed moving parts</li> <li>• the appropriate use, maintenance and storage of PPE.</li> </ul>
<i>Food safety and hygiene regulations and procedures</i> may include:	<ul style="list-style-type: none"> <li>• Australian Shellfish Sanitation program</li> <li>• display, packaging and sale of food, including seafood and aquatic products</li> <li>• equipment design, use, cleaning and maintenance</li> <li>• exporting requirements, including AQIS Export Control (Fish) orders</li> <li>• handling and disposal of condemned or recalled seafood products</li> <li>• HACCP, food safety program, and other risk minimisation and quality assurance systems</li> <li>• location, construction and servicing of seafood premises</li> <li>• people, product and place hygiene and sanitation requirements</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• Primary Products Standard and the Australian Seafood Standard (voluntary)</li> <li>• processing, further processing and preparation of food, including seafood and aquatic products</li> <li>• product labelling, tracing and recall</li> <li>• receipt, storage and transportation of food, including seafood and aquatic products</li> <li>• requirements set out in Australian and New Zealand Food Authority (ANZFA) Food Standards Code and state and territory food regulations</li> <li>• temperature and contamination control along chain of custody.</li> </ul>
<i>ESD principles</i> may include:	<ul style="list-style-type: none"> <li>• controlling use and recycling of water, and managing water quality and quantity</li> <li>• increasing use of renewable, recyclable and recoverable resources</li> <li>• managing environmental hazard identification, risk assessment and control</li> <li>• managing imported products quarantine and inspection, facility biosecurity, translocation of livestock and genetic material, and health certification</li> <li>• managing stock health and welfare, especially for handling, holding, transport and slaughter</li> <li>• managing sustainable fisheries or broodstock/seedstock collection requirements, such as size limits, quotas, season restrictions, population dynamics, fishing impacts, reducing by-catch, fisheries management strategies and maintaining biodiversity</li> <li>• managing, controlling and treating effluents, chemical residues, contaminants, wastes and pollution</li> <li>• minimising noise, dust, light or odour emissions</li> <li>• planning environmental and resource efficiency improvements</li> <li>• preventing genetically modified organisms, live cultured or held organisms from escaping into environment</li> <li>• protecting native and protected flora and fauna, marine or land parks or areas, adhering to the Convention on International Trade in</li> </ul>

<b>RANGE STATEMENT</b>	
	<p>Endangered Species of Wild Flora and Fauna (CITES), the Ramsar Convention, World Heritage and other international treaties for which Australia is a signatory</p> <ul style="list-style-type: none"> <li>• reducing emissions of greenhouse gases</li> <li>• reducing use of non-renewable resources</li> <li>• reducing disturbances to soils, erosion and surface water flows from machinery use and other activities</li> <li>• reducing energy use and introducing alternative energy sources.</li> </ul>
<b><i>PPE</i></b> may include:	<ul style="list-style-type: none"> <li>• buoyancy vest or personal floatation device (PFD)</li> <li>• gloves, mitts or gauntlets, and protective hand and arm covering</li> <li>• hard hat or protective head covering</li> <li>• hearing protection (e.g. ear plugs and ear muffs)</li> <li>• insulated protective clothing for freezers or chillers and refrigeration units</li> <li>• non-slip and waterproof boots (gumboots) or other safety footwear</li> <li>• personal locator beacon or Emergency Position Indicating Radio Beacon (EPIRB)</li> <li>• protective eyewear, glasses and face mask</li> <li>• protective hair, beard and boot covers</li> <li>• protective outdoor clothing for tropical conditions</li> <li>• respirator or face mask</li> <li>• safety harness</li> <li>• sun protection (e.g. sun hat, sunscreen and sunglasses)</li> <li>• uniforms, overalls or protective clothing (e.g. mesh and waterproof aprons)</li> <li>• waterproof clothing (e.g. wet weather gear and waders).</li> </ul>
<b><i>Cultured or held stock</i></b> may include:	<ul style="list-style-type: none"> <li>• adults, broodstock (ready to breed), seedstock or stockers, eggs and sperm, fertilised eggs, larvae, post-larvae, seed, spat, hatchlings, yearlings, juveniles, fry, fingerlings, yearlings, smolt, sporophytes, seedlings and tissue cultures</li> <li>• finfish, crustaceans, molluscs, aquatic reptiles,</li> </ul>

<b>RANGE STATEMENT</b>	
	<p>amphibians, polychaete and oligochaete worms, plankton, micro-algae, seaweed, aquatic plants, live rock, sponges and other aquatic invertebrates</p> <ul style="list-style-type: none"> <li>• for human consumption (seafood), stockers for other farms, stockers for conservation or recreational fishing, display or companion animals (ornamentals), and other products, including pearls, skins, shells, eggs, chemicals and pigments</li> <li>• wild caught, hatchery or nursery reared.</li> </ul>
<b>Wildlife</b> may include:	<ul style="list-style-type: none"> <li>• introduced species</li> <li>• native fauna</li> <li>• native flora</li> <li>• protected areas</li> <li>• protected species.</li> </ul>
<b>Other resource users/uses</b> may include:	<ul style="list-style-type: none"> <li>• commercial and recreational fishing</li> <li>• commercial, Indigenous and recreational shipping</li> <li>• divers, swimmers, water skiers and wind surfers</li> <li>• farmers, agriculturists, foresters and industrialists</li> <li>• heritage areas, national parks and marine parks</li> <li>• Indigenous and other community groups</li> <li>• naturalists, bird watchers and botanists</li> <li>• owners of neighbouring land or housing.</li> </ul>
<b>Appropriate bodies consulted</b> may include:	<ul style="list-style-type: none"> <li>• Coastcare and Landcare and catchment management groups</li> <li>• consultants and specialists</li> <li>• councils</li> <li>• governments</li> <li>• non-government organisations and other stakeholder groups</li> <li>• provision for the evaluation of environmental assets for insurance purposes</li> <li>• statutory bodies.</li> </ul>
<b>Planning parameters</b> may include:	<ul style="list-style-type: none"> <li>• access to: <ul style="list-style-type: none"> <li>• land</li> <li>• power</li> <li>• water</li> </ul> </li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• other inputs or materials</li> <li>• area available for waste distribution/storage/treatment capacity</li> <li>• availability of water, ground water levels, water re-use or recycling systems</li> <li>• chemical use</li> <li>• climate</li> <li>• culture or holding system type</li> <li>• disease status within the stock</li> <li>• exotic stock regulations/notifiable diseases</li> <li>• financial resources</li> <li>• future increases in stock numbers and individual sizes (biomass)</li> <li>• future increases in supplementary feeding</li> <li>• intensity of operations</li> <li>• labour resources</li> <li>• minimise escapes</li> <li>• minimise genetic interaction</li> <li>• proximity to neighbours</li> <li>• quarantine requirements</li> <li>• siting of culture or holding structures in relation to areas where wastes will be collected</li> <li>• soil and water type</li> <li>• stock flow alterations</li> <li>• stock species, type and numbers</li> <li>• stock transfer/movement</li> <li>• topography</li> <li>• volume of waste currently produced, future trends, relevant legislation and regulations relating to waste management</li> <li>• whole farm planning.</li> </ul>
<p><b><i>Waste water management systems</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• composting and worm farms</li> <li>• filter feeding species and aquatic plants or seaweeds</li> <li>• integrated aquaculture or agriculture, hydroponics or aquaponics</li> <li>• spreading irrigation to paddocks, crops or trees</li> <li>• recycling</li> <li>• self-composting toilets and septic tanks</li> <li>• settlement ponds or lagoons and constructed wetlands.</li> </ul>

<b>RANGE STATEMENT</b>	
<b><i>Efficient</i></b> may include:	<ul style="list-style-type: none"> <li>• cost-effectiveness</li> <li>• effective conservation of waste into a useable forms</li> <li>• efficiency in overall design and operation</li> <li>• environmental friendliness</li> <li>• labour relations</li> <li>• maximising benefit from recycled wastes</li> <li>• meeting the legal requirements</li> <li>• resource utilisation efficiency, recycling or reuse.</li> </ul>
<b><i>Emissions or discharges</i></b> may include:	<ul style="list-style-type: none"> <li>• gas</li> <li>• light</li> <li>• liquids and solids</li> <li>• noise</li> <li>• odour and fumes</li> <li>• particulates and dust</li> <li>• smoke</li> <li>• vapour.</li> </ul>
<b><i>Alternative energy sources</i></b> may include:	<ul style="list-style-type: none"> <li>• biogas</li> <li>• solar generators, tubing and panels</li> <li>• water generators (hydro-electric)</li> <li>• wind generators.</li> </ul>
<b><i>Design of buildings and structures</i></b> may include:	<ul style="list-style-type: none"> <li>• building materials</li> <li>• cavity sizes</li> <li>• location and construction of windows</li> <li>• orientation of building or structure</li> <li>• planting surrounding the building or structure</li> <li>• self-composting toilets</li> <li>• use of colour</li> <li>• waste disposal</li> <li>• windbreaks</li> <li>• workplace services for employees.</li> </ul>
<b><i>Relevant factors</i></b> may include:	<ul style="list-style-type: none"> <li>• topography and characteristics of area, including: <ul style="list-style-type: none"> <li>• ambience</li> <li>• biology</li> <li>• climate</li> <li>• current policies and practices</li> <li>• energy use</li> </ul> </li> </ul>



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	<ul style="list-style-type: none"> <li>• flora and fauna</li> <li>• geology</li> <li>• heritage</li> <li>• hydrology</li> <li>• noise, dust, light and odour control</li> <li>• oceanography</li> <li>• overburden of vegetation</li> <li>• presence of protected species</li> <li>• surrounding human activities</li> <li>• surrounding vegetation and wildlife</li> <li>• water availability and use.</li> </ul>
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**Unit Sector(s)**

<b>Unit sector</b>	Aquaculture operations
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**Co-requisite units**

<b>Co-requisite units</b>	

**Competency field**

<b>Competency field</b>	
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